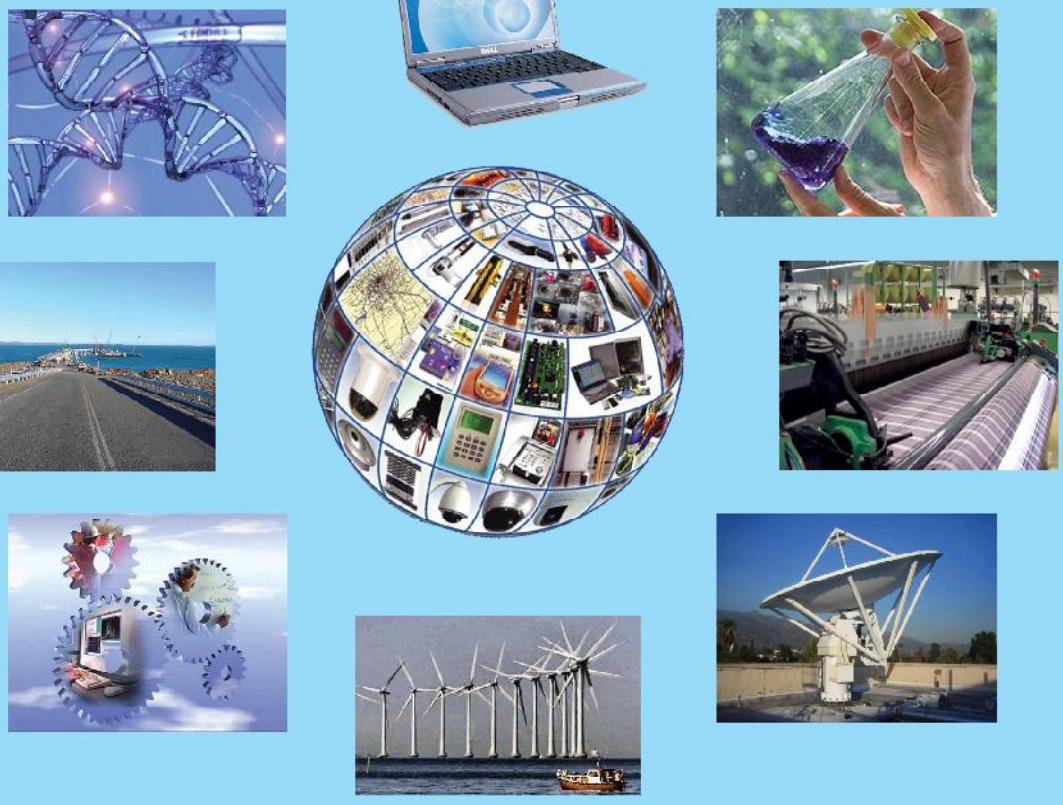
IJEST

ISSN: 0973-6255
Vol. 10 No.2
July - December 2016

Indian Journal of Engineering, Science, and Technology

A Refereed Research Journal



Published by

BANNARI AMMAN INSTITUTE OF TECHNOLOGY

(Autonomous Institution Affiliated to Anna University of Technology, Coimbatore - Approved by AICTE - Accredited by NBA and NAAC with "A" Grade)
Sathyamangalam - 638 401 Erode District Tamil Nadu India
Ph: 04295-226340 - 44 Fax: 04295-226666
www.bitsathy.ac.in E-mail: ijest@bitsathy.ac.in

Indian Journal of Engineering, Science, and Technology

IJEST is a refereed research journal published half-yearly by Bannari Amman Institute of Technology. Responsibility for the contents rests upon the authors and not upon the IJEST. For copying or reprint permission, write to Copyright Department, IJEST, Bannari Amman Institute of Technology, Sathyamanagalam, Erode District - 638 401, Tamil Nadu, India.

Indian Journal of Engineering, Science, and Technology

ISSN: 0973-6255

Volume 10 Number 2 **July - December 2016**

CONTENTS

Excerpt from the Proceeding of National Conference

Distortion Correction Scheme for Multiresolution Camera Images

M.Mohankumar[1], T.Thamaraimanalan[2] and N. Sanjeev[3]
[1&2]Assistant Professor, Sri Eshwar College of Engineering, Coimbatore - 641 202, Tamil Nadu
[3]Technical Manager, Caliber Embedded Technologies, Coimbatore - 641 044, Tamil Nadu
E-mail:mohankumar.m@sece.ac.in,thamaraimanalan.t@sece.ac.in,sanjeev.n@calibertech.net

Abstract

An efficient VLSI architecture implementation for barrel distortion correction in surveillance camera images is presented. The distortion correction model is based on least squares estimation method. To reduce the computing complexity, an odd-order polynomial to approximate the back-mapping expansion polynomial is used. By algebraic transformation, the approximated polynomial becomes a monomial form which can be solved by Horner's algorithm. The proposed VLSI architecture can achieve frequency 218MHz with 1490 logic elements by using 0.18µm technology. Compared with previous techniques, the circuit reduces the hardware cost and the requirement of memory usage.

Keywords: Barrel distortion correction, Horner's algorithm, Least squares estimation, Surveillance

1. INTRODUCTION

Nowadays, surveillance camera is commonly used in public and private places such as government buildings, military bases, car parks, and banks, and so forth. Surveillance camera can capture the entire region of interest with cameras as few as possible if cameras with large field of view are adopted. Surveillance cameras are video cameras used for the purpose of observing an area. It is connected to a recording device or IP network, and may be watched by a guard. Cameras and recording equipment used to be relatively expensive and required human personnel to monitor camera footage, but analysis of footage has been made easier by automated software that organizes digital video footage into a searchable database, and by video analysis software. The amount of footage is also drastically reduced by motion sensors which only record when motion is detected. With cheaper production techniques, surveillance cameras are simple and inexpensive enough to be used in home security systems, and for everyday surveillance.

The distortion correction circuit may be included in end-user camera equipment's, so how to implement it with lower hardware cost is an important issue. To reduce more hardware, algebraic transformation is used to replace all the vector magnitude square by a new variable. It makes the new combined polynomial becomes a monomial form. Therefore, Horner's algorithm [6] is able to efficiently evaluate the results of back-mapping and polar to Cartesian coordinate transformation. This approach not only greatly decreases the calculation complexity of back mapping but also provides a flexible architecture for different designs by time multiplexed technique [7], [8]. To reduce more hardware costs and power consumption, we also implemented a low cost linear interpolation circuit by algebraic manipulation technique. It greatly eliminates the number of multipliers from eight to three. In this paper, a low- cost, low-power, and low memory requirement distortion correction circuit is designed for surveillance or wide-angle camera applications.

2. OVERVIEW OF DISTORTION CORRECTION TECHNIQUE

In this section, least-square estimation method is used for distortion correction technique. Barrel distortion can be corrected by two main tasks: 1) back mapping of all pixels in CIS onto DIS, and 2) calculating the intensity of every pixel in CIS by linear interpolation [7]. The block diagram of the distortion correction procedure is shown in Figure1. First the transformation mapping from rectangular coordinate to polar coordinate for all pixels is done. Then, a back mapping procedure is introduced to decrease the computing complexity and polar to rectangular coordinate steps by eliminating the angle θ and reducing the square root operation for ρ. Finally, a basic algebraic manipulation is used to decrease the arithmetic resource of the linear interpolation.

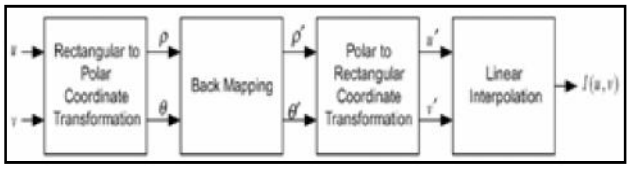


Fig 1. Block diagram for distortion correction procedure

The first step of the proposed distortion correction technique is transforming all pixels in the distorted image space (DIS) onto the corrected image space (CIS) i, e., this step is to convert rectangular to polar coordinate. The distortion center is (u'_c, v'_c) in DIS and the correction center is (u_c, v_c) in CIS. In DIS, (u', v') is the Cartesian coordinate and (ρ, θ) is the polar coordinate. The distance ρ from distortion center (u'_c, v'c) to an image pixel (u', v') and the angle θ between the pixel and distortion center are given by

$$\rho' = \sqrt{(u' - u'_c)^2 + (v' - v'_c)^2} \quad (1)$$

$$\theta' = arc\tan\left(\frac{v' - v'_c}{u' - u'_c}\right) \quad (2)$$

The distance ñ from distortion center (u_c ,v_c) to an image pixel (u, v) and the angle θ between the pixel and distortion center are given by

$$\rho = \sqrt{(u - u_c)^2 + (v - v_c)^2} \quad (3)$$

$$\theta = \arctan\left(\frac{v - v_c}{u - u_c}\right) \quad (4)$$

The second step is back-mapping process which will map the pixel (ρ, θ) in CIS to (ρ,θ) in DIS. The back mapping procedure can be defined by a back mapping expansion polynomial of degree N as
(5)

$$\rho' = \sum_{n-1}^{N} b_n p^n \quad (5)$$

$$\theta' = \theta \quad (6)$$

where b_n is the back mapping coefficient which can be obtained by the least-squares estimation method.

The third step is to perform the polar to rectangular coordinate conversion. The location (u', v') in DIS can be calculated as

$$u' = u'_c + \rho' cos\theta'$$
$$v' = v'_c + \rho' sin\theta' \quad (7)$$

The next step is to perform linear interpolation. Here, the pixel (u', v') location need not be an integer location. Its intensity value can be calculated by linearly interpolating with the intensity values of the four neighboring pixels (u', v') around in DIS.

2.1 Simplified Back-Mapping Procedure

As mentioned above, the odd order polynomial is high-approximation to the back mapping expansion polynomial is used. The back mapping expansion polynomial can be approximated to odd-order polynomial as

$$\rho' = c_0\rho + c_1\rho^3 + c_2\rho^5 + c_3\rho^7 + \cdots. \quad (8)$$

where *c*0, *c*1 , *c*2 , *c*3 . . . are back-mapping coefficients of the odd-order back-mapping polynomial. There are two steps to reduce the computing resources of back-mapping procedure. The first is eliminating the calculation of θ. According to (7), the ¯ and θ' are the same. Thus, the cos ¯ and sin θ can be obtained as

$$\sin\theta = \sin\theta = \frac{v - v_c}{\rho} \quad (9)$$

$$\cos\theta = \cos\theta = \frac{u - u_c}{\rho} \quad (10)$$

In below equations mentioned, here no odd power of ρ exists, so the square-root calculation for ρ can be removed.

$$u' = u'_c + \rho' \cdot \frac{u - u_c}{\rho} \quad (11)$$

$$u' = u'_c + (c_0 + c_1\rho^2 + c_2\rho^4 + c_3\rho^6 \ldots\ldots)' \cdot (u - u_c)'$$

$$v' = v'_c + \rho' \cdot \frac{v - v_c}{\rho} \quad (12)$$

$$v\,v' = v'_c + (c_0 + c_1\rho^2 + c_2\rho^4 + c_3\rho^6 \ldots\ldots)' \cdot (v - v_c)'$$

$$v' = v'_c + (c_0 + c_1\rho^2 + c_2\rho^4 + c_3\rho^6 \ldots\ldots)' \cdot (v - v_c)'$$ Thus, the

complex square-root calculation is eliminated because both u'and v'are calculated with ρ^2 rather than with ρ.

3. HORNER'S ALGORITHM

The main purpose of Horner's algorithm [16] is to efficiently evaluate the polynomials in monomial form. Given the polynomial

$$p(x) = \sum_{i=0}^{n} a_i x^i$$
$$p(x) = a_0 + a_1 x + a_2 x^2 + \ldots\ldots + a_n x^n \quad (13)$$

where $a_0, a_1, \ldots, a_n$ real numbers, then to evaluate the polynomial at a specific value of x, say x_o. A new sequence of constants is defined as follows:

$$\begin{aligned} b_n &:= a_n \\ b_{n-1} &:= a_{n-1} + b_n x_0 \\ &\vdots \\ b_0 &:= a_0 + b_1 x_0. \end{aligned} \quad (14)$$

Then b_o is the value of $p(x_o)$
Then the polynomial can be written as

$$p(x) = a_0 + x\left(a_1 + x\left(a_2 + \cdots + x\left(a_{n-1} + a_n x\right)\cdots\right)\right). \quad (15)$$

Thus, by iteratively substituting the b_i into the expression,

$$\begin{aligned} p(x_0) &= a_0 + x_0(a_1 + x_0(a_2 + \cdots + x_0(a_{n-1} + b_n x_0)\cdots)) \\ &= a_0 + x_0(a_1 + x_0(a_2 + \cdots + x_0(b_{n-1})\cdots)) \\ &\vdots \\ &= a_0 + x_0(b_1) \\ &= b_0. \end{aligned} \quad (16)$$

As described above, an iteration function is used to rewrite the polynomial. The function p^n which is the *n*th iteration of p can be represented as $p.p^{n-1}$ and it is defined as

$$p^n = p.\ p^{n-1} \quad (17)$$

To rewrite the polynomial as iteration function, the evaluated polynomial at the specified value of $x = x_o$ can be represented as

$$p(x_o) = (c_{n-1} + c_n . x_o . p^{n-1}(x_o) \quad (18)$$

The polynomial is evaluated to compute $p(x_o)$ where x_o is a constant.

The Horner's algorithm is executed by following the below steps:

Step 1: Set $u = n$ (where n is the degree of the polynomial)
Step 2: Set Result = Cn.
Step 3: If $u = 0$ stop. Answer is Result.
Step 4: Compute Result =Result × *xo* + *Cu*"1.
Step 5: $u = u$ " 1.
Step 6: Go to step 3.

By Horner's algorithm, the computing complexity of the evaluating polynomial can be decreased. The complexity of back mapping and polar to rectangular coordinate steps can be reduced in the same way.

4. PROPOSED VLSI ARCHITECTURE

Figure 2 shows the block diagram of proposed architecture. In this design, when the start signal is enabled, the circuit will output the intensity value of the first pixel after 21 clock cycles. Then, it can process one pixel in CIS per clock cycle. Totally, it would take (1024 x 728 + 21) cycles to process an image with 1024 x 728 pixels. This design consists of four main modules: mapping unit, memory bank, linear interpolation unit and controller. The memory bank is composed of solid state drives and RAM. The interpolation unit linearly interpolates the final intensity value. The controller provides the control signals of each state to other units and handles the whole correction procedure. The detailed circuits of mapping and linear interpolation units are described as follows.

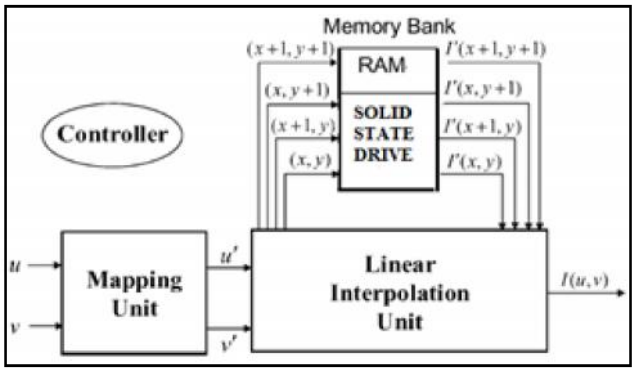


Fig 2. Proposed VLSI Architecture

For each pixel (u, v) in CIS, the mapping unit performs the operations needed to calculate (u', v'). Most multipliers and adders are realized with 24-bit width as adopted in [6]. According to the simulation results obtained from XILINX, it was found that the propagation delay of a 24-bit multiplier is quite long. Hence, the 15-bit two-stage pipelined multiplier is adopted in the design to get better pipeline scheduling. Fig 3. shows the 15-stage pipelined architecture of the mapping unit. The linear interpolation unit obtains the intensity values of the four neighboring pixels around (u', v') and calculates the final

intensity value I (u, v). Fig 4. shows the 6-stage pipelined architecture of the linear interpolation unit which performs the operations needed to calculate I (u,v).

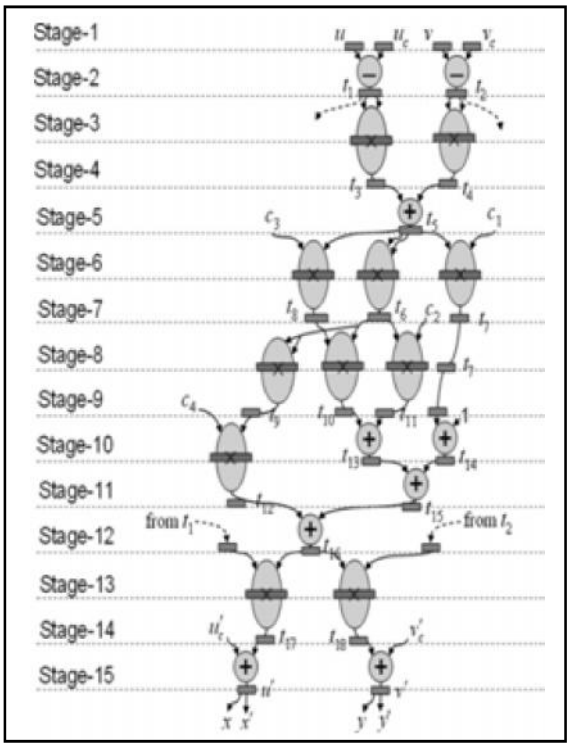


Fig 3. 15-stage pipelined architecture of mapping unit

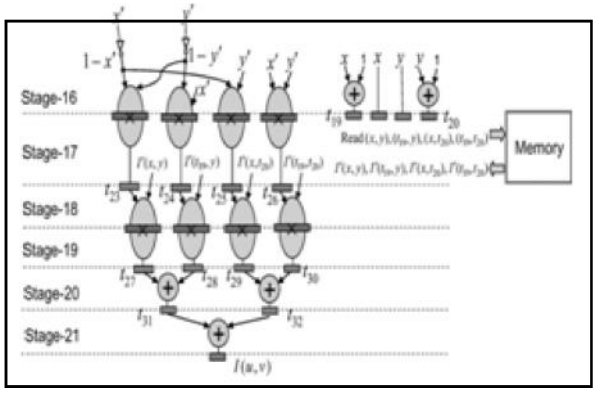


Fig 4. 6-stage pipelined architecture of linear interpolation unit

5. RESULTS AND DISCUSSION

The VLSI architecture of the proposed design was implemented by using Verilog HDL. Here MATLAB is used to convert the image file to grey scale image. Table 1 shows the Simulation Results of two designs using Altera EP20K600EBC652-1X FPGA the size the design with TSMC's 0.18 m cell library. The results show that the design contains 1490 logic elements. It works with a clock period of 5 ns and operates at a clock rate of 218 MHz.

Table 1.Comparative Analysis

Paper	Logic Elements	Clock Rate	Throughput
[13]	1686	200MHz	14Mpixels/s
Proposed	1320	210MHz	21Mpixels/s

6. CONCLUSION

In this paper, a low-cost, low-power, and low memory requirement VLSI architecture of distortion correcting circuit was presented for surveillance images. The computing complexity of correcting functions is reduced by Horner's algorithm and the algebraic manipulation of the linear interpolation. This provides an efficient and effective approach to eliminate the distortion. It provides a logic element of about 1490, clock rate of 218MHz and throughput of 21Mpixels/s. From this it is proved that this algorithm has high performance than other existing VLSI correcting designs.

REFERENCES

(1) M. Anderson, "VCR Quality Video at 1.5 Mbits/s", National Communication Forum, Chicago, Oct. 1990.

(2) "Coding of Moving Pictures And Associated Audio", Committee Draft of Standard ISO11172: ISO/MPEG 90/176, Dec. 1990.

(3) ITU-T and ISO/IEC JTC 1, "Generic Coding Of Moving Pictures And Associated Audio Information: Video", ITU-T Recommendation H.262 – ISO/IEC 13818-2 (MPEG-2), Nov. 1994.

(4) I. Haritaoglu, D. Harwood and L. S. Davis, "W: Real-Time Surveillance of People and their Activities", IEEE Trans. Pattern Anal. Machine Intell., Vol. 22, Aug. 2000, pp.809-830.

(5) Iain E. G. Richardson, "H.264 and MPEG-4 Video Compression: Video Coding for Next-generation Multimedia", John Wiley & Sons, Ltd. 2003.

(6) H. T. Ngo and V. K. Asari, "A Pipelined Architecture for Real-Time Correction of Barrel Distortion In Wide-Angle Camera Images", IEEE Trans. Circuits Syst. Video Technol., Vol.15, No.3, Mar.2005, pp. 436-444.

(7) P. Y. Chen, C. C. Huang, Y. H. Shiau and Y. T. Chen, "A VLSI Implementation of Barrel Distortion Correction for Wide-Angle Camera Images", IEEE

Trans. Circuits Syst. II Express Briefs, Vol.56, No.1, Jan. 2009, pp.51-55.

(8) Jong Sun Kim, Dong Hae Yeom and Young Hoon Joo, "Fast and Robust Algorithm of Tracking Multiple Moving Objects for Intelligent Video Surveillance Systems", IEEE Transactions on Consumer Electronics, Vol. 57, No. 3, August 2011.

(9) Shih-Chia Huang, "An Advanced Motion Detection Algorithm with Video Quality Analysis for Video Surveillance Systems", IEEE Transactions on Circuits and Systems for Video Technology, Vol. 21, No. 1, January 2011.

(10) P. G. S. Mythili, S. Vamsee Krishna, "Time Multiplexed VLSI Architecture for Real-Time Barrel Distortion Correction in Video-Endoscopic Images", International Journal for Scientific Research & Development| Vol. 1, No.8, 2013.

(11) S. Yasotha, V. Gopalakrishnan & M. Mohankumar, "Multi-sink Optimal Repositioning for Energy and Power Optimization in Wireless Sensor Networks", in Wireless Personal Communications, Vol.82, No.3, June 2015.

(12) M.Mohankumar, R.Gowrimanohari, "A Novel Design Of Current Mode Multiplier/Divider Circuits For Analog Signal Processing", in International Journal of Computer Science and Mobile Computing, Vol.3, No.10, October 2014, pp.918-925.

(13) M.Mohankumar, R.Gowrimanohari, "VLSI Architecture For Barrel Distortion Correction In Surveillance Camera Images", In Journal of Electronics And Computer Sciecne, Vol 2, No.5, May 2015.

(14) M. Mohankumar, V. Gopalakrishnan and S.Yasotha, "A Vlsi Approach For Distortion Correction In Surveillance Camera Images", in ARPN Journal of Engineering and Applied Sciences, Vol.10, No.9, May 2015, ISSN 1819-6608.

(15) M.Mohankumar, R.Gowrimanohari, "A Novel Design of Current Mode Multiplier/Divider Circuits For Analog Signal Processing", in International Journal of Computer Science and Mobile Computing, Vol.3, No.10, October 2014, pp.918 - 925.

(16) M.Mohankumar, R.Gowrimanohari, "VLSI Architecture For Barrel Distortion Correction In Surveillance Camera Images", In Journal of Electronics And Computer Sciecne, Vol 2, No.5, May 2015.

(17) V.Pavithra, M.Mohankumar, "Secure Network Sharing Nemo based Ad-Hoc", In IJCSMC, Vol.3, No.2, Februray 2014, pp.645-652.

(18) K.Kokulavani, M.Mohankumar, "High Speed And Lower Hardware Complexity VLSI Architecture For Lifting Based Discrete Wavelet Transform", In IJCSMC, Vol. 3, Issue. 3, March 2014, pp.733-739.

Real -Time City-Scale Taxi Ridesharing

M.Palanisamy, S.R.Vineya, T.Yamuna, L.Revathi
Department of Information Technology,
M.Kumarasamy College of Engineering, Karur - 639 113, Tamil Nadu

Abstract

Proposed and developed a taxi-sharing system that accepts taxi passengers' real-time ride requests sent from smartphones and schedules proper taxis to pick up them via ridesharing, subject to time, capacity, and monetary constraints. The monetary constraints provide incentives for both passengers and taxi drivers: passengers will not pay more compared with no ridesharing and get compensated if their travel time is lengthened due to ridesharing; taxi drivers will make money for all the detour distance due to ridesharing. While such a system is of significant social and environmental benefit, e.g., saving energy consumption and satisfying people's commute, real-time taxi-sharing has not been well studied yet. To this end, we devise a mobile-cloud architecture based taxi-sharing system. Taxi riders and taxi drivers use the taxi-sharing service provided by the system via a smart phone App. The Cloud first finds candidate taxis quickly for a taxi ride request using a taxi searching algorithm supported by a spatio-temporal index. A scheduling process is then performed in the cloud to select a taxi that satisfies the request with minimum increase in travel distance. We built an experimental platform using the GPS trajectories generated by over 33,000 taxis over a period of three months. A ride request generator is developed (available at http://cs.uic.edu/_sma/ridesharing) in terms of the stochastic process modelling real ride requests learned from the data set. Tested on this platform with extensive experiments, our proposed system demonstrated its efficiency, effectiveness and scalability. For example, when the ratio of the number of ride requests to the number of taxis is 6, our proposed system serves three times as many taxi riders as that when no ridesharing is performed while saving 11 percent in total travel distance and 7 percent taxi fare per rider.

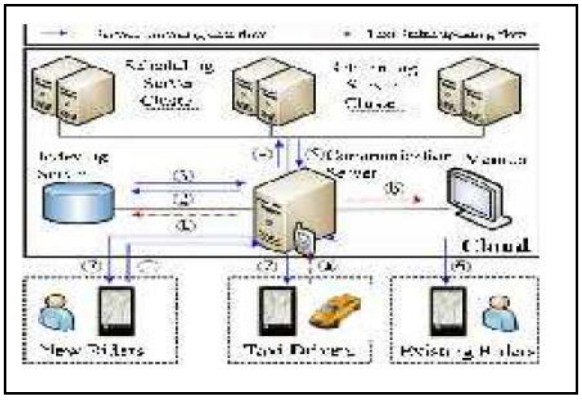
1.INTRODUCTION

Taxi is an important transportation mode between public and private transportations, delivering millions of passengers to different locations in urban areas. However, taxi demands are usually much higher than the number of taxis in peak hours of major cities, resulting in that many people spend a long time on roadsides before getting a taxi.

Increasing the number of taxis seems an obvious solution. But it brings some negative effects, e.g., causing additional trafūc on the road surface and more energy consumption, and decreasing taxi driver's income .To address this issue, a taxi-sharing system that accepts taxi passengers' real-time ride requests sent from smart phones and schedules proper taxis to pick up them via taxi-sharing with time, capacity, and monetary constraints (the monetary constraints guarantee that passengers pay less and drivers earn more compared with no taxi- sharing is used this project).Our system saves energy consumption and eases trafūc congestion while enhancing the capacity of commuting by taxis. Mean while, it reduces the taxi fare of taxi riders and increases the proūt of taxi drivers. Image retrieval based on color, texture and shape is a wide area of research scope.It is a framework for combining all the three i.e. color, texture and shape information, and achieve higher retrieval efficiency. The image and its complement are partitioned into non- overlapping tiles of equal size.

2. CONSTRAINTS

The crux of the taxi-sharing problem is to dispatch taxis to ride requests, subject to certain constraints and a taxi status V satisfies a ride request Q or Q is satisfied by V if the following constraints are met vehicle capacity constraint. The number of riders that sit in the taxi does not exceed the number of seats of a taxi at any time.



Architecture of the real time taxi-sharing system

3. TAXI SEARCHING

The taxi searching module quickly selects a small set of candidate taxis with the help of the spatiotemporal index. In this section, it describes the index structure and then detail the searching algorithm .The cloud consists of multiple servers for different purposes and a monitor for administers to oversee the running of the system.

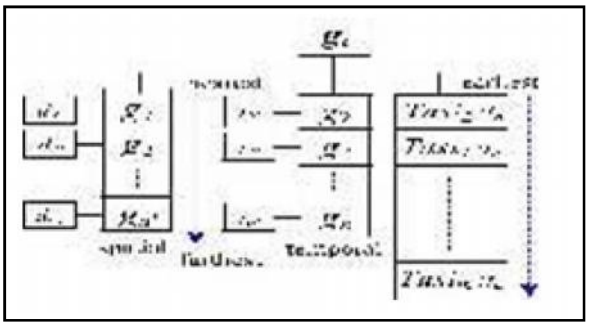
Taxi drivers and riders use the same smart phone App to interact with the system, but are provided with different user interfaces by choosing different roles. Since multiple taxi statues may satisfy a ride request, an objective function is usually applied to find the optimal taxi. A variety of objective functions have been used in the existing literature, where a weighted cost function combining multiple factors such as travel distance increment, travel time increment and passenger waiting time. That is a rider does not pay more than without taxi- sharing; a taxi driver does not earn less than without taxi-sharing .

4. SEARCHING ALGORITHMS

4.1 Single-Side Taxi Searching

For the sake of the clarity of description, Suppose there is a query Q and the current time ti where g7 is the grid cell in which : o is located.

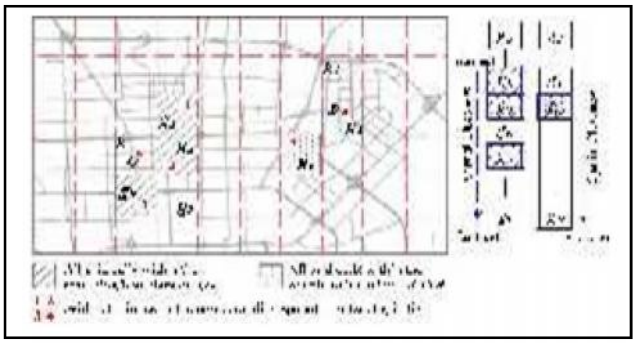
The first grid cell selected by the algorithm. Any other arbitrary grid cell g_i is selected by the searching algorithm only holds, where t_{i7} represents the travel time from grid cell g_i to grid cell g7.Indicates that any taxi currently with in grid cell g_i can enter g7 before the late bound of the pickup window using the travel time between the two grid cells.



The single-side taxi searching algorithm

4.2 Dual-Side Taxi Searching

The dual-side searching is a bidirectional searching process which select grid cells and taxis from the origin side and the destination side of a query simultaneously. From the details of the algorithm, consider the ride request where g7 and g2 are the grid cells in which Q : o and Q : d are located respectively. Squares filled with stripes stand for all possible cells searched by the algorithm at Q : o side. These cells are determined by scanning g2 the temporally-order grid cell list of g7.That is, each grid cell in g7 which holds is a candidate cell to be searched at the origin side.



Dual-side taxi searching algorithm

5. LITERATURE SURVEY

Shuo Ma, Yu Zheng,Ouri Wolfson,(June 2013)"T-Share: A Large-Scale Dynamic Taxi Ridesharing Service" By encouraging passengers to share taxi trips, taxi ridesharing is of significant social and environmental benefit, such as saving energy consumption and satisfying people's commute in peak hours. Despite the great potential, the taxi ridesharing, especially with dynamic queries, is not well studied. By formally define the dynamic ridesharing problem and present a large-scale taxi ridesharing service, which efficiently serves real- time requests sent by taxi users and generates ridesharing schedules that reduce the total

travel distance significantly. In this method, a taxi searching algorithm using a spatiotemporal index which is to quickly retrieve candidate taxies that could satisfy a user query.

A schedule allocation algorithm is then to check each candidate taxi so as to insert the user's trip into the schedule of the taxi which satisfies the query with minimum incurred travel distance for the ridesharing. To tackle the heavy computational load, a lazy shortest path calculation strategy is devised to speed up this schedule allocation algorithm . The service of a GPS trajectory dataset generated by over 33,000 taxies during a period of 3 months. By learning the spatiotemporal distributions and the stochastic process of real user queries from this dataset, an experimental platform has built that can simulate user behaviours in taking a taxi in the real- world. Tested on this platform with extensive experiments, the approach demonstrates its efficiency, effectiveness, and scalability.

Fernandes,Ferreira, (Sep 2012), "Empirical Evaluation of a Dynamic and Distributed Taxi-Sharing System" Modern societies rely on efficient transportation systems for sustainable mobility. In this project it performs a large-scale and empirical evaluation of a dynamic and distributed taxi-sharing system that evolved from it.

The novel system takes advantage that widespread availability of communication and computation to convey a cost-efficient, door-to-door and flexible system, offering a quality of service similar to traditional taxis. The shared taxi service is assessed in a real-city scenario using a highly realistic simulation platform. Simulation results have shown the system's advantages for both passengers and taxi drivers, and that trade-offs need to be considered. Compared with the current taxi operation model, results show a increase of 48% on the average occupancy per traveled kilometer with a full deployment of the taxi-sharing system.

The combination of the color, shape and texture features between image and its complement in conjunction with the shape features provides a robust feature set for image retrieval. Metadata refers to keywords, tags, or descriptions associated with the image. The term "content" refer to colors, shapes, textures, or any other information that can be derived from the image itself. CBIR is desirable because most web-based image search engines rely purely on metadata and this produces a lot of garbage in the results.

Jing Yuan, Yu Zheng, Chengyang Zhang, Xing Xie, Guang-Zhong Sun, (July 2011), "An Interactive-Voting Based Map Matching Algorithm" Matching a raw GPS trajectory to roads on a digital map is often referred to as the Map Matching problem.To address this problem, an Interactive voting-based Map Matching (IVMM) algorithm is based on the following three insights: 1) The position context of a GPS point as well as the topological information of road networks, 2) The mutual influence between GPS points (i.e., the matching result of a point references the positions of its neighbors; in turn, when matching its neighbours, the position of this point will also be referenced), and 3) The strength of the mutual influence weighted by the distance between GPS points .In this approach, consider the spatial and temporal information of a GPS trajectory but also devise a voting-based strategy to model the weighted mutual influences between GPS points.

The IVMM algorithm is based on a user- labeled real trajectory dataset. As a result, the IVMM algorithm out performs the related method (ST- Matching algorithm). The integration of the above combination, then cluster based on alike properties create the co-occurrence matrix. Co-occurrence matrix calculate the feature vector for texture. Canny algorithm is used for edge detection to calculate the feature vector for the shape. Invariant moments are then used to record the shape features.

G.Gidofalvi,T.Pedersen, (June 2007), "Cab–Sharing:An Effective, Door–To–Door, On–Demand Transportation Service" City transportation is an increasing problem. Public transportation is cost effective, but do not provide door to door transportation; This makes the far more expensive cabs attractive and scarce. It deals with a location-based Cab-Sharing Service (CSS), which reduces cab fare costs and effectively utilizes available cabs. The CSS accepts cab requests from mobile devices in the form of origin-destination pairs. Then it automatically groups close by requests to minimize the cost, utilize cab space, and service cab requests in a timely manner.

Simulation-based experiments show that the CSS can group cab requests in a way that effectively utilizes resources and achieves significant savings, making cab-

sharing a new, promising mode of transportation. Then, the characteristics of the global and local color histogram, texture features through co-occurrence matrix and Haar wavelet transform and shape are compared and analyzed for CBIR. Finally, the best method of each feature is fused during similarity measure to improve image retrieval effectiveness and accuracy. The content based image retrieval will better than text retrieval because these CBIR will retrieve more similar image than the text retrieval. Content-based image retrieval is regarded as one of the most effective ways of accessing visual data.

The system is designed to show images which are related to the query image. Extracting color, texture, and shape features from an image plays a vital role in content-based image retrieval. Initially RGB image is converted into HSV color space due to its perceptual uniformity.

Roberto Wolfler Calvo,Fabio De Luigi,Palle Haastrup,Vittorio Maniezzo , (Dec 2004), "A Distributed Geographic Information System For The Daily Car Pooling Problem" Following the difficulty of public transport to adequately cover all passenger transportation needs, different innovative mobility services are emerging. Among those are car pooling services, which are based on the idea that sets of car owners having the same travel destination share their vehicles. Until now these systems have had a limited use due to lack of an efficient information processing and communication support. In this study an integrated system for the organization of a car pooling service is presented, using several current Information and Communication Technologies (ICT's) technologies: web, GIS and SMS.

The core of the system is an optimization module which solves heuristically the specific routing problem. The system has been tested in a real-life case study. . The features further can be classified as low-level and high-level features. Users can query example images based on these features such as texture, colour, shape, region and others. By similarity comparison the target image from the image repository is retrieved. Meanwhile, the next important phase today is focused on clustering techniques. Clustering algorithms can offer superior organization of multidimensional data for effective retrieval. Clustering algorithms allow a nearest neighbour search to be efficiently performed. Hence, the image mining is rapidly gaining more attention among the researchers in the field of data mining, information retrieval and multimedia databases. Spatial Databases is the one of the concepts which plays a major role in Multimedia System.

6. EXISTING SYSTEM

Unfortunately, real-time taxi-sharing has not well explored, through ridesharing which is based on private cars and often known as carpooling or recurring ridesharing. It was studied for years to deal with people's routine life. In contrast to existing ride sharing, real-time taxi-sharing is more challenging because both ride requests and positions of taxis are highly dynamic and difūcult to predict. First, passengers are often lazy to plan a taxi trip in advance, and usually submit a ride request shortly before the departure. Second, a taxi constantly travels on roads, picking up and dropping off passengers. Its destination depends on that of passengers, while passengers could go anywhere in a city.

7. DRAW BACK OF EXISTING SYSTEM

- Request and position of taxis are highly dynamic drivers and difficult predict.
- Decreasing taxi drivers income.
- Spend a long time on road sides before getting a taxi.

8. PROPOSED SYSTEM

A taxi-sharing system that accepts taxi passengers' real-time ride requests sent from smart phones and schedules proper taxis to pick up them via taxi-sharing with time, capacity, and monetary constraints (the monetary constraints guarantee that passengers pay less and drivers earn more compared with no taxi-sharing is used). Our system saves energy consumption and eases trafūc congestion while enhancing the capacity of commuting by taxis. Meanwhile, it reduces the taxi fare of taxi riders and increases the proūt of taxi drivers.

A report on a system based mobile cloud architecture, which enables real-time taxi-sharing in a practical setting is implemented . In the system, taxi drivers independently determine when to join and leave the service using an App installed on their smart phones. Passengers submit real-time ride requests using the same App (if they are willing to share the ride with others).

Each ride request consists of the origin and destination of the trip, time windows constraining when the passengers want to be picked up and dropped off On receiving a new request, the Cloud will ūrst search for the taxi which minimizes the travel distance increased for the ride request and satisūes both the new request and the trips of existing passengers who are already assigned to the taxi, subject to time, capacity, and monetary constraints.

9. MODULE DESCRIPTION USER

User plays a major role in this System. The User First need to Register in this System. Then he login to the System and Look for Taxi they can Book the Taxi. The real-time ride requests sent from smartphones and schedules proper taxis to pick up them via taxi-sharing with time, capacity, and monetary constraints the monetary constraints guarantee that passengers pay less and drivers earn more compared with no taxi-sharing is used. The destination depends on that of passengers, while passengers could go anywhere in a city.

10. DRIVER

In the system taxi drivers independently determine when to join and leave the service using this System. The Booking Request From the Users are send to the Driver and they can Desired if Accept or Denial. And pick up them via ride sharing Request from User. it reduces the taxi fare of taxi riders and increases the proūt of taxi drivers. The Driver Database are all in the Cloud System they Track the User Location and send back the information to the Driver to Track and Pickup the User.

11. TAXI SHARING

Each ride request consists of the origin and destination of the trip, time windows constraining when the passengers want to be picked up and dropped off in most case, the pickup time is present. On receiving a new request, the Cloud will ūrst search for the taxi which minimizes the travel distance increased for the ride request and satisūes both the new request and the trips of existing passengers who are already assigned to the taxi, subject to time, capacity, and monetary constraints. Then the existing passengers assigned to the taxi will be inquired by the cloud whether they agree to pick up the new passenger given the possible decrease in fare and increase in travel time. Only with a unanimous agreement, the updated schedules will be then given to the corresponding taxi drivers and passengers.

12. TAXI BOOKING

Taxi Booking is user Request for Taxi. The taxi sharing status is optional to the user. While Booking the Taxi Latitude and Longitude position of current user Location are determined and passed on this and the destination Latitude and Longitude position distance between the source and destination are calculated by Algorithm. Based on this Fair for the taxi is generated if the user on the taxi sharing he or she can save 40% fair amount .The Booking Request of User is Send to the Driver as an alert the can accept or denial the Booking.

13. DRIVER

In the system taxi drivers independently determine when to join and leave the service using this System. The Booking Request From the Users are send to the Driver and they can Desired if Accept or Denial. And pick up them via ride sharing Request from User. it reduces the taxi fare of taxi riders and increases the proūt of taxi drivers. The Driver Database are all in the Cloud System they Track the User Location and send back the information to the Driver to Track and Pickup the User.

14. SYSTEM DESIGN INPUT DESIGN

Input design is one of the most important phases of the system design. Input design is the process where the input received in the system are planned and designed, so as to get necessary information from the user, eliminating the information that is not required.

The aim of the input design is to ensure the maximum possible levels of accuracy and also ensures that the input is accessible that understood by the user.The input design is the part of overall system design, which requires very careful attention.

If the data going into the system is incorrect then the processing and output will magnify the errors.

The objectives considered during input design are:Nature of input processing. Flexibility and thoroughness of validation rules.Handling of properties within the input documents.Screen design to ensure accuracy and efficiency of the input relationship with

files.Careful design of the input also involves attention to error handling, controls, batching and validation procedures.

Input design features can ensure the reliability of the system and produce result from accurate data or they can result in the production of erroneous information.

15. OUTPUT DESIGN

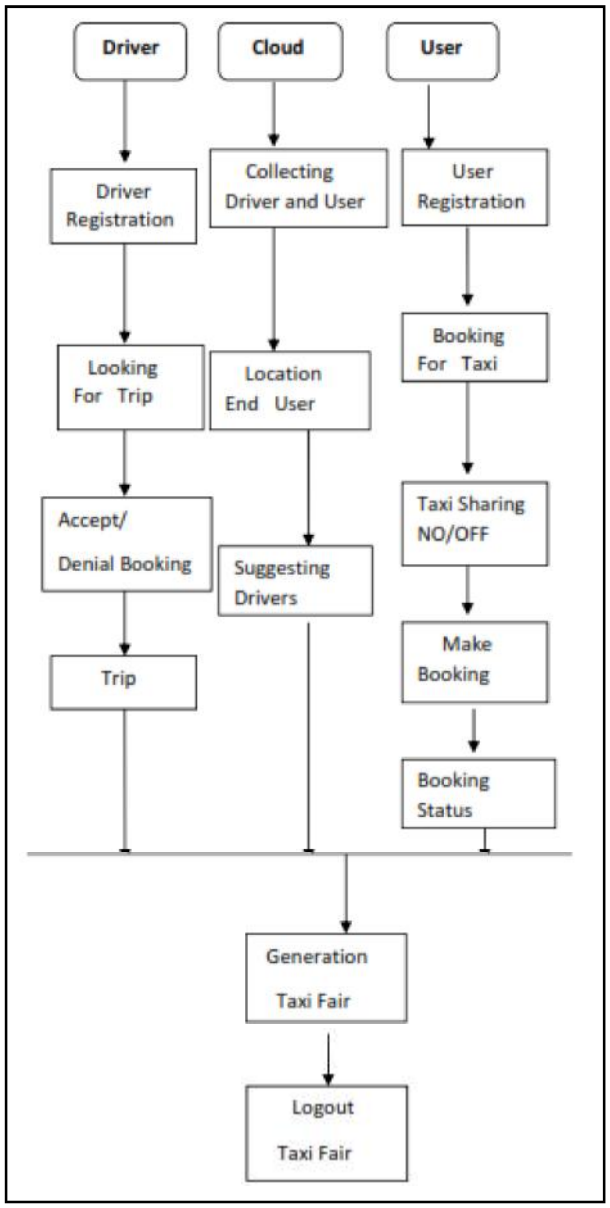
The output design is the most important and direct source of information to the user. The encoding time and file size for both the fractal as well as fast fractal technique are shown in output screen. Output from the computer system is required to communicate the result of processing to the user and to provide permanent copy of these results for later consultation. While designing the output, the type of output format, frequency etc has been taken into consideration.

Output designed to simply generate an output of the process whether it was successful or not. The system saves the total travel distance of taxis when delivering passengers the system can save over one third million liter of gasoline per day, which is over 120 million liter of gasoline per year (worth about 150 million dollar). Thirdly, the system can also save the taxi fare for each individual rider while the proūt of taxi drivers does not decrease compared with the case where no taxi-sharing is conducted.

16.CONCLUSION

This project deals with a mobile-cloud based real-time taxi-sharing system. The experimental results demonstrated the effectiveness and efūciency of the system in serving real-time ride requests. Firstly, the system can enhance the delivery capability of taxis in a city so as to satisfy the needs of more people. Secondly, the system saves the total travel distance of taxis when delivering passengers the system can save over one third million liter of gasoline per day, which is over 120 million liter of gasoline per year (worth about 150 million dollar). Thirdly, the system can also save the taxi fare for each individual rider while the proūt of taxi drivers does not decrease compared with the case where no taxi-sharing is conducted.

Architecture Diagram



REFERENCES

(1) S.Ma,Y.Zheng and O. Wolfson, 2013, "T- Share: A large-scale dynamic ridesharing service", Data Ebginering (ICDE).
(2) K. Wong, I. Bell and G. H. Michael, May 2006, "Solution of the Dial-a-ride Problem with Multi-dimensional Capacity Constraints", Int. Trans. Oper. Res., Vol. 13, No.3.
(3) Z. Xiang, C. Chu, and H. Chen, 2006,"A Fast Heuristic for Solving a Large-scale Static Dial-a-ride Problem Under Complex Constraints", Eur. J. Oper. Res., Vol. 174.
(4) J. Yuan, Y. Zheng, C. Zhang, W. Xie, X. Xie, G. Sun, and Y. Huang, 2007, "T-drive: Driving Directions based on Taxi Trajectories", in Proc. 18th SIGSPATIAL Int. Conf. Adv. Geographic Inf. Syst.
(5) J. Yuan, Y. Zheng, X. Xie, and G. Sun, 2011, "Driving with Knowledge from the Physical World", in Proc. 17th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining.

Free Energy Generator

S. Santhosh
Nettur Technical Training Foundation GKDITR Campus, Coimbatore - 641 407, Tamil Nadu

Abstract

The present invention refers to a self-contained system of energy regeneration, which in addition has several advantages set out below. The system comprises an electric motor drive (1), a main generator (2), auxiliary generators (3), a flywheel (4), and pulleys (5). The system is intended to generate its own operating power, and provide an extra supply for other purposes. This invention can mainly used in the field of agriculture for generating free energy to run their water pumps in free of electricity. This reduces the consumption of electricity. The renewable efficiency makes the process work continuously when the electrical power is removed.

1. INTRODUCTION

It has been known for many years, how to construct machines which can generate electric current. These are known by the generic name of "electric power generators", consisting of rotating machine that transforms mechanical power into electrical power as a result of alternative action between a magnetic field and a moving conductor.

However, the various types of generator which make up the current state of the art require the help of a motor, which transforms mechanical power into electrical energy, and that motor requires an independent power source which must be supplied continuously.

Thus, a system capable of generating its own power supply as well as providing an extra power supply for other purposes is not known in the current state of the art.

2. SUMMARY OF THE INVENTION

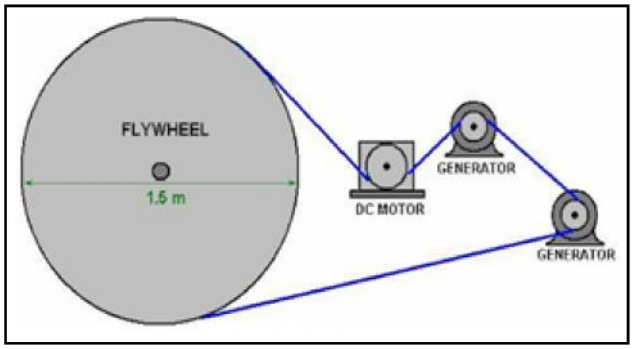
It is capable of producing its own operating energy in addition to generating a surplus which can be used in electrical networks using voltage converters required for any electrical installation, whether in homes, offices, warehouses etc.., with it is possible to reach places where it is difficult to install the power grid, allowing its use as an alternative source of energy other than solar or wind power.

Other applications would be in the automotive field, as a power source for motorcycles, cars, etc. by connecting the system to the propelling motor, and thus achieving the necessary motion of the vehicle.

Overall, the system is comprised of the following basic components:

1. An electric traction motor.
2. A main generator.
3. A auxiliary generator(or)alternator
4. A flywheel
5. And pulleys
6. A load and output-power controller

3. CONCEPT BEHIND IT



The concept is based on the production of free energy. At first i will explain how the concept works in reality in this we had use a motor with pulley of rating 1HP and 2000 rpm and it is connected to another pulley with a shaft.

The shaft is connected to another pulley which is connected to generator now according to the concept when the motor starts rotating the generator will also starts rotating

In-between this process we had fixed a flywheel that will produce at least twice as much energy as you need

to drive your alternator, why because when a shaft is directly connected with a motor and a alternator it will have high torque and it cant rotate freely and after the installation of free wheel just you try to rotate in hand it will rotate freely

Why this concept is inbuilt her is at initial condition we are going to start the motor using electricity and it will run the alternator with the help of the shaft and the pulleys but after the alternator reaches certain rpm the electricity incoming is unplugged at that time the motor should not stop suddenly for that condition a fly wheel is introduced in it to get a free and continuous motion for certain time

One of the best application in our day-to-day life where the fly wheel is used and the fly wheel concept is used her as the major concept to drive a huge load with less effort

4. WORKING PRINCIPLE

4.1 Flywheel

A **flywheel** is a rotating mechanical device that is used to store rotational energy. **Flywheels** have an inertia called the moment of inertia and thus resist changes in rotational speed. The amount of energy stored in a **flywheel** is proportional to the square of its rotational speed.

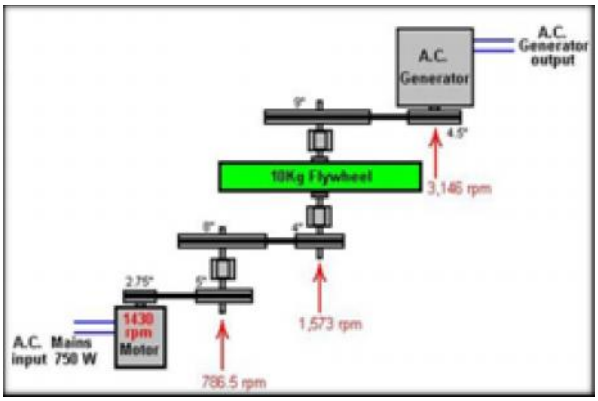
4.2 Motor

Basic **working principle** of an **Induction Motor**. In a DC **motor**, supply is needed to be given for the stator winding as well as the rotor winding. But in an **induction motor** only the stator winding is fed with an **AC** supply. ... This alternating flux revolves with synchronous speed.

4.3 Generator

AC GENERATOR. **Principle**: **A.C. generators** or alternators (as they are usually called) operate on the same fundamental **principles** of electromagnetic induction as D.C. **generators**. the speed at which the coil or magnetic field rotates.

4.4 Working



Now let's know how it works at initially we are starting the motor with the help of electric power after some time when the motor reaches its maximum rpm the electricity input to the motor is removed and the input terminals of the motor is given to the output terminals of the alternator.

Now the motor is running with the supply what is produced by the alternator and this is a continuous process and without the help of any external energy now it can run continuously.

This concept will use the electricity once with low power after the motor reaches maximum rpm than the power for the motor is taken by the generated power from the alternator and the input electric power is switched of In this project 1430 rpm is converted to 3146 rpm this is two times increased rpm than normal rpm. Now we can use the output power to any other source. The output power depends on the alternator we are using.

5. TANGIBLE GAINS

5.1 Table Mentioning the Cost Efectiveness

Table 1 Before Implementing

Sl.No.	Motor Used	Total Power Consumption per Hour	Total Hours Motor Used	Total Power Consumption Per Month
1	3Φ 10hp ac motor 1770 rpm	7.45KW/HR	4hrs a day	894KW/HR

Table 2 After Implementing

Sl.No.	Motor Used	Total Power Consumption per Hour	Total Hours Motor Used	Total Power Consumption Per Month
1	1Φ 1hp ac motor 1500 rpm	1KW/HR	15 min a time 30 min a day	120KW/HR

6. POWER SAVED

Per day : 25.8KW
Per month : 774KW
Per year : 9417KW

6.1 Advantages

i. Reduce the power usage and can save more power
ii. It is a continuous source of energy renewed again and again iii. Power is needed only for initial conditions iv. Can be used at home in future v. Not a complicated process
vi. No interruption in electricity

6.2 Disadvantages

i. Cost is high (but one time investment)

7. FUTURE IMPLEMENTATION

Our future implementation is to implant our project in domestic applications like industries and homes for water pumps and reduce the power and save the electricity.

8. CONCLUSION

Thus i conclude my project that the free energy will save the power for future generation and farmers can use this in single phase itself and it will be benefit for the government and the farmers.

REFERENCE

(1) http://www.free-energy-info.co.uk/Chapt4.html
(2) http://peswiki.com/directory:chas-campbell-generator

Agro Web for Farmers using Ontology

P. Keerthana, R. Sowmiya and V. Bharathi
Kongunadu College of Engineering and Technology, Tholurpatti - 621 215, Trichy District, Tamil Nadu
E-mail: Sowmiyacse003@gmail.com, keerthipalnimalai@gmail.com, bharuravi92@gmail.com

Abstract

Agricultural information is heterogeneous,polymorphic and distributed that the current web architecture may be unable to find the appropriate search contents. This paper introduces construction of a multi-linguistic agriculture ontology system as information searching tool for the retrieval of related search topics and the establishment of distributed data acquisition model in the web. There is an increasing demand due to the growing information needs which require image and video sharing and larger content sharing. This requires greater disk storage, faster servers combined with virtualization technology. Thus in this paper to maintain vast amount of data, we propose our system in cloud so as to satisfy our required storage needs thereby making it as a single point of access to satisfy the desired computing needs.

Keywords: *Agriculture, Cloud, Polymorphic, Ontology.*

1. INTRODUCTION

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications. Cloud computing is a type of grid computing where unused processing cycles of all computers in a network are harnesses to solve problems too intensive for any stand-alone machine. The goal of cloud computing is to apply traditional high-performance computing power to perform tens of trillions of computations per second, in consumer-oriented applications to deliver personalized information, to provide data storage.

In the context of information sharing, ontology is used to provide a description of the concepts and relationships that exist among the data. In general, a search engine might be able to scan for keywords, but it cannot understand how those keywords are used in the context of page. This paper provides an idea of introducing the approach for Semantic Web search wherein the software agents can be used to scan and interpret information on web pages.

The software agents are computer programs that round around the web pages searching for the relevant information. The search agent interacts with user and web services. This is made possible with the help of ontology via meta-key search. Ontology is a file that defines the relationships among a group of terms that would exist in the form of metadata. Metadata is information included in the code for web pages that is complex to be viewed by humans, but readable by computers.

This paper illustrates the conversion from a traditional agricultural thesaurus to a new ontological information searching system[4] which can be implemented on cloud. Cloud is a new paradigm of computing that has started to evolve recently wherein the applications are accessed from the web browser and the data are stored on the servers hereby maintaining a bulk amount of data in the network cloud[5].

2. RELATED WORKS

AGROVOC is a controlled vocabulary covering all areas ofinterest to *FAO (Food and Agriculture Organisation)*, including food, nutrition, agriculture, fisheries, forestry, environment, etc[4]. It is implemented by means of VocBench, a web-based, multi-lingual, editing and workflow tool which manages concepts and terms in AGROVOC. A major issue with AGROVOC is that the multi-lingual terminology that was English-centric failed to express the concepts as the terms were simply translated and not lexicalized in a particular language[3].

Agriculture Ontology Service (AOS) serves as a referenceinitiative that structures and standardises agricultural terminology in multiple languages for use of any number of systems in the agricultural domain and provide several services. However, it strives to:

- Increase the efficiency and consistency with which multilingual agricultural resources are described and associated together
- Increase functionality and relevance in accessing these resources and
- Provide a framework for sharing common descriptions, definitions and relations within the agricultural community

3. DESIGN OF THE SYSTEM

The sharing of information and knowledge has become an urgent task of computer technology. Classification and relation of characteristic words that are formed in the agricultural ontology are used to form data dictionary which is composed of the finite character words[2].

The retrieval word that is provided by user is used to match the key terms in the data dictionary, and this strategy is used to analyse the results of matching to determine the subject of the information and index. The data dictionary is composed of related topics with meta-keywords and an index for every search links to optimize the search.

Despite the growing number of ontologies available online, their range of application in real world projects is comparatively limited. Moreover, there may be countable number of such sites implemented in cloud. Storage is another major issue for an agricultural vocabulary system with larger heterogeneous information. Thus this system is implemented in cloud to satisfy the desired storage needs.

The proposed system will have the data dictionary that is formulated and ordered after an agricultural zoning analysis for providing information about the crops, the type of land and the appropriate climate suitable for the crop. Thus this paper proposes a system wherein ontology is used for the knowledge-based construction of classification and refining tool facilitating indexing and searching processes in a repository environment.

The system is implemented as an agent-based approach that supports composition of web services to address the situation of a user's request that cannot be satisfied by any available service. An agent is provided to satisfy the requests from multiple users simultaneously by creating a pool of services. The proposed system provides lexicalized multi-lingual options in a conveniently accessible manner for better agricultural information service.

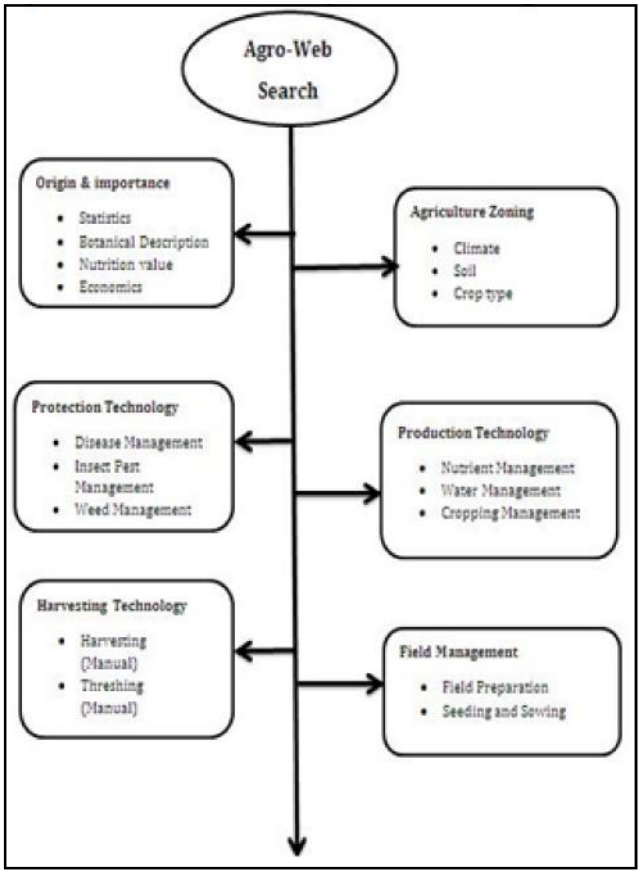


Fig.1 Sketch of the proposed system

4. IMPLEMENTATION OF THE SYSTEM

The front of web browser is responsible for the display of classification tree and classification navigation information, the input, selection of searching criteria and performance of data enquiry results[2]. The application of web server encapsulates all business logic, including the establishment of dynamic connection with database, enquiry and submission of SQL queries[2]. The database management systems of background database contain Microsoft SQLServer2008. The proposed system is designed to deploy on a private cloud using Ubuntu.

4.1 Flow of Ontological Searching

- First the user enters search terms in the input box, then the keywords are passed to the .Net application, the ontology which are related to searching terms are extracted from the database.
- Second the agricultural products ontology information

is classified by three levels, the user can retrieve the required information by clicking way. While clicking the icon of the left of the tree it can be smaller, while selecting and clicking a class name, the application program will match the name of class and search terms of user input, and make the original document database for searching, the results corresponding to the selected terms are displayed[2].

- Thirdly if the key words and classification of the information cannot be exactly matched, the system directly searches the possible keywords for related topics and displays the search results.

4.2 Features of the Proposed System

The following are some of the features provided by the proposed agricultural system:

- Selection of crop on the basis of soil test report and market demand.
- Live weather updates through internet
- Selection of natural pesticides and their amount according to the symptoms and climatic conditions
- Visual and audio feedback for semi-literate users
- Comparison of historical data for intelligent decision making
- Multi-Lingual lexicalized contents for user friendly application

5. CONCLUSION

This paper proposes an agricultural information retrieval model based on ontology, and the function and work flow are designed to be implemented in cloud. The approach analyses web services from multiple perspectives and integrates the results. This kind of ontology is helpful for semantic web browser for helping the all levels of people[1]. An index or id is assigned to each term that helps in avoiding mutual conflicts. So for search engine this ontology will be helpful for searching required information. Also as the system is proposed in cloud the storage and omnipresent issues are resolved.

6. FUTURE WORKS

The following points list the future works possible in this area:

- The relationship of the classes can be expanded[1].
- Construction of an ontology generation process which allows the automatic building of an ontology that can assist in expanding, classifying and retrieving relevant services without any guidance as a contrary to the existing methods.
- To extend to provide the generality and abstraction which makes it useful to many next-generations Web-service based applications.

REFERENCES

(1) Sujan Chowdhury, Mahedi Kaysar, Kaushik Deb **"**Designing a Semantic Web Ontology of Agricultural Domain **",**7th International Forum, 2012.

(2) Duan Liying, Li Hongjuan,He Dongbin,Wen Zhe,Liu Xuning "Research on Intelligent Searching ofAgricultural Information Based on Ontology**",** 2012International Conference on Computer Science and Service System.

(3) A. C. Liang, Boris Lauser, Margherita Sini, Johannes Keizer, Stephen Katz "From AGROVOC to theAgricultural Ontology Service / Concept Server", CEUR Workshop Proceedings on OWL:Experiences and Directions, Vol. 216, 2006.

(4) Chun Chang, GUojian Xian and Guangda Li "Thesaurusand Ontology Technology for the Improvement of Agricultural Information Retrieval",World Conference on Agricultural Information and IT, 2008.

(5) "Implementation of Cloud Computing on WebApplication"by Liladhar R.Rewatkar and UjwalA.Lanjewar, International Journal of Computer Applicaions, Vol. 2, No.8, June 2010.

Hand-held object Recognization for Blind Person Using RASPBERRY PI

A. Aabi, T. Dhivyalakshmi, S. Joan Kanishka and S. Jaipriya
Department of Electronic Communication Engineering,
Sri Krishna College of Technology, Coimbatore - 641 042, Tamil Nadu

Abstract

In this project, blind person were recognizing the hand-held object by using eSpeak software through the Raspberry Pi. The camera was placed in the spectacle of the blind person. Initially the objects are captured by camera. To match the captured image and the image in the MATLAB database, we have to find the histogram of the captured images and compare with the histogram of image in the MATLAB database. To find the histogram, initially we have to convert the captured image into the gray scale image and followed with LBP algorithm. LBP means Local Binary Pattern algorithm. This algorithm is used to recognize the objects. This algorithm used to convert the gray scale image into the LBP code image. Then the output of the MATLAB is given to the Raspberry Pi as an interrupt. By using eSpeak software, LBP code is converted into speech output. The speech output is obtained at the audio jack of the Raspberry Pi. By connecting microphone Bluetooth earpiece at the audio jack, we can hear the speech output. The entire application is based on Raspberry Pi. Using Raspberry pi the overall performance and efficiency get increased. The Raspberry Pi kit is a mini computer in built system and power consumption is very less.

Keywords: *Audio jack, Bluetooth earpiece, Camera, Python, Raspberry Pi, Raspibian, Spectacle.*

1. INTRODUCTION

The Raspberry Pi 2 processing capacity is 6 times of the previous models. This second generation Raspberry Pi provides BCM2836 processor, which is a powerful ARM Cortex-A7 which runs at 900MHz. 1Gbyte memory capacity is present in the board.

The local binary pattern operator, which is used to transforms an image into an array of integer labels as describing small-scale appearance of the image and it is an image operator. Thus obtained labels are most commonly the histogram, which are used for image analysis. This project helps the Blind person to live comfortably in this modern world. Ojala et al, Who introduced the basic local binary pattern. This concept was based on the assumption that texture contains two complementary aspects which are pattern and its strength. A 3Ч3 pixel block of an image is present the local binary pattern. The statistical robustness is the reason for using uniform patterns and where the local primitives that are detected by the LBP contain spots, ыat areas, edges, edge ends and curves.

The eSpeak software is widely used here. This is used to improve the given input speech language and that is based on GUI program that are using a random text. The paper proposes a Raspberry Pi based Hand-held object recoginization for blind person

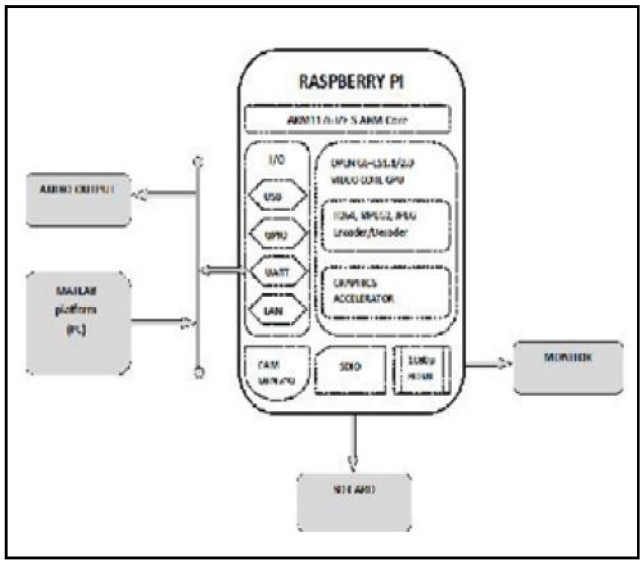
2. LITERATURE REVIEW

The blind person uses camera based technique to identify the hand-held objects. From cluster of background an object is identified. For that region of interest (ROI) are used. To find region of interest (ROI), we uses novel text localization algorithm to get the gradient features of edge pixels using Adaboost model. These texts are binarized and threshold value is obtained for that text character. Finally speech output is obtained from the binarized text character. Second paper is proposed to overcome the disadvantages of the previous paper. This project also used for the blind person in their daily lives. In previous paper, we have to shake the object to recognize the text. But, now it will automatically recognize the text character in the hand of blind person. It is also converting the text into binaries but optical character recognition (OCR) software is used here. Then finally speech output is obtained. Third paper is proposed to identify the different strings of characters in the natural scene images. We extract the character from the image and enhancement techniques are used here. Finally the text is detected by structure based partition method and then grouping all the text using robust

algorithm. The obtained characters are provided with closed contours and these characters are placed in straight line. Then text and images are separately binarized. The color- based partition gives better performance than gradient-based partition. The text strings are extracted along with arbitrary orientations with the help of text line grouping. The better performance is obtained when adjacent character grouping (CA) is combination with color-based partition. An efficient algorithm is also detected automatically, where it is localize and extract complex backgrounds with horizontal aligned text which is used for in the localization of text.

3. PROPOSED SYSTEM

The Raspberry Pi processing capacity is 6 times of the previous models. This second generation Raspberry Pi provides BCM2836 processor, which is a powerful ARM Cortex-A7 which runs at 900MHz. The board has an increased memory capacity of 1Gbyte.



4. HARDWARE DISCRIPTION

4.1 Power Supply

The Micro USB connection is used as a power. The advantage in using Raspberry Pi is to produce at least 700mA at 5 volts and power supply's ratings is maintained carefully. The main adaptor is suitably used in Raspberry Pi. The components that used in power the Raspberry Pi are,

1. Needed USB power supply
2. USB port with wall warts
3. Backup Battery

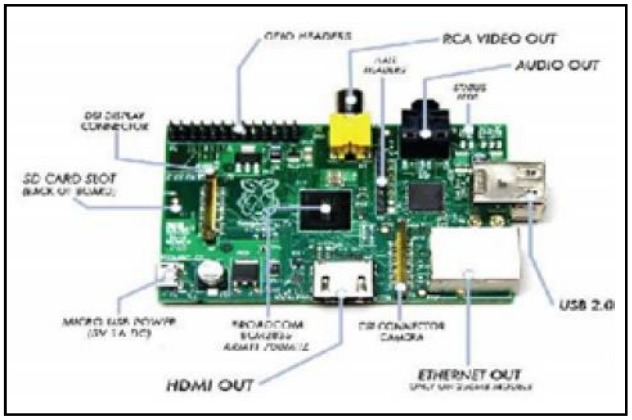


Fig.2.Raspberry Pi kit

4.2 USB hub

The USB hub is used for additional service connection and it is used for multiple accesses. The power hub is used for additional power supply to the device without effecting Raspberry Pi. USB version 2.0 is used for power availability. USB version 1.1 is used for keyboards and mice, but not for other accessories.

4.3 Display

The display consists of two components, HDMI (high definition) and Composite (low definition). A full-size 'male' HDMI cable is used to connect the HD TVs and LCD Monitors, and inexpensive adaptoris used for DVI. The supported HDMI versions are 1.3 and 1.4, and a version 1.4 based cables are always recommended. HDMI is used to send the output to Raspberry pi as audio and video output. Older TVs can be connected using Composite (a yellow-to- yellow cable) is used for connection in older TVs version. PAL and NTSC TVs are also supported now. The composite video, audio outputs are sent to the headphone or to an amplifier.

5. SOFTWARE DISCRIPTION

5.1 eSpeak Software

The eSpeak software is widely used in TTS. This software is an open source and it is under the license agreement, which is used to improve speech language. The eSpeak software is a General User Interface (GUI) program which is used to provide phonetic records in case of random text. Preparation and compilation of phoneme data is done via eSpeak software. The generation speed is high in using this

software, but the obtained speech output is not natural when compared to the original human voice. In addition eSpeak software has basic tools that are used for adjusting the input text and supports DDE servers.

5.2 Features of eSpeak Software

- SSML (Speech Synthesis Markup Language) is supported in eSpeak software.
- It is Compact size of about 1.4 Mbytes.
- It is used as a front-end to MBROLA diphone voices.

5.3 The MATLAB System

The MATLAB system consists of five main functions:

- Provided the Development Environment.
- Provided the MATLAB Language.
- To Handle Graphics.
- Used in Application Program Interface Modeling, simulation and prototyping.
- Data analysis, exploration and visualization.
- Scientific and Engineering graphics.
- Application development, including graphical user interface (GUI).

Fig.3.Gray scale output

Fig.4.LBP code output

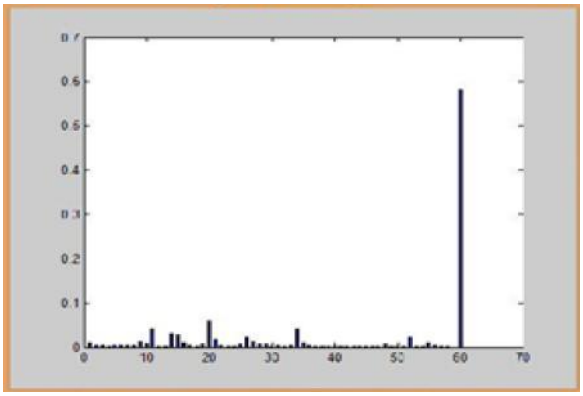


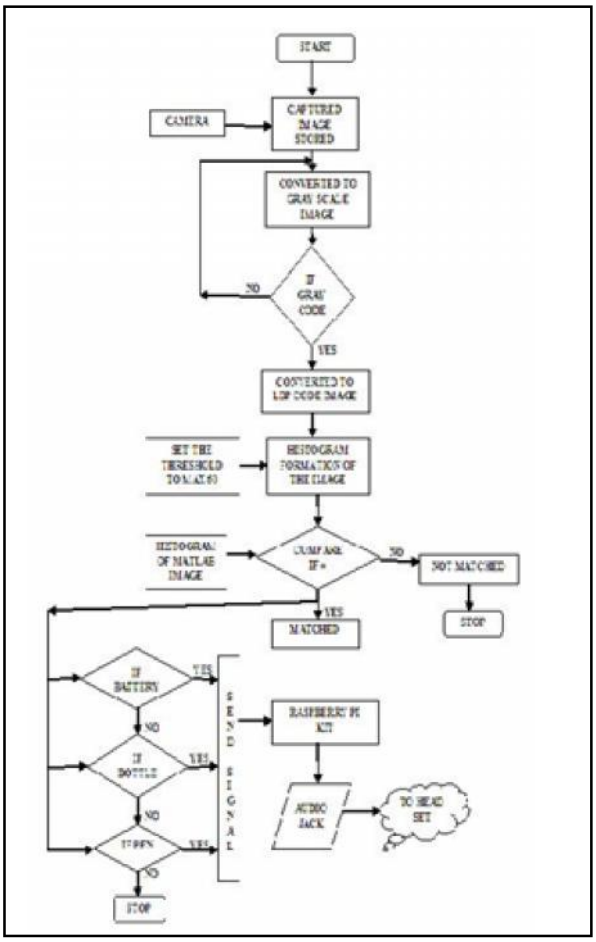
Fig.5.Histogram output

Fig.6.Matched output

5.4 Python Language

1. It is open source- scalable
2. Easy to learn
3. Cross platform compatibility
4. Object oriented
5. High level programming language
6. It is an interpreter
7. Dynamic semantics
8. Maintainability
9. Standard library
10. Interactive mode
11. Database
12. GUI programming

6. FLOWCHART



7. RESULT

Thus object was converted into gray scale image followed by LBP code image. Then the LBP code image is compared with the original image, if 16 features are matched, then histogram graph was plotted with threshold value of intensity. Thus we get the matched output.

8. CONCLUSION AND FUTUREWORK

In our project, we have recognized the hand- held objects for assisting blind persons. In order to solve the common problem faced by the blind persons. From the graph, we observed that 16 features are matched and object was recognized. Our future work will extend to find the direction and color of traffic signals and to find the routes.

REFERENCES

(1) D. Dakopoulos and N. G. Bourbakis, "Wearable Obstacle Avoidance Electronic Travel Aids For Blind: A Survey," IEEE Trans. Syst., Man, Cybern., Vol. 40, No.1, Jan. 2010, pp. 25-35.

(2) B. Epshtein, E. Ofek and Y.Wexler, "Detecting Text in Natural Scenes with Stroke Width Transform", in Proc. Comput. Vision Pattern Recognition., 2010, pp.2963-2970.

(3) L. Katherine Bouman, Golnaz Abdollahian, MireilleBoutin and Edward J. Delp, "A Low Complexity Sign Detection and Text Localization Method for Mobile Applications", IEEE Trans. Syst., 2012.

(4) X. Yang, S.Yuan and Y. Tian, "Recognizing Clothes Patterns for Blind People by Confidence Margin based Feature Combination", in Proc. ACM Multimedia, 2011, pp. 1097-1100.

(5) C. Yi and Y. Tian, "Text String Detection From Natural Scenes By Structure Based Partition And Grouping", IEEE Trans. Image Process., Vol.20, No.9, Sep. 2011, pp.2594-2605.

Micro Electro Mechanical Systems

B. Aishwarya[1] and R. Jeya arpana[2]
Department of Electrical and Electronics
Mepco Schlenk Engineering College, Mepco Nagar - 626 005, Sivakasi, Tamil Nadu
E-mail: aishuahs@gmail.com, arpanajeya@gmail.com

Abstract

The aim of this presentation is to provide logical build of knowledge about the world of science and engineering at the micro scale not a comprehensive treatment of the field at large. The most promising device of 21st century is Micro Electro Mechanical System (MEMS) and it has the potential to revolutionize the industrial and consumer product by combining silicon based microelectronics with micro machining technology. As creating micro structure requires such a different set of tools than those encountered in the macro world, much of learning about MEMS is necessary in the upcoming generation. MEMS provide not only better functionality with smaller chip area, but also alternative transceiver architecture for improved performance and reliability. This presentation is going to deal about MEMS manufacturing, working & application in day-to-day life. Science says that everything is possible and it is certainly right, so we can even make IMPOSSIBLE as I M POSSIBLE. Applying is essential than sheer knowledge; doing is important than mere willingness and thereby we can enjoy the extensive BLESSINGS OF MEMS TECHNOLOGY.

1. INTRODUCTION

Micro-Electro-Mechanical Systems, or MEMS, is a technology of miniaturized mechanical and electro-mechanical elements. It emerges at Nano scale (i.e.) from well below one micron on the lower end of the dimensional spectrum, all the way to several millimeters. Likewise, the types of MEMS devices can vary from relatively simple structures having no moving elements, to extremely complex electromechanical systems with multiple moving elements under the control of integrated microelectronics .MEMS represents an extraordinary technology that transform whole industries and drive the next technological revolution. The term used to define MEMS varies in different parts of the world. In the United States they are predominantly called MEMS, while in some other parts of the world they are called "Microsystems Technology" or "micro machined devices". MEMS are also referred to as micro machines in Japan, or *micro systems technology* (*MST*) in Europe.

Main process involved in MEMS manufacturing is fabrication. The fabrication of MEMS evolved from the process technology in semiconductor device fabrication. The basic techniques are deposition of material layers, patterning by photolithography and etching to produce the required shapes While the functional elements of MEMS are miniaturized structures - micro sensors and micro actuators. Micro sensors and micro actuators are categorized as "transducers", which are defined as devices that convert energy from one form to another.

2. WHAT IS MEMS?

MICRO-Small size, micro fabricated structures **ELECTRO**-Electrical signal or control **MECHANICAL**-Mechanical functionality **SYSTEMS**-Structures, Devices, System controls. It is a mechanical device driven by electricity. It converts mechanical movements into electrical signal. After extensive development, todays commercial MEMS –also known as Micro System Technologies (MST), Micro Machines (MM) have proven to be more manufacturable, reliable and accurate.

3. WHY WE NEED MEMS?

These devices can replace bulky elements with micro-scale equivalentthat can be produced in large quantity by fabrication.

- Low power consumption.
- Reduces cost.
- Improved selectivity.
- High sensitivity.

4. MEMS MANUFACTURING PROCESS

MEMS design involves

- Fabrication
- Testing
- Packaging

5. FABRICATION

The principle substrate material for the fabrication of MEMS is highly purified polycrystalline silicon. This silicon with appropriate dopant is put in quartz crucible and placed in a furnace of high temperature. Seed crystal is dipped into the melt and slowly pulled out. This brings mass of silicon and is cutted into wafers. These silicon wafers are sawed into 100-800 rectangular chips. Each chip contains hundreds of components. To create moveable parts, several layers are needed for structural and electrical interconnect purposes, with so called sacrificial oxide layers in between.

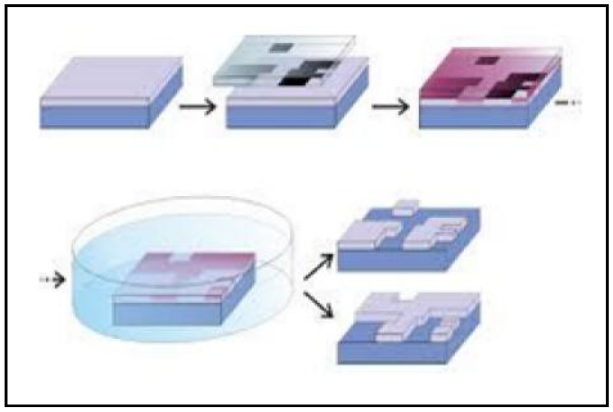
After deposition of many layers, with the help of photolithography we can able to produce microscopically small circuits and device patterns on silicon wafers, This process uses UV rays or X rays or electron beam lithography technique, photolithography involves two process photo mask and photo etching .photo mask is accomplished by clear Mylar. These mask are going to be placed over the wafers by selective etching.

6. PACKAGING

There are three different packaging configurations available:

- Metal can package.
- Ceramic flat package.
- Dual-in-line (ceramic or plastic) package.

The metal can packages are available in 8,10,12 leads, whereas the flat or dual-in-line package is commonly available in 8,14,16 leads but even 24 or 36 or 42 leads are also available for special circuits. Ceramic packages, whether of flat type or dual-in-line are costly due to fabrication process, but have the advantage of best hermetic sealing. Most of the general purpose, dual-in-line plastic packages due to economy.



7. WORKING: SENSORS:

Sensor is a transducer to measure a quantity. The input motion converted to output signal. It is a low input power device.

Types of Sensor:

7.1 Resistive sensing

7.1.1 Piezo resistive sensing

When a piezo resistive material is squeezed, pressed or subjected to any other forces its corresponding strain causes change in electrical resistance and in turn it generate an signal and the signal send to the actuator.

7.1.2 Magneto Resistive Sensing

It is similar to piezo resistive sensing but here instead of external force magnetic field is applied.

7.2 Capacitive Sensing

Making one of the conductors in a capacitor movable is a basis for capacitive sensing. Measurand which moves one of the plates in turn causes the voltage difference. This signal send to the actuator,

7. 3 Piezoelectric Sensing

Whenever the force is applied to the piezo electric material it causes accumulation of positive charge on one side and negative charge on another side then it acts as a capacitor, after that it performs like capacitive sensing.

7.4 Resonant Sensing

Whenever a current and a magnetic field is applied to the conductor (here the measurand is magnetic field) it produces Lorentz force which cause vibration in the conductor. This in turn produce signal and the signal is sent to actuator.

8. ACTUATORS

It is also a transducer to move or control a system.it is a high input power device.in actuation input signal is converted into output motion.

Types:

8.1 Capacitive Actuation

Whenever ac or dc apply with same polarity is supplied to both movable and stationary structures. Due to the same polarity repulsion occurs. The repulsion in turn move the system into action.

8.2 Piezo Electric Actuation

When the Voltage is applied across piezo electric material the whole setup becomes a capacitor. The applied voltage causes shrink the material in the applied voltage direction this shrinks causes the system to move.

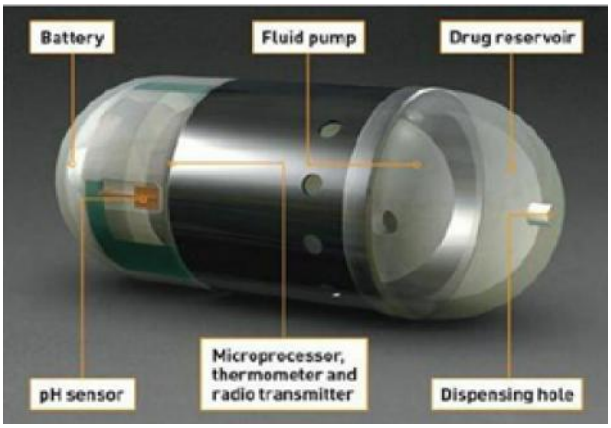
8.3 Magneto Strictive Actuation

Piezo electric material is sandwiched between two magneto strictive materials then magnetic field is applied to it. Due to the applied magnetic field, both material's dimensions changes. This change in piezo electric material produces voltage which causes the system to move.

9. APPLICATIONS

9.1 In Medical Field

Electronic pill to treat gastro intestinal cancer. An ingestible pill is swallowed by the patient, finds its way to the tumor, dispenses the drugs and passes harmlessly from the body. Smart pill contains reservoir for drugs supply, fluid pump for drug delivery, pH sensor for navigation, thermometer, microprocessor and radio waves for communication. Micro pump devices based on skin contact actuation for drug delivery.



9.2 In Microphones

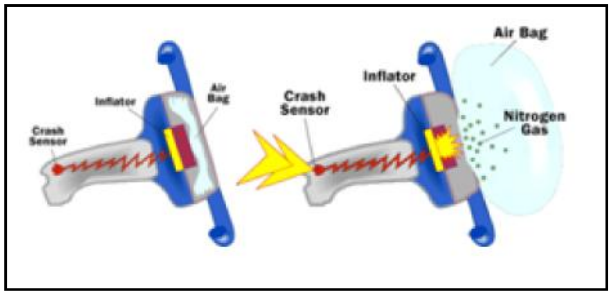
The MEMS microphone also called as microphone chip is widely used in the present day communication world.

The silicon mechanical element senses the motion when you touch the mobile phone. The IC which converts the motion measured by the sensor into analog or digital signal. MEMS microphones in portable devices, e.g., mobile phones, head sets and laptops.

9.3 In Automobiles

Airbags are stretchable fabrics or other materials that are tightly packed in various locations throughout your vehicle. There are airbags at the front of the dashboard in most cars, and many vehicles have airbags along the side of the car as well. These bags are compressed and kept in a small area. When there is an accident, MEMS which senses the sudden change and actuators fill the air bag with air and provide a cushioning system for the people in the car so that they are not thrown around in the event of a crash. While this does

not necessarily prevent total injury or death, it can be very helpful in cushioning the passengers in a car in many cases.



9.4 In Military

MEMS technology helps projectiles to reach their targets accurately.

9.5 In Inkjet Printer

Inkjet printers which use piezo electrics or thermal bubble ejection to deposit ink on paper.

10. ADVANTAGES & DISADVANTAGES

ADVANTAGES	DISADVANTAGES
1)Minimize energy and material used in manufacturing	1)Farm establishment require huge investment
2)Improved reproducibility	2)Very complex design procedure
3)Cost and performance advantages	3)Prior knowledge is needed for integration of MEMS devices
4)Higher accuracy, sensitivity, selectivity	4)Market value of component are high

11. CONCLUSION

This enabling technology promises to create entirely new categories of product. MEMS will be the indispensable factor in advancing technology. As with all emerging technologies had been predicted to revolutionize technology and our lives. We will be able to transfer ourselves into computers at some point. Most arguments against this outcome are seemingly easy to circumvent. Very soon this technology will be highly accepted whole over the world but wisdom lies in right use.

"Technology does not create Brain but Brain creates Technology"

We will be able to transfer ourselves into computers at some point &this is just a 'blink of an eye'...there's lot more to come…

Intelligent Braking System Using Microcontroller [AMEGA8-16PI] to Prevent Accident

P. Pavithra and M. Sheeba Jansy
Kongu Engineering College, Perundurai, Erode - 638 052, Tamil Nadu

Abstract

Accident prevention has been one of the leading areas of research today.Our paper is designed to prevent accidents due to loss of control, drunken driving, and rash driving, using circuitry aided by a microcontroller kit. In our work, braking distance and the distance of the obstacle are taken into consideration along with the speed of the vehicle. The microcontroller kit is powered with a microcontroller AMEGA8-16PI. The Hall sensor helps in finding the speed of movement of the vehicle and the ultrasonic sensor senses the distance of the object in front. These sensors provide real- time inputs to the microcontroller program. Using a Hall sensor the system will sense the speed of the vehicle and with the microcontroller, it will calculate the distance required to bring the vehicle to a complete stop for that speed. Braking motors is incorporated to activate the brakes thereby achieving automatic braking procedures. The system helps in conjunction with the driver judgment if the driver doesn't sense the obstacle and applies the brake at the right time then the microcontroller initiates braking motor to apply the brakes automatically. Our future work deals with incorporating real time brake shoe wear system to *provide enhanced feature for the intelligent braking system. By looking at safety in terms of avoiding accidents in the first place and then protecting occupants when a crash is unavoidable we can prevent more accidents, save more lives, and reduce insurance and medical costs to society. Intelligent Braking System approach represents a significant shift from the traditional approach to safety, but it is fundamental to achieving the substantial benefits.*

1. INTRODUCTION

Accidents are considered as non-avertable. Accidents occur due technical problems within the vehicle or due the mistakes of the drivers. Some times the drivers may become fatigue and they lose the control over the vehicle and sometimes the accidents occur due to drunken drivers and sometimes due to rash driving. In all these cases the accidents occur because the brakes are not applied at right time. When the drivers come to know that the vehicle is going to collide they become nervous and they don't apply the brakes. Majority of the accidents occur only this way. The system designed will prevent such accidents. It keeps track of any vehicles in front. It will continuously keep track of the distance between the two vehicles. When two come dangerously close the microprocessor in the system will activate the brakes and it will slow down the vehicle or bring it to a stop if needed.

2.NEED FOR THIS SYSTEM

2.1 Accidents

Accidents are resulting in loss of invaluable lives, materials and money. So far the accident preventing systems are not very efficient and the loss of lives is continuing. There are many systems like air bags, GPS, robo driven cars, tracked cars etc which can avert accidents to some extent.

2.2 Causes of Accidents

There are many causes of accidents. Some of them are

- Ignoring traffic rules
- Drunken driving
- Dream driving
- Mechanical failures in the vehicle
- Mistakes of the drivers

In all these cases the basic reason cited is failure to apply the brakes at the right time. In all the above cases if the brakes are applie the right time the accidents can be averted. If a system is developed, which applies the brakes at the time of accidents automatically will avert accidents, which are caused by all the above reasons. This project aims to overcome the mistake made by the drivers and at the time of accidents the system takes control of the vehicle and brings the vehicle to stop before colliding.

3. OUR VISION

Braking distance of a vehicle for a particular speed is the distance at which the vehicle comes to a halt from the current speed from the point of application of the brakes. Here the speed of the vehicle is sensed and the corresponding braking distance is calculated using a microcontroller. The distance of the obstacle in front is also sensed. The microcontroller compares the two distances. If the distances are within critical limits, the microcontroller activates the brakes and slows down the vehicle or brings the vehicle to a halt before the obstacle thus avoiding the collision.

In the case of moving vehicles, if the vehicle goes very close to the vehicle in front, the system will apply the brakes and will maintain a safe distance between the two vehicles The concepts of microcontroller – controlled automatic braking system prevents accidents to great extent. The distance of the obstacle in the front is continuously sensed and it is given as input to microcontroller. Simultaneously the speed of the vehicle is sensed and given to the microcontroller. The program in the microcontroller judges the position of the vehicle and if the vehicle is within the critical limits then the brakes will be activated automatically.

4. FACTORS CONSIDERED

The Factors considered in designing the system are

4.1 Braking Distance

The braking distance is the main factor considered in this system.
Braking distance for a particular speed is the distance between the point of application of the brakes and the point at which the vehicle comes to a complete stop from the present speed. It is calculated using the following formula

Braking distance = v^2 /2μg m

Where V - Velocity of the vehicle (m/s)
μ - Coefficient of friction of the road = 0.8
g - Acceleration due to gravity = 9.81 m/s^2

In the formula the condition of the brakes and the road conditions are not considered for coefficient of friction μ.

Table showing braking distance for particular speeds

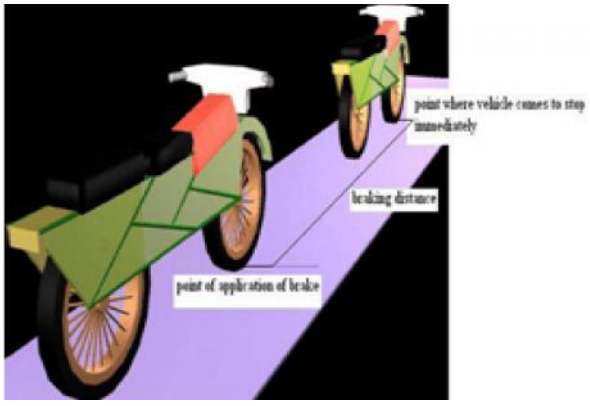
Velocity (Km/hr)	Braking Distance (m)
60	17.69
50	12.28
40	7.86
30	4.42
05	0.12

4.2 Distance of Obstacle in Front

The distance of any obstacle, a parked or a moving vehicle, a road block, a tree in the roadside, is sensed using an Ultrasonic sensor and it is fed to the microcontroller.

5. CONCEPT PROPOSED

With the proposed system, these sorts of accidents can be averted. Using a HALL sensor the system will sense the speed of the vehicle and with the microcontroller, it will calculate the braking distance: that is the distance required to bring the vehicle to a complete stop for that speed. Using an Ultrasonic distance sensor, the system will sense any moving or stationary obstacles in front and continuously keep track of its distance.



When the driver sees an obstacle in front and slows down there is no problem. On the other hand, if he does not apply the brakes and proceeds at the same speed, he comes to appoint where the distance of the obstacle equals the braking distance. This is the last chance for the driver to apply the brake and slow down the vehicle. If he still goes at the same speed, the microcontroller in the system will activate the brakes and avoids a collision by bringing the vehicle to a stop.

Normally, one would not stop at a point when the vehicle is touching the obstacle. Some distance is left before the obstacle. The distance is also accounted for by the microcontroller. Hence for 50 kmph if the braking distance is say 12.28m, 0.5m is added and the braking distance is calculated as 12.78m. In the case of moving vehicles, if the vehicle goes very close to the vehicle in front, the system will apply the brakes and will maintain a safe distance between the two vehicles.

6. INSTRUMENTS USED

The devices used were Hall sensor, ultrasonic distance sensor, microcontroller kit and braking motor.

6.1 Hall Sensor

A Hall sensor is a transducer that varies its output voltage in response to changes in magnetic field density. Hall sensors are used for proximity switching, positioning, speed detection, and current sensing applications. In its simplest form, the sensor operates as an analog transducer, directly returning a voltage. With a known magnetic field, its distance from the Hall plate can be determined. Using groups of sensors, the relative position of the magnet can be deduced.

6.1.1 Location of the Sensor

Two Magnets were fastened on the spokes of the vehicle. So the spokes (metals) will not be sensed. Only the magnets pole will be sensed. Sensor is attached to the inner side of the mud guard as shown in the figure. When the wheel completes one rotation a pulse will be coming out form the sensor. This pulse is given as input to the microcontroller.

6.1.2 Reasons for Selecting this Device

The alternatives for speed measurement can be tachometers but interfacing of conventional tachometers with the microcontroller is difficult. So use of tachometers for speed measurement is ruled out. Hall effect devices when appropriately packaged are immune to dust, dirt, mud, and water. These characteristics make Hall Effect devices better for position sensing than alternative means such as optical and electromechanical sensing.

6.1.3 Specifications

- 25V DC, 25 mA
- Make: TT Electronics, OPTEK Technology.

6.2 Ultrasonic Distance Sensor

This senses the distance of the obstacles from its location and it gives an equivalent analog output for the distance sensed.

6.2.1 Working principle

Ultrasonic waves of 40 KHz frequency will be sent from the transmitter of the sensor. The ultrasonic waves have the property that they are not affected by environmental changes. This ultrasonic wave will be reflected back from the obstacle. An ultrasonic receiver present in the same sensor receives these waves after reflection. The time difference between transmission and receiving is calculated and the distance is estimated by program present in the ASIC (Application Specified Integrated Chip) present in the sensor. This distance is displayed in a LCD display and simultaneously an equivalent analog output is given out from the device.

6.2.2 Location

This sensor is fitted in front of the vehicle. This sensor gets switched on once the vehicle is started and the sensor gives out the analog output continuously depending on the position of the obstacle.

6.2.3 Specifications

- Range : 1-32 ft.
- Resolution : .12 inches
- Signal Output : 0-5 Vdc
- Excitation Voltage : 12-24 Vdc

6.3 Microcontroller Kit

The whole control of the system was in the hands of AMEGA8-16PI microcontroller. A microcontroller (or MCU) is a computer-on-a-chip. It is a type of microprocessor emphasizing self-sufficiency and cost-effectiveness, in contrast to a general-purpose microprocessor (the kind used in a PC).

6.3.1 Why Microcontroller

The is a low power, high performance CMOS 8 bit microcomputer with 4k bytes of flash programmable and erasable read only memory (PEROM).the on chip flash allows the program memory to be reprogrammed in system or by a conventional non volatile memory programmer. It s a powerful microcomputer providing highly flexible and cost effective solution too many embedded control applications.

6.3.2 Interfacings

Of the ports of the microcontroller two were used as input ports one for ultrasonic sensor and other for proximity sensor. The other port was used as output port to give signal to the braking system. The signals form proximity sensor was given in port B through two bits. The output is taken from port C.

6.4 Braking Motor

The braking motor in out project just applied the brakes. As the project was done in two- wheeler (TVS 50), has cable brakes; the rotation of the motor just pulls out the cables by which the vehicle comes to a halt. The intensity of braking is high as the motor used has very high torque.

6.4.1 Why Motor

The easy way to apply the brake is to pull the cables. The Hobson's choice is an electric motor. The rotation causes the braking. The motor selected had very high initial torque so the application of the brakes will be very sudden and the vehicle comes to a halt immediately.

6.4.2 Specifications

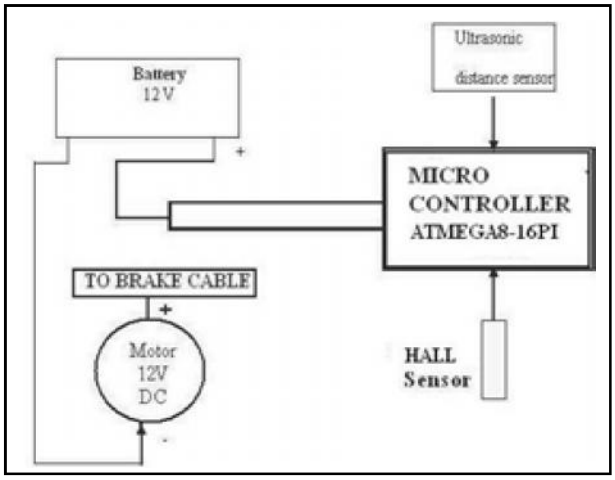
- 12V DC
- 00 Ampere, Series motor.

7. IMPLEMENTATION AND TESTING

Interfacing of the Ultrasonic sensor with the microcontroller posed problems. Also the microcontroller kit needed a 12V power supply, which was provided using wires from the vehicle battery. If the vehicle was to be moved this supply also created problems. Hence it was decided to alter the implementation and testing such that instead of testing with a moving vehicle and a stationary obstacle the testing can be done with a stationary vehicle. The ultrasonic sensor acquired did not have ports to take output. Moreover the sensor had ASIC chip and LCD display, so taking the output from the sensor to the microcontroller was a problem. So taking output from the sensor was ruled out. But this sensor will be the idle and efficient one during actual implementation. But due to economic and time constraints a PROXIMITY SWITCH was used temporarily.

When the proximity switch was pressed it was taken into consideration that the vehicle has entered the critical limit, that is, the braking distance becomes less than that of the braking distance required for that speed. There by the microcontroller accesses these two signals and gives the output signal which drives the motor to pull the braking cable.

8. BLOCK DIAGRAM



9. WORKING

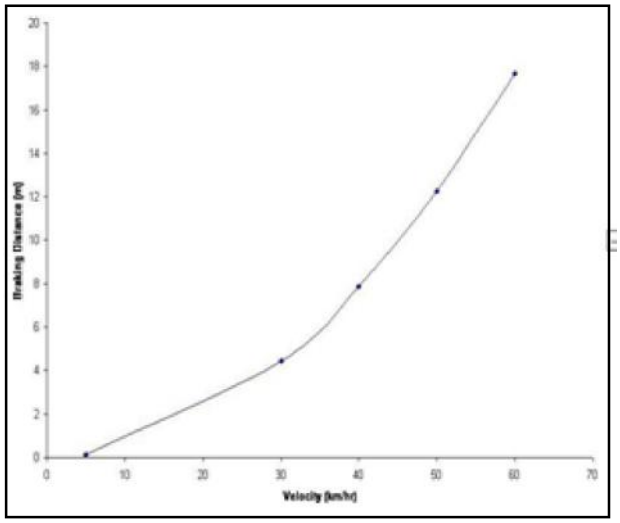
9.1 Speed Calculations

In its simplest form, the sensor operates as an analog transducer, directly returning a voltage. With a known magnetic field, its distance from the Hall plate can be determined. This is also done practically prior to programming. The same way above a look up table is drawn showing relations between speed and time interval between pulses. Depending on the speed of rotation of the wheel voltage will be given out from the sensor.

9.2 Distance Calculations

For this case of distance a proximity switch is used. When the proximity switch was pressed it was taken

into consideration that the vehicle has entered the critical limit, that is, the braking distance becomes less than that of the braking distance required for that speed. This is given as input to the microcontroller kit. The microcontroller calculates the distance.



9.3 Braking System

The braking motor is a 12V motor. The output from the microprocessor is 5V. A solenoid was used to drive the motor. The activating signal from the microprocessor was given to the solenoid which in turn drives the motor. The motor shaft is connected to the brake shoes through a cable as in conventional two wheeler braking system. When the motor rotates the brake cables are pulled and the brake shoes are activated.

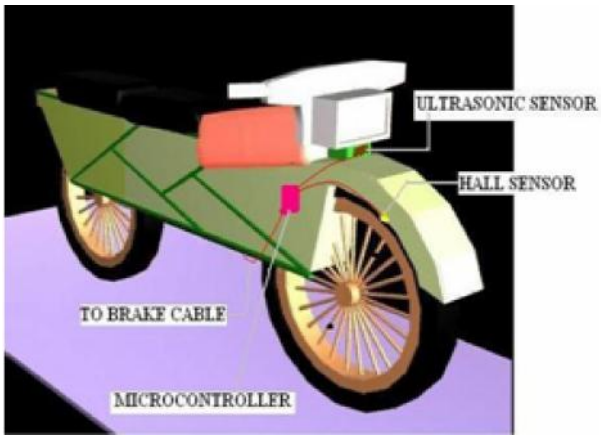
10. ECONOMIC FACTORS

Cost Involved

Hall Sensor : Rs. 225.00
Ultrasonic Distance Sensor : Rs. 1700.00
Braking Motor : Rs. 900.00
Total : Rs. 2825.00

Modern automobiles come with inbuilt processors. The program for the Intelligent Braking System can be added to the control system of the onboard processor. Sensors can be designed and integrated with the vehicle. Hence implementation of this system will not be very expensive. If this system is implemented it will cost max of Rs.5000/- approx. For a vehicle manufacturer this won't be a costly affair for the function it performs.

11.CONCEPTUAL PROTOTYPE



12. CONCLUSION

The Intelligent Braking system, if implemented can avert lots of accidents and can save invaluable human lives and property. Implementation of such an advanced system can be made compulsory similar to wearing of seat belts so that accidents can be averted to some extent. Our Intelligent braking system provides a glimpse into the future of automotive safety, and how much more advanced these individual systems can be for avoiding accidents and protecting vehicle occupants when they are integrated into one system. The future of automotive safety is more than just developing new technology; it is shifting the approach to safety. **INTELLIGENT BRAKING SYSTEM** approach represents a significant shift from the traditional approach to safety, but it is fundamental to achieving the substantial benefits.

REFERENCES

(1) www.ijritcc.org/download/conferences/ICMTEST.../1461913781_29-04-2016.pdf
(2) www.ijetae.com/files/Volume3Issue4/IJETAE_0413_18.pdf

IGBT Based Variable Frequency Inverter

P. Sharmila and P. Saranya
Department of Electronics and Communication Engineering,
Kongu Engineering College, Perundurai, Erode - 638 052, Tamil Nadu
E-mail: sharmilapalanisamy70@gmail.com

Abstract

This project"IGBT BASED VARIABLE FREQUENCY INVERTER" focuses on running industrial machines at the required frequency during the absence of power supply.All inverters used in India have a working frequency of 50 Hz so inverters are desined to work at the frequency of 50Hz.In contrast the working frequency of all machines in US was 60 Hz,so inverters manufactured in our country can't be made to work in US.To overcome this problem this inverter was designed.Nowadays inveters of high cost was used to meet the needs of any machine,but this inveter is designed with low cost.A switching device IGBT is used in the power stage as it has greater power gain and low input loss.Though MOSFET and JFET were used in commercial inverters,IGBT has the combined characteristics of both.However IGBT is costlier than both this satisfies the needs of all machines.

1. INTRODUCTION

Inverters increasingly plays an important role in the feild of industrialization. An inverter is an electronic device or circuitry that changes direct current(DC) to alternating current(AC).Thus in the absence of power supply power stored in battery in the form of DC was converted into AC by the inverter to run the machine.Since all inverters work in the fixed frequencyof 50Hz.those inverters cannot be imported and used in foreign countries such as U.S where the working frequency was 60Hz.To overcome this disadvantage "IGBT BASED VARIABLE FREQUENCY INVERTER"was designed.In this inverter,frequency can be tuned accordingly. As commercial inverters are available at high cost this inverter is of low cost.

2. OBJECTIVE

Basic objective of this project is:

- To make inverter work at all frequency range rather than optimum frequency.
- To reduce the manufacturing cost of inverters.

3. PROPOSED SYSTEM

The igbt based variable frequency inverter converts dc to ac when a frequency is tuned to particular range as needed by the machine.

4. COMPONENTS WORKING

The IGBT(Insulated Gate Bipolar Junction Transistor) transistor, a switching device combines the best parts of MOSFET,the transistor with high input impedance and high switching speed and BJT, the transistor with low saturation voltage.it has greater power gain and low input losses.since IGBT has been used in high frequency applications we prefer this transistor for switching frequency.here we use SG3524 that incorporates all the function required in the construction of RPS, inverter ,or a switching regulator on a single chip.we use opto-coupler as it prevents high voltages from affecting the system receiving the signal.capacitors of high voltage was used to avoid frequent discharging.To vary the frequency we make use of variable resistance. A 1ampere bridge is used to rectify the supply voltage to DC.In the power stage we use heat sinks to blow out the transistor heat.if adequate heat sinking is provided IC7808 can deliver over 1A output current.To avoid over heating of heat sink and transformer cooling fan was used.

5. WORKING

When input AC supply of 230V is given to the primary side of the step down transformer 12V is rectified using 1A bridge.After rectification the regulator IC 7808 gives out an output of 8v for the operation of whole setup which acts as a charging circuit. According to the variation in the 100kilo ohm variable resistance

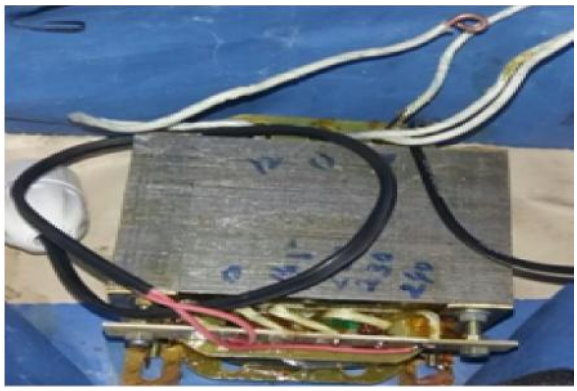
SG3524, a pulse width modulator produces a pulse of varying ON and OFF times.This pulse is given as the input to the gate terminal of the IGBT.So that the IGBT turns ON when the pulse is positive and turns OFF when the pulse is negative.This module produces a square wave with 12V.this output is given to the transformer that steps up 12V into 230V.Thus this entire setup act as a variable frequency inverter.

6. SCOPE

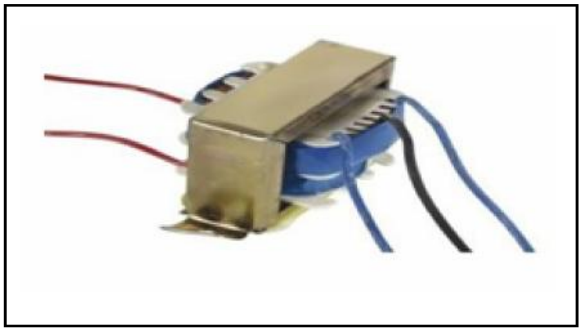
In industries for tuning the frequency of the inverter to adapt the required operating speed of the machine.

7. BASIC COMPONENTS TRANSFORMER

7.1 Stepup Transformer

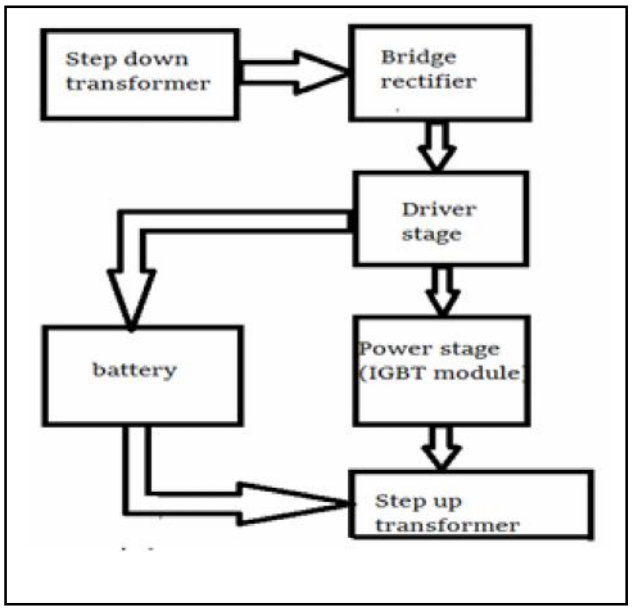


7.2 Stepdown Transformer



7.3 IGBT MODULE

7.4 Block Diagram



7.5 Estimated Cost

Sl.No.	Components	Cost(Rs)
1	Step-down Transformer	70
2	Step-up Transformer	1600
3	IGBT Module	2500
4	Driver stage	500
5	Battery	800
	Total	5470

7.6 Advantages

- Low cost.
- Produces different frequencies according to the machine speed.

7.7 Disadvantages

- Battery get dry up soon.
- For higher amperes at the output, cost of the stepup transformer will be high.

8. CONCLUSION

Thus this inverter was highly suitable for running the industrial machines with any operating speed at low cost.

REFERENCE

(1) http://www.electroschematics.com/5865/pwm-inverter/
(2) http://www.futureelectronics.com/en/transistors/igbt-transistor.aspx.

Colour Video Denoising Based on Combined Interframe and Intercolour Prediction

J. Logesh and N.Malligarjunan
Department of Mechatronics Engineering,
Maharaja Engineering College, Coimbatore – 641 654, Tamil Nadu

Abstract

An image denoising strategy based on an enhanced sparse representation in transform domain is proposed to colour video. An advanced colour video denoising scheme called as CIFIC based on combined interframe and intercolour prediction algorithm is proposed.CIFIC performs the denoising filtering in the RGB color space, and exploits both the interframe and intercolor correlation in color video signal directly by forming multiple predictors for each color component using all three color components in the current frame as well as the motion- compensated neighboring reference frames. The temporal correspondence is established through the joint-RGB motion estimation (ME) which acquires a single motion trajectory for the red, green, and blue components. Then the current noisy observations as well as the interframe and intercolor predictors are combined by a linear minimum mean squared error (LMMSE) filter to obtain the denoised estimate for every color component. Furthermore, the LMMSE filter applied in the adaptive luminance–chrominance space (LAYUV for short) is compared with CIFIC and thus CIFIC can theoretically achieve lower denoising error. Meanwhile, when compared with other state-of-the-art algorithms, CIFIC provides competitive performance both in terms of the color peak signal-to-noise ratio and in perceptual quality.

1. COLOUR IMAGE AND VIDEO NOISE REDUCTION

Video has become a part of our everyday life. Think of television broadcast for example. Many other video applications include: video-phone, teleconferencing, satellite observations, autonomous navigation, astronomical and medical imaging. Video, being an image sequence, is often called video sequence as well. In many applications video sequences are corrupted by some amount of noise. This addresses denoising of video sequences. Video denoising is especially interesting for surveillance systems, but also for television and medical video. In this methods white Gaussian noise is assumed, which is considered as a good noise model in many applications of interest including surveillance with night-vision cameras. The two new filtering algorithms in the base domain and two new denoising methods in the transform (wavelet) domain are proposed. The proposed algorithms are first described for grey-scale sequences in progressive format and subsequently extended to interlaced and Colour sequences. For optimal filtering performance, several schemes for noise estimation are proposed, which is used for the adaptation of the algorithm to various noise levels. The main target applications for the proposed algorithms are surveillance and TV broadcasting systems. In these applications the aim is quality enhancement and automatic image sequence analysis. Although in practice, the noise is not always white Gaussian (as assumed by the proposed algorithms) the performance of the proposed denoising schemes is still sufficiently good, even in case of correlated noise. The other possible applications are video coding facilitation and medical imaging (2D image sequences and 3D volumes).

1.2 Colour Video Denoising

1.2.1 Degradation of Video Sequences

Various degradations in image sequences can be classified as follows:

Spatial degradations: This can be due to the non-zero dimensions of picture elements used in the imaging device, or due to lens errors, defocus, and bandwidth limitations in electronics.

The effects are usually referred to as blur, unsharpness,ringing, echo, etc.Temporal degradations: These are caused by non-zero exposure time of the photosensitive material of the imaging device, by long decay times of light emitting materials, phosphors in displays. These degradations include motion blur, temporal flickering artifacts and etc.

Geometrical degradations: The distorted geometry of the displayed pictures, which can be due to lens

aberrations, deflection non-linearity in camera and display tubes.Point-wise degradations: It modifies the grey-level of image sequence elements without affecting detail or motion. These degradations are referred to as noise, which is often some kind of random process, e.g., thermal noise, quantum noise etc, depending on the source of degradation. In this thesis point-wise degradations are mainly focused and noises in image sequences are considered. Video sequences are often distorted by noise during acquisition, recording and/or transmission.

2.EXPLANATION

2.1 Video Denoising

Video denoising is generally achieved through some linear or non-linear operation on a set of neighboring (in the spatio-temporal sense) pixels, exploiting their correlation. In general, the best video denoising can be achieved by exploiting information from both future and past frames, but this leads to an additional delay of at least one frame which is undesirable in some real-time applications. For this reason, many algorithms exploit information from past frames only (usually the current frame and one or two previous frames).

Spatial and/or temporal - recursive schemes for denoising can significantly reduce computational cost and memory requirements of the algorithm. In particular temporally recursive techniques, which use the current and the previously processed frame for filtering, can produce an advanced denoising result provided motion is treated in a correct manner. This is because the image sequence information is gathered over many previously processed frames, thus providing more efficient noise removal.

In video denoising, correct treatment of motion is an important issue, which can significantly improve the efficiency of noise removal results. Specifically, for each spatial pixel position in the frame an optimal motion vector trajectory between two or more frames is determined. The motion vector trajectory is assumed to consist of pixels (from different consecutive frames) with the most similar intensity values, i.e., with the highest temporal correlation. This enables efficient noise filtering through temporally-uniform areas, which have a high degree of information redundancy. Consequently, noise can be smoothed well without degrading the noise- free image sequence content.

There are two main categories of motion detectors: The motion detector compares corresponding pixel values from successive frames, it uses only temporal information. The second category additionally includes spatial information and is less sensitive to noise.

3. EXPERIMENTAL RESULTS

3.1 Colour Image Denoising Output - Sample 1 (Lena.png)

Noise level, ó = 25, AWGN

3.2 Colour Image Denoising Output - Sample 2 (Teddy.png)

Noise level, ó = 25, AWGN

Input Image Denoised Image

3.3 Quantitative Analysis For Image Denoising

To validate the effectiveness of denoising algorithm, both grey scale and colour images under different AWGN levels are compared. The performance parameters are shown in Table 3.1 and Table 3.2 given below. Results shows that PSNR values achieved for different noise range using this spatio-temporal sequences with block matching techniques and filtered by wiener filter.

3.4 Quantitative Analysis For Video Denoising

To validate the effectiveness of denoising algorithm, colour videos under AWGN level(ó = 50) are compared. The performance parameters and its PSNR values of different sample videos are shown in Table 3.3 given below. Results shows that PSNR values achieved for different noise range using this spatio-temporal

sequences with block matching techniques and filtered by wiener filter based on Combined Interframe and Intercolour Prediction Algorithm.

Table 3.1 Comparison of AWGN table for Colour Space Image 1 - Lena.jpg

AWGN	Image Size	Input Noisy Image PSNR Value	Denoised Image PSNR Value	Denoising Time in Sec
σ = 25	400x400x3	20.177 dB	30.173 Db	9.6 sec
σ = 50	400x400x3	14.157 dB	26.642 Db	17.9 sec
σ = 75	400x400x3	10.635 dB	25.261 Db	18.5sec

Table 3.2 Comparison of AWGN table for Colour Space Image 2 - Teddy.jpg

AWGN	Image Size	Input Noisy Image PSNR Value	Denoised Image PSNR Value	Denoising Time in Sec
σ = 25	256x25 6x3	20.181 dB	33.030 dB	4.4 sec
σ = 50	256x25 6x3	14.160 dB	30.468 dB	7.1 sec
σ = 75	256x25 6x3	10.638 dB	28.694 dB	7.1 sec

Table 3.3 Comparison of PSNR Values for Sample Colour Videos

Sample Videos Name AWGN σ = 50	Image Size	Input Noisy Frames PSN R Value	Denoised Video PSNR Average Values	Denoising Frames / Sec
Cartoon .avi	144x176 x3	14.12 8dB	27.88 dB	50
Rhinos.avi	240x320 x3	14.15 dB	29.97 dB	50
Baby.avi	145x178 x3	14.12 8dB	26.05 dB	50

3.5 Denoised Colour Video Samples and its PSNR Values Sample 1: Xylo.avi

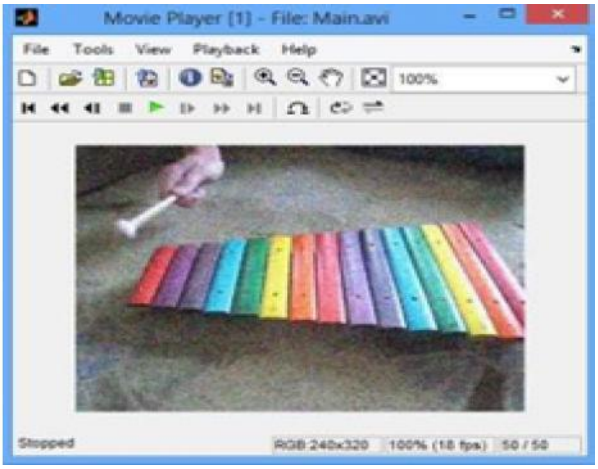


Fig. 1 Noisy input video

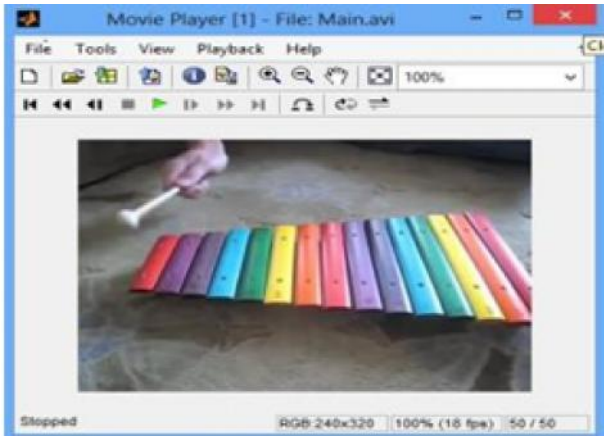


Fig. 2 Denoised output video

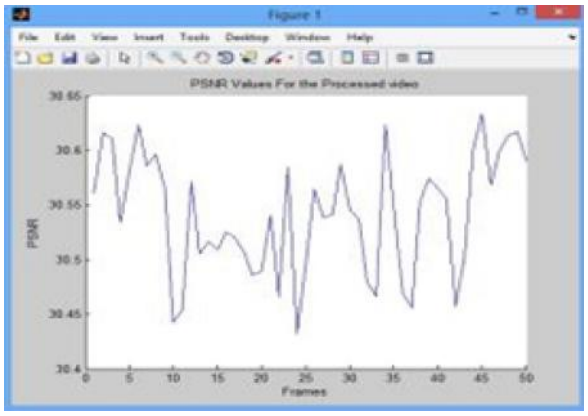


Fig.3 Plot between Frames and PSNR

SAMPLE 2: Rhinos.avi

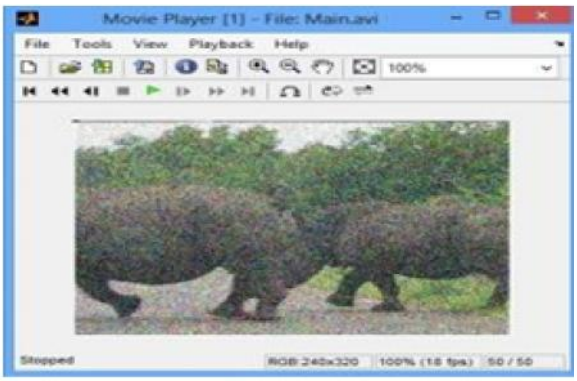


Fig. 4 Noisy input Video

4. CONCLUSION

In this project, an effective color video denoising algorithm CIFIC which directly exploits both the intercolor and interframe correlation in the color video signal. CIFIC applied joint-RGB ME to find a common motion field for RGB components and combined the current noisy observation as well as the interframe and intercolor predictors to obtain the LMMSE denoised estimate. The ill condition in LMMSE weight determination was detected and remedied by the remedial refinement to get rid of the annoying color artifacts. Experimental results verify the effectiveness of CIFIC in color noise reduction when compared with other state-of-the-art algorithms. Thedifferent approaches for noise reduction in video sequences are investigated. In this project work, developing spatio-temporally adaptive filtering schemes for noise removal, with special attention to preserving spatio-temporal sequence details are concentrated on images. Consideration given to both grey-scale and Colour sequences in progressive and interlaced format. The noise in sequences was most of the time assumed Gaussian and in some cases (less often) impulse. Because of the importance of the noise level estimate for optimal video denoising results, a special attention on noise level estimation methods are given. In particular, investigation and evaluation of many techniques for noise level estimation of Gaussian noise was done and proposed two new methods. For an evaluation of the algorithms' performance, in this project work, both objective and subjective criteria usages are done. For the objective criteria concerning denoising performance, in case of grey-scale sequences, Peak Signal to Noise Ratio (PSNR) is used as a general indicator of the denoising performance per each frame and average PSNR (PSNRav) over a whole sequence. In case of Colour sequences Colour-based Peak Signal to Noise Ratio (PSNRC) was used for the evaluation. The introduction of new measure, Peak Temporal Signal Deviation to Noise Ratio (PTSDNR), which was sometimes used in many work for evaluating the quality of the motion compensation as far as its contribution in denoising is concerned, in grey-scaled sequences. Additionally, Mean Square Error (MSE) and motion vector field Smoothness (S) criteria were used in some cases for evaluating motion estimation and compensation, as a part of a video denoising algorithm.

5. FUTURE WORK

The noise in video sequences was most of the time assumed Gaussian; hence this algorithm will develop for other types of noises. Because of the importance of the noise level estimate for optimal video denoising results, in future a special attention on noise level estimation and achieving good PSNR value within short duration of time are to be modified. The processing speed of CIFIC can be further enhanced through fast Motion Estimation algorithms, multithreading and parallelism design for possible real-time applications.

REFERENCES

(1) S. Awate and R. Whitaker, "Higher-Order Image Statistics for Unsupervised, Information-Theoretic, Adaptive, Image Filtering", Proc. IEEE International Conference, Computer Vision and Pattern Recognition. Vol.13, No.5, 2005, pp.220-230.

(2) S. Awate and R. Whitaker, "Unsupervised, Information-Theoretic, Adaptive Image Filtering for Image Restoration", IEEE Trans., 2006.

(3) A. Buades, B.Coll and J. Morel, "A Non-Local Algorithm for Image Denoising", Proc. IEEE

International Conference. Computer Vision and Pattern Recognition.Vol.19, No.7, 2005, pp. 123-139.

(4) A. Buades, B.Coll and J. Morel, "Nonlocal Image and Movie Denoising," Int'l Journal. Computer Vision. Vol.8, No.15, 2008, pp.120-126.

(5) Y.Cheng, "Mean Shift, Mode Seeking and Clustering", IEEE Trans. Pattern Analysis and Machine Intelligence. Vol.17, No.2, 1995, pp. 257-261.

(6) C. K. Chu, I.Glad, F.Godtliebsen and J.S. Marron, "Edge Preserving Smoothers for Image Processing", J. Am. Statistical Association, Vol.13, No.5, 1998, pp.490-530.

(7) P. Mrazek, J. Iickert and A.Bruhn, "On Robust Estimation and Smoothing with Spatial and Tonal Kernels", Geometric Properties from Incomplete Data,Klette.R, Springer, Vol.18,No.7, 2006, pp. 157-166.

(8) P. Perona and J. Malik, "Scale Space and Edge Detection Using Anisotropic Diffusion", IEEE Trans. Pattern Analysis and Machine Intelligence.Vol.4, No.3, 1990, pp.545-557.

(9) S.M. Smith and J.M. Brady, "Susan- A New Approach to Low Level Image Processing", Int'l Journal. Computer Vision. Vol.7, No.5, 1997, pp.264-323.

(10) C.Tomasi and R. Manduchi, "Bilateral Filtering for Gray and Colour Images", Proc. Int'l Conference. Computer Vision.2, Vol.16, No.8, 1998, pp.654-665.

Experimental Study on Cement Concrete Using Internal Curing Agents

Anjan shukla, V.Sheela and R.Mercy Shanthi
Karunya University, Coimbatore - 641 114, Tamil Nadu

Abstract

Internal curing is a practical way of supplying additional water throughout the concrete mixture. Additional water helps prevent early age shrinkage and increases hydration of cementious materials throughout the concrete. Internal curing provides readily available additional water throughout the concrete, so hydration can continue while more of the pores in the cement paste remain saturated. This reduces shrinkage and early age curling/warping, increases strength. This paper presents an experimental study on the compressive and split tensile strength test of concrete using internal curing agents such as such as super absorbent polymer(SAP), poly ethylene glycol(PEG), carboxy methyl cellulose(CMC).

Keywords: *Carboxy methyl cellulose, Super absorbent polymer, Poly ethylene glycol.*

1. INTRODUCTION

Knowledge of the shrinkage characteristics of concrete is a necessary starting point in the design of structures for crack control. Such knowledge will enable the designer to estimate the probable shrinkage movement in reinforced or prestressed concrete and the appropriate steps can be taken in design to accommodate this movement. When concrete is exposed to the environment it tends to reach an equilibrium with that environment. If the environment is a dry atmosphere the exposed surface of the concrete loses water by evaporation. The rate of evaporation will depend on the relative humidity, temperature, water-cement ratio and the area of the exposed surface of the concrete. The first water to be lost is that held in the large capillary pores of the hardened concrete. The loss of this water does not cause significant volume change. However, as drying continues, loss of water from small capillary pores and later from gel pores takes place. With the reduction in the vapour pressure in the capillary pores, tensile stress in the residual water increases. Tensile stresses in the capillary water are balanced by compressive stresses in the surrounding concrete and as a result the concrete shrinks.

2. EXPERIMENTAL WORK

The compressive strength of concrete is one of the most important properties of concrete. Compressive strength of concrete for the given design mix was determined. For this 150 mmX 150mm X 150mm size of concrete cubes were cast. After 28 days of internal curing, the cubes were tested in the compressive strength testing machine. The ultimate load at which the cube broken was taken and the compressive strength was calculated for average of three cubes and the results was found. IS 516-1959 codebook is used. Split tensile strength test shows that the tensile strength of concrete specimens which is in the form of cylinder and is loaded to failure along the entire length. Three specimens each had been cast for super absorbent polymer, polyethylene glycol, and carboxy methyl cellulose for both cube and cylinder.

3. MIX PROPORTION

Cement	394.32 kg/m3
Water content	0.50
Internal curing agents	0.1%
Fine aggregate	665 kg/m3
Coarse aggregate	1128 kg/m3

4. TESTING OF SPECIMENS

After the specimens are allowed to be cured for 28 days at the room temperature they become suitable for testing. For determining the compressive strength of concrete the cubes are subjected to load under compression testing machine and the load at which the specimen fails is noted. Compressive strength for three specimens each for super absorbent polymer, polyethylene glycol, and carboxy methyl cellulose have been found and the average is taken as results. Calculating the compressive strength in the test specimen from the maximum load on the specimen and

the initial computed cross-sectional area as follows:
S=P/A
Where s: compressive strength , (N/mm2)
P=maximum load, (N) A= cross sectional area ,(mm2)

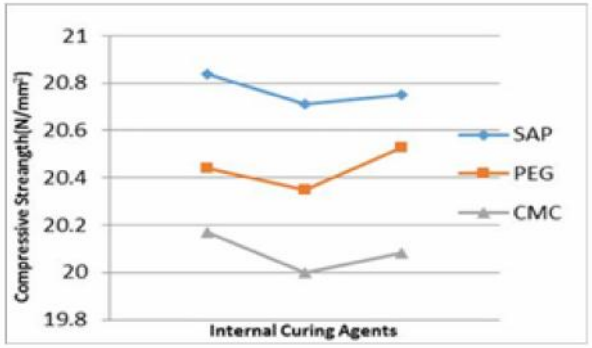
Fig.1 Testing of cube for compressive strength

Average cube compressive strength after 28 days for the following specimens are:
SAP=20.76 N/mm2
PEG=20.44 N/mm2
CMC=20.08 N/mm2

TABULATIONS

S.NO	SPECIMEN DESIGNATION	PERCENTAGE ADDED	MAXIMUM LOAD, P,KN	CROSS SECTIONAL AREA, A, MM2	COMPRESSIVE STRENGTH, N/MM2
1	$S_{28}C_1$	0.1	469	22,500	20.84
2	$S_{28}C_2$	0.1	466	22,500	20.71
3	$S_{28}C_3$	0.1	467	22,500	20.75
4	$P_{28}C_1$	0.1	460	22,500	20.44
5	$P_{28}C_2$	0.1	458	22,500	20.35
6	$P_{28}C_3$	0.1	462	22,500	20.53
7	$C_{28}C_1$	0.1	454	22,500	20.17
8	$C_{28}C_2$	0.1	450	22,500	20
9	$C_{28}C_3$	0.1	452	22,500	20.08

Average cube compressive strength after 28 days for the following specimens are : SAP=20.76 N/mm2
PEG=20.44 N/mm2
CMC=20.08 N/mm2



After testing the cubes for compressive strength and finding the results, split tensile strength for cylindrical specimens were conducted and the results were found out. For finding the split tensile strength for cylindrical specimens the specimens are subjected to load till it failed and the load was noted and split tensile strength for the specimen was tested using the formula:
T=2P/3.14ld
Where:
P=maximum applied load indicated by the testing machine, (N)
l=average length of the specimen, (mm)
d=average diameter of specimen, (mm)
T=split tensile strength (N/mm2)

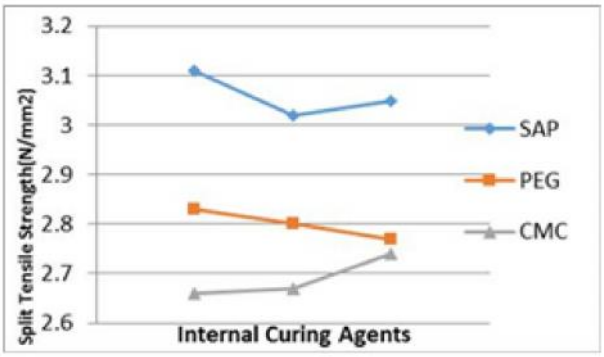
Fig. 2 Testing of cylinder for split tensile strength

TABULATIONS

SL.NO.	SPECIMEN DESIGNATION	PERCENTAGE ADDED	MAXIMUM LOAD, P (KN)	LENGTH OF THE SPECIMEN, l (mm)	DIAMETER OF THE SPECIMEN, d (mm)	SPLIT TENSILE STRENGTH, T (N/mm2)
1	$S_{28}ST_1$	0.1	220	300	150	3.11
2	$S_{28}ST_2$	0.1	214	300	150	3.02
3	$S_{28}ST_3$	0.1	216	300	150	3.05
4	$P_{28}ST_1$	0.1	200	300	150	2.83
5	$P_{28}ST_2$	0.1	198	300	150	2.80
6	$P_{28}ST_3$	0.1	196	300	150	2.77
7	$C_{28}ST_1$	0.1	188	300	150	2.66
8	$C_{28}ST_2$	0.1	189	300	150	2.67
9	$C_{28}ST_3$	0.1	194	300	150	2.74

Split tensile strength after 28 days for the following specimens are:

SAP=3.06N/mm2
PEG=2.8N/mm2
CMC=2.69N/mm2



5. RESULTS AND DISCUSSIONS

The testing of specimens cube as well as cylinder for compressive strength and split tensile strength respectively shows desirable results. Specimens casted by mixing superabsorbent polymer showed highest strength followed by the specimens casted by mixing polyethylene glycol which is followed by the specimens casted using carboxy methyl cellulose. SAP is a polymer which can absorb and retain extremely large amount of water as a result of which the specimens casted with SAP were able to withstand more load as compared to the rest two internal curing agents such as PEG and CMC.

6. CONCLUSIONS

This experiment was conducted to check the advantage of casting specimens using internal curing agents over normal concrete.

REFERENCE

(1) O.S. Olafusi and F.A. Olutoge, "Strength Properties of Corn Cob Ash Concrete", Journal of Emerging Trends in Engineering and Applied Sciences (JETEAS), Vol.3, pp. 297-301.

(2) M. Liu, "Self-Compacting Concrete with Different Levels of Pulverized Fuel Ash. Construction and Building Materials, Vol.24, 2010, pp.1245-1252.

(3) A. Leemann R. Loser and B. Munch, "Influence of Cement Type on Its Porosity and Chloride Resistance of Self-Compacting Concrete", Cement and Concrete Composites, Vol.32, 2010, pp.116-120. http://dx.doi.org/10.1016/j.cemconcomp.2009.11.007

(4) S.C. Kou and C.S. Poon, "Properties of Self-Compacting Concrete Prepared with Coarse and Fine Recycled Concrete Aggregates", Cement and Concrete Composites, Vol.31, 2009, pp.622-627.http://dx.doi.org/10.1016/j.cemconcomp.2009.06.005

(5) F.M.A. Filho, B.E. Barragran, J.R. Casas and A.L.H.C. ElDebs, "Hardened Properties of Self-Compacting Concrete-A Statistical Approach", Construction and Building Materials, Vol.24, 2010, pp.1608-1615. http://dx.doi.org/10.1016/j.conbuildmat.2010.02.032

(6) O. Boukendakdji, S.Kenai, E.H.Kadri and F. Rouis, "Effect of Slag on the Rheology of Fresh Self-Compacted Concrete", Construction and Building Materials, Vol.23, 2009, pp.2593-2598. http://dx.doi.org/10.1016/j.conbuildmat.2009.02.029

(7) B. Craeye, D.G.Schutter and B. Desmet, *et al.*, "Effect of Mineral Filler Type on Autogenous Shrinkage of Self- Compacting Concrete", Cement and Concrete Research, Vol.40, 2010, pp.908-913. http://dx.doi.org/10.1016/j.cemconres.2010.01.014

(8) ACI Committee 237, "Self-Consolidating Concrete", Emerging Technology Document, American Concrete Institute, Farmington Hills, 2005.

(9) P. Bartos, "Self-Compacting Concrete", Concrete, Vol.33, 1993, pp.9-14.

(10) H.M. Okamura and M. Ouchi, "Self- Compacting Concrete", Journal of Advances Concrete Technology, Vol.1, 2003, pp.5-15. http://dx.doi.org/10.3151/jact.1.5

(11) B. Li, J. Wang and M. Zhou, "Effect of Limestone Fines Content in Manufactured Sand on Durability of Low- and High-Strength Concretes", Construction and Building Materials, Vol.23, 2009, pp.2846-2850. http://dx.doi.org/10.1016/j.conbuildmat.2009.02.033

(12) V. Corinaldesi and G. Moriconi, "Influence of Mineral Additions on the Performance of 100% Recycled Aggregate Concrete", Construction and Building Materials, Vol.23, 2009, pp.2869-2876. http://dx.doi.org/10.1016/j.conbuildmat.2009.02.004

(13) Z. Grdiж, I. Despotoviж and G.T. Жuгиiж, "Properties of Self-Compacting Concrete with Different Type of Additives. Facta Universitatis, Vol.6, 2008, pp.173-177.

(14) EFNARC, "Specification and Guidelines for Self-Compacting Concrete", Farnham, 2002.

(15) F. de Larrard, C. F. Ferraris and T. Sedran, "Fresh Concrete", A Herschel- Bulkley Material, 1996.

Study on Mechanical Behaviour of Concrete Using Rice Husk Ash and Steel Scrap

J. K. Harihar Kalathil and K. Sudalaimani
Department of Civil Engineering,
Thiagarajar College of Engineering, Madurai - 625 015, Tamil Nadu

Abstact

Recent technological development has shown that industrial wastes, agricultural wastes, urban and rural waste materials are valuable as inorganic and organic resources and can produce various useful products. Amongst the solid wastes, the most prominent ones are fly ash, blast furnace slag, rice husk, silica fume and demolished construction materials. Rice husk is one of the supplementary materials, in this study the rice husk has been collected and the property of the rice husk has been determined by burning the rice husk. The ash from the burnt rice husk is collected and the property has been founded out by X Ray Diffraction and EDAX. The best sample which has more silica content has been used for our investigation. Steel scrap collected from the lathe has been used based on the aspect ratio. RHA will be partially replaced with the cement based on the percentage. Steel scrap will be replaced in percentage to the weight of the concrete. At various percentages of RHA and steel scrap the strength behaviour has been studied. The percentages of replacement of RHA are 0%, 10%, 20% and 30%. To the total volume of concrete 1.5% of steel scrap is added. From the results it has been shown 10% and 20% has shown an increase in strength compared to the conventional concrete.

1. INTRODUCTION

Concrete is a widely used construction material for various types of structures due to its structural stability and strength. All the materials required producing such huge quantities of concrete come from the earth's crust. Thus, it depletes its resources everyyear creating ecological strains. On the other hand, human activitieson the Earth produce solid waste in considerable quantities of over2500/MT per year, including industrial wastes, agricultural wastesand wastes from rural and urban societies. Recent technologicaldevelopment has shown that these materials are valuable asinorganic and organic resources and can produce various usefulproducts.Amongst the solid wastes, the most prominent ones arefly ash, blast furnace slag, rice husk, silica fume and demolishedconstruction materials.From the middle of 20th century, there had been an increase in theconsumption of mineral admixtures by the cement and concreteindustries. The increasing demand for cement and concrete ismet by partial cement replacement. Substantial energy and costsavings can result when industrial by-products are used as a partialreplacement for the energy intense Portland cement. The use ofby- products is an environmental friendly method of disposal oflarge quantities of materials that would otherwise pollute land,water and air. Most of the increase in cement demand will be metby the use of supplementary cementing materials.

Rice milling generates a by-product known as husk. This surrounds the paddy grain. During the milling of paddy about 78 % of weight is received as rice, broken rice and bran. The rest 22 % of the weight of paddy is received as husk. This husk is used as fuel in the rice mills to generate steam for the parboiling process. This husk contains about 75 % organic volatile matter which burns up and the balance 25 % of the weight of this husk is converted into ash during the firing process, which is known as rice husk ash (RHA). Rice husk was burnt approximately 48 hours under uncontrolled combustion process. The burning temperature was within the range of 600 to 850 degrees. The ash obtained was ground in a ball mill for 30 minutes and its colour was seen as grey. This RHA in turn contains around 85%-90% amorphous silica. So for every 1000 kg of paddy milled, about 220 kg (22%) of husk is produced, and when this husk is burnt in the boilers, about 55 kg (25%) of RHA is generated. Concrete is a material weak in tension and fails in a brittle manner when subjected to flexure, tension and impact forces. When, Steel fibres added to concrete, the behavioural efficiency of this composite material is superior to that of plain concrete and many other construction materials of equal cost. Dueto

this benefit, the use of FRC has increasedlargely in the recent years and finds itsapplication in airport and highway pavements, earthquake-resistant and explosive-resistant structures, mine and tunnel linings, bridge deck overlays and hydraulic structures. However, steel fibres available in market are costly and this makes steel fibre reinforced concrete uneconomical. As a part of waste management, effective utilization of waste material is indeed a great need in the recent years. Lathe scrap, which exhibits the property of steel fibre largely, can be used as an alternate for steel fibre in the FRC production.

1.1. Rice Husk Ash

India is a major rice producing country, and the husk generated during milling is mostly used as a fuel in the boilers for processing paddy, producing energy through direct combustion and / or by gasification. About 20 million tons of RHA is produced annually. This RHA is a great environment threat causing damage to the land and the surrounding area in which it is dumped. Lots of ways are being thought of for disposing it by making commercial use of this RHA. In the present investigation, Portland cement was replaced by rice husk ash at various percentages to study compressive and flexural strength of concrete.

Rice husk can be burnt into ash that fulfils the physical characteristics and chemical composition of mineral admixtures. Puzzolanic activity of rice husk ash (RHA) depends on (i) silica content, (ii) silica crystallization phase, and (iii) size and surface area of ash particles. In addition, ash must contain only a small amount of carbon. RHA that has amorphous silica content and large surface area can be produced by combustion of rice husk at controlled temperature. Suitable incinerator/furnace as well as grinding method is required for burning and grinding rice husk in order to obtain good quality ash. Although the studies on puzzolanic activity of RHA, its use as a supplementary cementitious material, and its environmental and economical benefits are available in many literatures, very few of them deal with rice husk combustion and grinding methods.

1.1.1 Advantages of Rice Husk Ash

The optimized RHA, by controlled burn and/or grinding, has been used as a pozzolanic material in cement and concrete. The product obtained from R.H.A. is identified by trade name Silpoz which is much finer than cement.

- The use of Rice Husk Ash improves the strength and durability of the concrete.
- The use of RHA as a supplementary material in concrete reduces the environmental problems such as disposal of wastes.
- The Carbon-di-oxide emission has also been reduced.

1.1.2 Properties of Rice Husk Ash

- Studies have shown that RHA resulting from the burning of rice husks at control temperatures have different physical and chemical properties based on the source area.
- At burning temperatures of 550^0C – 800^0C, amorphous silica is formed, but at higher temperatures crystalline silica is produced.
- The silica content is between 90 and 96%.
- Studies have shown that to obtain the required particle size, the RHA needs to be grinded to size 10 μm - 45 μm.
- Specific gravity of the RHA will be about 2.05.

1.2 Steel Scrap

Fibre reinforced concrete (FRC) is a composite material consisting of cement, fine aggregate, coarse aggregate, water and fibres. In this composite material, short discrete fibres are randomly distributed throughout the mass. Extensive research work has been carried out by using different types of fibres. Literature survey has a very limited study on FRC using industrial waste fibres. Due to the increase in the population and industrial activities, the quantity of waste fibres generated from various metal industries has been increased. These scrap from the industries can be effectively be used for making high strength FRC.

1.2.1 Aspect Ratio

- The aspect ratio of an image describes the proportional relationship between its width and its height.
- According to the literatures the aspect ratio of the fibre to be used in concrete must be around 50-75.
- Based on the literatures reviewed the aspect ratio selected for the investigation is 50.
- So the length of the steel scrap is 20mm and diameter is 0.4mm.

2. OBJECTIVES OF THE STUDY

The main objective is to study about the mechanical properties of the Concrete by partial replacement of cement with Rice Husk Ash and by addition of Steel Scrap.

- To carry out detailed literature study about the investigation related with this studypaper and the conclusion and remarks drawn by the authors of the literatures.
- To find the properties of the Rice Husk this had been collected and burnt under controlled temperature.
- The RHA samples were collected by burning at various temperatures at different duration of burning. The samples were analysed by X-ray Diffraction and EDAX test to find out the physical and chemical properties.

3. METHODOLOGY

A preliminary experimental investigation was carried out to study the material properties such as specific gravity for the material used. The RHA samples were collected by burning the Rice Husk in controlled temperature fr different duration by using the furnace. The properties and aspect ratio of the steel scrap has been derived based on the literature reviewed. The burnt samples were sent for XRD and EDAX testing for the analysis of chemical properties of RHA. The sample with optimum silica content will be used for experimental purpose.

3.1 Materials Used

The following material has been used for experimentalstudy.

3.2 Fine Aggregate

Fine aggregate are basically sands from the land or the marine environment. The sand used for the experimental program was locally procured and conformed to grading zone II. The sand was first sieved through 4.75mm sieve to remove any particles greater than 4.75mm and then was washed to remove the dust. The fine aggregates were tested per Indian Standard specification IS: 383-1970.

3.3 Coarse Aggregate

Coarse aggregates are particles greater than 4.75mm, but generally range between 9.5mm to 37.5mm in diameter. They can either be from Primary, Secondary or Recycled sources. Primary, or 'virgin', aggregates are either Land- or Marine- Won. Gravel is a coarse marine-won aggregate; land-won coarse aggregates include gravel and crushed rock. Gravels constitute the majority of coarse aggregate used in concrete with crushed stone making up most of the remainder.

3.4 Cement

A powder of alumina, silica, lime, iron oxide, and magnesium oxide burned together in a kiln and finely pulverized and used as an ingredient of mortar and concrete; *also* any mixture used for a similar purpose.

3.5 Rice Husk Ash

Rice Husk Ash is produced from the Rice Husk collected from the rice mill. The RHA is produced by burning the Rice Husk at proper temperature and duration.Rice husk can be burnt into ash that fulfils the physical characteristics and chemical composition of mineral admixtures. Puzzolanic activity of rice husk ash (RHA) depends on (i) silica content, (ii) silica crystallization phase, and (iii) size and surface area of ash particles.

3.6 Steel Scrap

Steel scrap is the waste collected from the Lathe industry and it has been used as a FRC in concrete due to its tensile behaviour. As the concrete is weak in tension it is used to increase its tensile strength.

3.7 Experimental Details

- Pycnometer was used to find the specific gravity of coarse and fine aggregate and the values were calculated.
- X-Ray Diffraction test was used to find the physical properties of the RHA samples. The chemical composition will be analyzed using EDAX test.

3.8 Method of Investigation

- The material properties of various materials used are experimentally investigated.
- The Rice husk has been collected from the rice mills in & around Madurai and burnt under controlled temperature.
- The samples are collected for different durations to find out the optimum silica content.
- Obtained samples physical properties are determined by X-Ray diffraction.
- Based on the XRD test result the samples chemical properties will be determined using EDAX testing.
- Spcimens are casted for various proportions(0%, 10%, 20% & 30%).
- The compressive strength has been calculated for curing period of 7 days and 28 days. Mean while the split tensile strength has been also calculated.

4. X RAY DIFFRACTION (XRD)

X-ray powder diffraction (XRD) is a rapid analytical technique primarily used for phase identification of a crystalline material and can provide information on unit cell dimensions. The analyzed material is finely ground, homogenized, and average bulk composition is determined.

4.1 Fundamental Principles of X-RAY Powder Diffraction (XRD)

X-ray diffraction is based on constructive interference of monochromatic X-rays and a crystalline sample. These X-rays are generated by a cathode ray tube, filtered to produce monochromatic radiation, collimated to concentrate, and directed toward the sample. The interaction of the incident rays with the sample produces constructive interference (and a diffracted ray) when conditions satisfy Bragg's Law ($n\lambda=2d \sin\theta$). This law relates the wavelength of electromagnetic radiation to the diffraction angle and the lattice spacing in a crystalline sample. These diffracted X-rays are then detected, processed and counted. By scanning the sample through a range of 2 θangles, all possible diffraction directions of the lattice should be attained due to the random orientation of the powdered material. Conversion of the diffraction peaks tod-spacings allows identification of the mineral because each mineral has a set of unique d-spacings. Typically, this is achieved by comparison of d-spacings with standard reference patterns.

All diffraction methods are based on generation of X-rays in an X-ray tube. These X-rays are directed at the sample, and the diffracted rays are collected. A key component of all diffraction is the angle between the incident and diffracted rays. Powder and single crystal diffraction vary in instrumentation beyond this.

5. EDAX

EDAX is a widely used technique to analyze the chemical components in a material under SEM. This method detects the X-rays produced as a result of the electron beam interactions with the sample. Mapping of the distribution of the different chemical elements constituting the specimen can be obtained.

X-ray data is processed to obtain the percentage of each measures element present in the individual particles. The compositional and morphological data are then combined for exploratory data analysis. SEM-EDAX is many times routinely used morphological information of the stone and identification of chemical composition.

6. SPECIFIC GRAVITY

Specific gravity is the ratio of the density of a substance to the density of a reference substance; equivalently, it is the ratio of the mass of a substance to the mass of a reference substance for the same given volume.

- The container should be thoroughly cleaned and the empty weight of the container should be taken. Let the empty weight of the container be W1.
- Then the container will be filled with aggregate upto the mark and the weight W2 will be taken.
- Next the container will be filled with water and aggregate, the weight W3 will be taken.
- Then the container will be filled with water till the mark and the weight W4 will be taken.
- Finally by using the below formula the specific gravity will be calculated

6.1 Mix Proportion

Table 1 Mix Proportion

Specimen	Cement (kg/m^3)	RHA (kg/m^3)	Coarse Aggregate (kg/m^3)	Fine Aggregate (kg/m^3)	Water (lit/m^3)	Super plasticizer (lit/m^3)	Steel Scrap (Percent)
S1-R0-S0	328.6	0	1260.42	753.66	147.87	3.286	0
S2-R10-S1.5	295.74	32.86	1259.18	752.92	147.87	3.286	1.5
S3-R20-S1.5	262.88	65.72	1257.94	752.18	147.87	3.286	1.5
S4-R30-S1.5	230.02	98.58	1256.70	751.44	147.87	3.286	1.5
S5-R0-S1.5	328.6	0	1260.42	753.66	147.87	3.286	1.5

7. RESULTS AND DISCUSSION

Table 2 Specific Gravity

Materials	Specific Gravity
Fine Aggregate	2.6
Coarse Aggregate	2.78
RHA	2.9
Cement	3.1

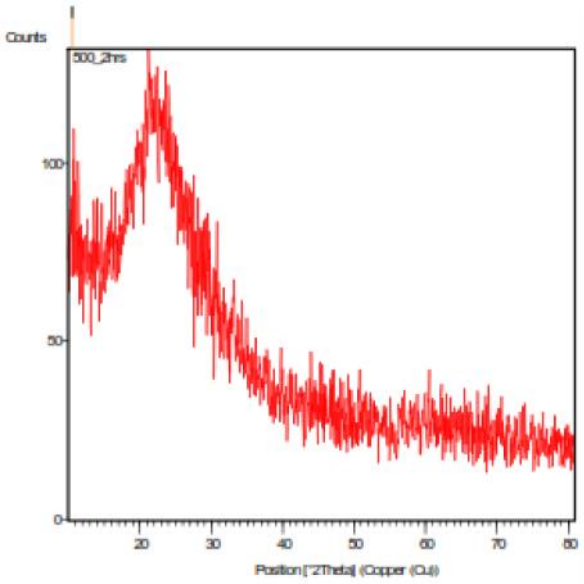


Fig. 3.1 XRD result (S1-C500-H2)

7.1 X Ray Diffraction

Totally 11 samples were collected by burning the Rice Husk at different temperature and duration. The details of the samples collected are shown in table 3.2.

Table 3 X-Ray Diffraction Samples

Samples	Temperature (Celsius)	Duration (Hours)
S1-C500-H2	500	2
S2-C500-H3	500	3
S3-C500-H4	500	4
S4-C550-H3	550	3
S5-C550-H4	550	4
S6-C600-H2	600	2
S7-C600-H3	600	3
S8-C600-H4	600	4
S9-C650-H2	650	2
S10-C650-H3	650	3
S11-C700-H3	700	3

Table 3 X-Ray diffraction results

Samples	Result
S1-C500-H2	Amorphous
S2-C500-H3	Amorphous
S3-C500-H4	Amorphous
S4-C550-H3	Amorphous
S5-C550-H4	Amorphous
S6-C600-H2	Amorphous
S7-C600-H3	Amorphous
S8-C600-H4	Amorphous
S9-C650-H2	Amorphous
S10-C650-H3	Amorphous
S11-C700-H3	Amorphous

.

7.2 EDAX Result

Based on the X-Ray diffraction result the sample has been selected based on its finess & color. The selected samples chemical properties were found out using edax test. Totally 5 samples has been chosen for EDAX test based on its fineness and colour. The details of the selected samples have been shown in table 4.

Table 4 EDAX Samples

Samples	Temperature (Celsius)	Duration (Hours)
S2-C500-H3	500	3
S4-C550-H3	550	3
S6-C600-H2	600	2
S7-C600-H3	600	3
S11-C700-H3	700	3

Table 5 Sio_2 Percentage of Selected Samples

Samples	Weight (%)
S2-C500-H3	96.61
S4-C550-H3	97.36
S6-C600-H2	95.23
S7-C600-H3	97.15
S11-C700-H3	97.36

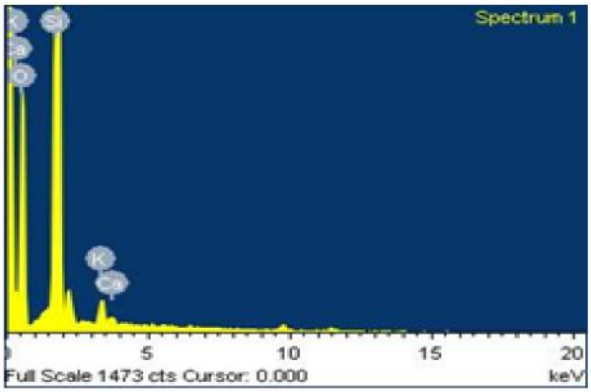


Fig. 3.2 EDAX Graph for sample

Table 6 Percentage of Elements for Sample S4-C550-H3

Element	Weight (Percentage)
O K	55.59
Si K	41.77
K K	2.08
Ca K	0.56

The SiO_2 Content in sample S4-C550-H3 from Table 6 is 97.36%.

Table 7 Compressive Strength

Specimens	7 Days (kN/mm^2)	28 Days (kN/mm^2)
S1-R0-S0	16.1	26.2
S2-R10-S1.5	17.5	28.3
S3-R20-S1.5	14.8	24.6
S4-R30-S1.5	15	25
S5-R0-S1.5	17.4	27.85

Table 8 Split Tensile Strength

Specimens	28 Days (kN/mm^2)
S1-R0-S0	2.1
S2-R10-S1.5	2.2
S3-R20-S1.5	1.8
S4-R30-S1.5	1.66
S5-R0-S1.5	2.05

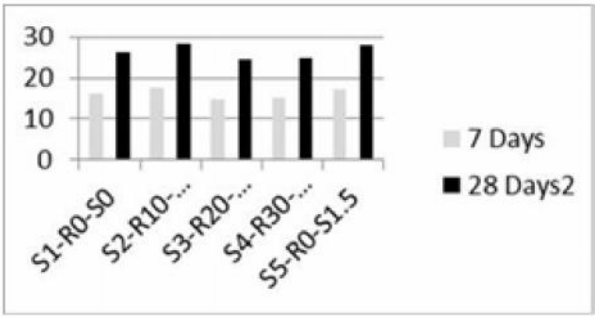


Chart 1 Compressive Strength

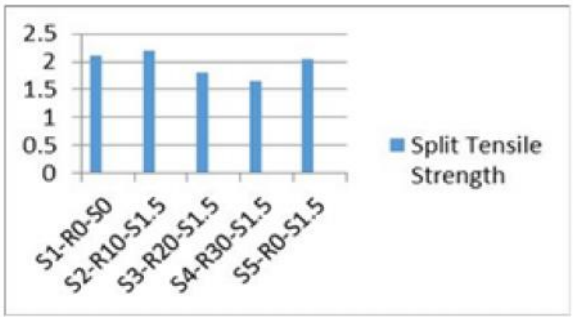


Chart 2 Split Tensile Stregth

8. CONCLUSION

The literature review has been done on various usages of RHA and its burning process. The details regarding the usage of lathe waste as replacement of the steel fibres are studied in detail.

- The properties of the Rice Husk Ash and the aspect ratio of the steel scrap from the late waste have been discussed.
- The aspect ratio for the Lathe waste is 50-60; this value is obtained based on the reference of journals.
- The Rice husk was collected and burnt under controlled temperature using furnace.
- Totally 11 samples were obtained at various temperature and duration. XRD test was done for all samples to find the physical properties.The result was Amorphous for all the 11 samples and it has been mentioned in table 3.2
- Totally 5 samples are selected and among the selected samples the sample which has optimum silica content will be used for our future work. And the details of the sample are shown in table 3.3.
- Due to the presence of optimum Si content in sample S4-C550-H3 from table 3.4. So sample S4-C550-H3 will be used for the experimental works.
- Various specimens where casted based on the propotions(0%, 10%, 20% & 30%). Compression strength and Split tensile strength has been calculated.
- From the table 4.7 it has been concluded that specimen S2-R10-S1.5 give high compressive strength compared to the conventional concrete. The specimen S5-R0-S1.5 gives high compressive strength this shows that the addition of steel scrap plays a vital role for the increase of the compressive strength.
- Mean while the split tensile strength is more in specimen R2-S10-R1.5 compared to the conventional concrete.
- Finally it can be concluded that the strength of concrete is increased by 10 percent replacement of RHA and 1.5 percent addition of steel scrap.

REFERENCES

(1) Alireza Naji Givi, Suraya Abdul Rashid, Farah Nora A. Aziz, Mohamad Amran Mohd Salleh, "Assessment Of The Effects Of Rice Husk Ash Particle Size On Strength, Water Permeability And Workability Of Binary Blended Concrete", Institute of Advanced Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia.

(2) F. Altun T.Haktanir and K. Ari, "Effects of Steel Fiber Addition on Mechanical Properties of Concrete and RC Beams", Construction and Building Materials, Vol.21, No.3, 2007, pp. 654-661.

(3) B.D. Cullity, "Elements of X-ray Diffraction", 2nd ed. Addison-Wesley, Reading, Mass, 1978.

(4) VP. Della, I. Kuhn and D. Hotza, "Rice Husk Ash as an Alternate Source for Active Silica Production", Mater Lett , Vol.57, Np.4, 2002, pp.818-21.

(5) Gemma Rodriguez de Sensale, "Strength Development of Concrete with Rice- Husk Ash", Cement & Concrete Composites, Vol.28, 2006.

(6) Ghassan Abood Habeeb, Hilmi Bin Mahmud, "Study on Properties of Rice Husk Ash and Its Use as Cement Replacement Material", Vol.13. No.2, 2010, pp.185-190.

(7) I. S. Ibrahim, M.B. Che Bakar, "Effects on Mechanical Properties of Industrialised Steel Fibres Addition to Normal Weight Concrete", UTM faculty of Civil Engineering, University Technology Malaysia.

(8) Makarand Suresh Kulkarni, Paresh GovindMirgal, Prajyot Prakash Bodhale and S.N. Tande, "Effect of Rice Husk Ash on Properties of Concrete", Journal of Civil Engineering and Environmental Technology, Vol.1, 2014, pp. 26-29.

(9) I.O. Obilade, “Use Of Rice Husk Ash As Partial Replacement For Cement In Concrete”, International Journal of Engineering and Applied Sciences, Vol.5, 2014, pp.11-16.
(10) P.Padma Rao, A.Pradhan Kumar, B.Bhaskar Singh, “A Study on Use of Rice Husk Ash in Concrete”, International Journal of Education and Applied Research, Vol. 4, 2014, pp.75- 81.

Efficient Reverse Top-k Boolean Spatial Keyword Queries on Road Networks

Priyaselvi
Department of Computer Science and Engineering,
Coimbatore Institute of Technology, Coimbatore -641 014, Tamil Nadu
priya.selvi93@gmail.com

Abstract

The present invention refers to a self-contained system of energy regeneration, which in addition has several advantages set out below. The system comprises an electric motor drive (1), a main generator (2), auxiliary generators (3), a flywheel (4), and pulleys (5). The system is intended to generate its own operating power, and provide an extra supply for other purposes. This invention can mainly used in the field of agriculture for generating free energy to run their water pumps in free of electricity. This reduces the consumption of electricity. The renewable efficiency makes the process work continuously when the electrical power is removed.

1. INTRODUCTION

Nearest neighbour search is one of the research in Information Technology where several algorithms and theoretical performance bounds have been devised for exact and approximate processing in main memory. The nearest query discovers the previously unknown, but potentially useful patterns from spatial databases, trying to find patterns in geographic data. Due to the popularity of search services on the Internet, users are allowed to provide a list of keywords besides the spatial Information of objects, which reduces Scalability and an increase of Query response time. Therefore there is a need for improved training methods, and virtual reality technology for processing this query, which is implemented by means of group nearest group (GNG) search.

Initially the set of Data points, containing the keyword information of query object and the query keyword should be given by the User. By GNG query, each nearest point matches at least one of the query keywords of the User. Next, the user wants to rank the selected locations with respect to the sum of distances to nearest interested facilities. As a result, the best location can be obtained from the minimized summed Distance calculation.

1.1 About Spatial Mining

Spatial data mining is the process of discovering interesting and previously un- known, but potentially useful patterns from large spatial datasets. Extracting interesting and useful patterns from spatial datasets is more difficult than extracting the corresponding patterns from traditional numeric and categorical data due to the complexity of spatial data types, spatial relationships, and spatial autocorrelation. Spatial data is about instances located in a physical space. When spatial information becomes dominant interest, spatial data mining should be applied. Spatial data structures can facilitate spatial mining. Standard data mining algorithms can be modified for spatial data mining, with a substantial part of preprocessing to take into account of spatial information. The main difference between data mining in relational data base system and in spatial database system is that attributes of the neighbours of some object of interest may have an influence on the object and therefore have to be considered as well.

The explicit location and extension of spatial objects define implicit relations of spatial neighbourhood (such as topological, distance and direction relations) which are used by spatial data mining algorithms. Therefore, new techniques are required for effective and efficient data mining.

Spatial data is stored in spatial databases. Multidimensional trees are used, in order to build indices for these data (e.g. quad trees, k-d trees, R- trees, R*-trees). Often attributes of spatial objects are still one-dimensional, so that this non-spatial part can be stored in relational databases with references to the spatial data. Spatial operations like spatial join and map overlay are the most expensive.

Spatial analysis or spatial statistics includes any of the formal techniques which study entities using their topological, geometric, or geographic properties.

The phrase properly refers to a variety of techniques, many still in their early development, using different analytic approaches and applied in fields as diverse as astronomy, with its studies of the placement of galaxies in the cosmos, to chip fabrication engineering, with its use of 'place and route' algorithms to build complex wiring structures. The phrase is often used in a more restricted sense to describe techniques applied to structures at the human scale, most notably in the analysis of geographic data. The phrase is even sometimes used to refer to a specific technique in a single area of research, for example, to describe geostatistics.

Complex issues arise in spatial analysis, many of which are neither clearly defined nor completely resolved, but form the basis for current research. The most fundamental of these is the problem of defining the spatial location of the entities being studied. For example, a study on human health could describe the spatial position of humans with a point placed where they live, or with a point located where they work, or by using a line to describe their weekly trips; each choice has dramatic effects on the techniques which can be used for the analysis and on the conclusions which can be obtained.

Other issues in spatial analysis include the limitations of mathematical knowledge, the assumptions required by existing statistical techniques, and problems in computer based calculations .Spatial analysis confronts many fundamental issues in the definition of its objects of study, in the construction of the analytic operations to be used, in the use of computers for analysis, in the limitations and particularities of the analyses which are known, and in the presentation of analytic results. Many of these issues are active subjects of modern research.

Common errors often arise in spatial analysis, some due to the mathematics of space, some due to the particular ways data are presented spatially, some due to the tools which are available. Census data, because it protects individual privacy by aggregating data into local units, raises a number of statistical issues.

1.2 About Nearest Keyword Search

Nearest neighbour search (NNS), also known as proximity search, similarity search or closest point search, is an optimization problem for finding closest points in metric spaces. The problem is: given a set S of points in a metric space M and a query point $q \in M$, find the closest point in S to q. In metric space, there is a valid concept of distance between points. The distance between two features is calculated by calculating the points distance between them. The lesser the distance between them, the more similar they are in appearance.

Various solutions to the Nearest Keyword Search problem have been proposed. The quality and usefulness of the algorithms are determined by the time complexity of queries as well as the space complexity of any search data structures that must be maintained. The informal observation usually referred to as the curse of dimensionality states that there is no general-purpose exact solution for NNS in high-dimensional Euclidean space using polynomial preprocessing and poly algorithmic search time.

The simplest solution to the Nearest Keyword Search problem is to compute the distance from the query point to every other point in the database, keeping track of the "best so far". This algorithm, sometimes referred to as the naive approach, has a running time of O(Nd) where N is the cardinality of S and d is the dimensionality of M. There are no search data structures to maintain, so linear search has no space complexity beyond the storage of the database. Naive search can, on average, outperform space partitioning approaches on higher dimensional spaces.

Algorithms for searching virtual spaces are used in constraint satisfaction problem, where the goal is to find a set of value assignments to certain variables that will satisfy specific mathematical equations . They are also used when the goal is to find a variable assignment that will maximize or minimize a certain function of those variables. Algorithms for these problems include the basic brute-force search (also called "naďve" or "uninformed" search), and a variety of heuristics that try to exploit partial knowledge about structure of the space, such as linear relaxation, constraint generation, and constraint propagation.

An important subclass are the local search methods, that view the elements of the search space as the vertices of a graph, with edges defined by a set of heuristics applicable to the case; and scan the space by moving from item to item along the edges, for example according to the steepest descent or best-first criterion, or in a stochastic search. This category includes a great variety of general heuristic methods, such as simulated annealing, A-teams, and genetic

programming that combine arbitrary heuristics in specific ways. This class also includes various tree search algorithms, that view the elements as vertices of a tree and traverse that tree in some special order. Examples of the latter include the exhaustive methods such as depth-first search and breadth-first search, as well as various heuristic-based search tree pruning methods such as backtracking and branch and bound.

Unlike general heuristics, which at best work only in a probabilistic sense, many of these tree-search methods are guaranteed to find the exact or optimal solution, if given enough time. Another important sub-class consists of algorithms for exploring the game tree of multiple-player games, such as chess or backgammon, whose nodes consist of all possible game situations that could result from the current situation.

The goal in these problems is to find the move that provides the best chance of a win, taking into account all possible moves of the opponent(s). Similar problems occur when humans or machines have to make successive decisions whose outcomes are not entirely under one's control, such as in robot guidance or in marketing, financial or military strategy planning. This kind of problem - combinatorial search - has been extensively studied in the context of artificial intelligence. Examples of algorithms for this class are the min max algorithm, alpha-beta pruning, and the A* algorithm.

An increasing number of applications require the efficient execution of nearest neighbour (NN) queries constrained by the properties of the spatial objects. Due to the popularity of keyword search, particularly on the Internet, many of these applications allow the user to provide a list of keywords that the spatial objects (henceforth referred to simply as objects) should contain, in their description or other attribute. For example, online yellow pages allow users to specify their address and a set of keywords, and return businesses whose description contains these keywords, ordered by their distance to the specified address location. As another example, real estate web sites allow users to search for properties with specific keywords in their description and rank them according to their distance from a specified location.

A spatial keyword query consists of a query area and a set of keywords. The answer is a list of objects ranked according to a combination of their distance to the query area and the relevance of their text description to the query keywords. A simple yet popular variant, which is used in our running example, is the distance-first spatial keyword query, where objects are ranked by distance and keywords are applied as a conjunctive filter to eliminate objects that do not contain them.

1.2 OBJECTIVE

The objective of "Efficient Nearest Neighbour Group Query Optimization "is to provide the finest solution for the group point in the dataset. In nearest neighbour queries, an optimization problem is evaluated for finding the closest points in metric spaces. Given a data point set D, a query point set Q and an integer k, the Group Nearest Group query finds a subset of points from D, ω ($|\omega| < k$), such that the total distance from all points in Q to the nearest point in ω is no greater than any other subset of points in D.

The processing focus of our approaches is on minimizing the access and evaluation of subsets of cardinality k in D since the number of such subsets is exponentially greater than the dataset. To do that, the hierarchical blocks of data points at high level are used to find an intermediate solution and then refined by following the guided search direction at low level so as to prune irrelevant subsets.

FORWARD SEARCH ALGORITHM (FSA) and BACKWARD SEARCH ALGORITHM(BSA) can provide an exact solution to find nearest group points. Thus, the focus of this experiment is to examine the efficiency these algorithms and to provide the optimal solution. In order to minimize the access and evaluation of potential subsets, the data points in FSA and BCA are hierarchically represented by data blocks, e.g., using R-tree. To refine the solution, the search space in lower hierarchical level is minimized by following the guided search direction. FORWARD SEARCH Algorithm aims to find the optimal solution without evaluating all subsets of k points. FORWARD SEARCH Algorithm is capable to provide the optimal solution.

2.1 Range Nearest - Neighbour Query

A range nearest-neighbour (RNN) query retrieves the nearest neighbour (NN) for every point in a range. Consider the ranges as (hyper) rectangles and propose efficient in-memory processing and secondary memory pruning techniques for RNN queries in both 2D and high- dimensional spaces. These techniques are

generalized for kRNN queries, which return the k nearest neighbours for every point in the range [1]. In general, processing an NN query on a spatial index involves two interleaving phases:

- secondary memory pruning of distant index nodes
- In-memory computation of the nearest neighbours.

2.2 Location-Based Instant Search

Location-based instant search that combines location based keyword search with instant search is formulated. Initially the filtering- effective hybrid index (FEH) is evaluated. Then development of indexing and search techniques are utilized for the FEH index and store prefix information to efficiently answer instant queries.

First present an index structure called "filtering-effective hybrid" (FEH) index. It judiciously uses two types of keyword filters in a node of a spatial tree based on the selectiveness of each keyword. One filter, called child filter, maps keywords and their corresponding children nodes. Another Filter, called "object filter", maps keywords to their corresponding records in the sub tree of the nodes [2]. During a traversal of the FEH index tree, the object filter at each node allows to directly retrieve records for these keywords in the filter, thus bypassing those intermediate nodes in the sub tree. Next is to find answers to a query as the user is typing the keywords character by character. Existing index techniques are utilized and queries are answered using FEH[4].

2.3 Hybrid Index Structures for Location Based Web Search

Location-based instant search that combines location based keyword search with instant search is formulated. Nearest neighbour (NN) queries on a spatial database is a classical problem. The k-NN algorithm for R-trees traverses an R-tree while maintaining a list of k potential nearest neighbours in a priority queue in a Depth- First (DF) manner. The DF algorithm is sub- optimal, i.e., it accesses more nodes than necessary. The Best-First (BF) algorithm achieves the optimal I/O performance by maintaining a heap with the entries visited so far, sorted by their minimum distance. DF can be more I/O consuming than BF. However, DF requires only bounded memory and at most a single tree path resides in memory during search.

The closest pair queries (CPQ) are a combination of spatial join and nearest neighbour queries, which find the pair with the minimum distance among all pairs from two data sets. The difference between nearest neighbour queries and closest pair queries is that the algorithms of the latter access two index structures (one for each data set) and utilize the distance function of the two intermediate nodes to prune the pairs. NNK specifies only one query location specifies a set of query locations [6].

2.4 Spatial Nearest Neighbour Query

The spatial data search on k nearest neighbour queries is based on the Revived R*-tree index structure. The incremental methods for search have the flowing drawbacks:

- They cannot support objects in multidimensional space
- Their methods are low efficient for incremental query.

To solve such search problem efficiently, the novel incremental search on spatial datais applied to multidimensional spatial databases. The counter for every entry of RR*-tree index structure, which marks the number of nearest neighbour and thus offers the information about the influences of a query point[9].

2.5 Continuous Skyline Query

A continuous skyline query involves both static and dynamic dimensions. The spatio- temporal coherence of the problem and the continuous skyline query processing are based on the moving query points. Distinguish the data points that are permanently in the skyline and use them to derive a search bound. Investigate the connection between the spatial positions of data points and their dominance relationship, which provides an indication of where to find changes in the skyline and how to maintain the skyline continuously. The analyze finds the space and time of skyline query processing requires more cost for query to process and to find the result [13]. A dynamic skyline query retrieves the moving data objects that are not spatially dominated by any other object with respect to a given query point. Existing efforts on supporting such queries, however, supports location as a single dynamic attribute and one or more static dimensions.

2.6 Aggregate Nearest Neighbour Quries

Aggregate nearest neighbour queries return the object that minimizes an aggregate distance function with respect to a set of query points. The processing of such queries for the query where the position and accessibility of spatial objects are constrained by spatial (e.g., road) networks. Consider alternative aggregate functions and techniques that utilize Euclidean distance bounds, spatial access methods, and/or network distance materialization structures [3]. The results show that their relative performance depends on the problem characteristics. In a realistic location- based application environment, a user can be indecisive about committing to a particular detour option. The user may wish to browse multiple (k) MDOs before making a decision. Furthermore, when a user moves, the kMDO results at one location may become obsolete. The continuous detour query (CDQ) processing based on incremental construction of a shortest path tree.

2.7 Tree Based Partition Query

Besides traditional domains (e.g., resource allocation, data mining applications), algorithms for medioid computation and related problems will play an important role in numerous emerging fields, such as location based services and sensor networks. Since the k-medioid problem is NP hard, all existing work deals with approximate solutions on relatively small datasets. The efficient methods for very large spatial databases, motivated by:

The high and ever increasing availability of spatial data. The need for novel query types and improved services.

The solutions exploit the intrinsic grouping properties of a data partition index in order to read only a small part of the dataset [7]. The results are better quality at a small fraction of the CPU and I/O costs (seconds as opposed to hours, and tens of node accesses instead of thousands). In addition, the medoid-aggregate queries, where k is not known in advance, but taken to compute a medoid set that leads to an average distance close to a user- specified value. Similarly, medoid-optimization queries aim at minimizing both the number of medoids k and the average distance.

2.8 K-Median Local Search Heuristics

Local search algorithms move from solution to solution in the space of candidate solutions (the search space) by applying local changes, until a solution deemed optimal is found or a time bound is elapsed. Local search heuristics for the metric k-median and facility location problems deűne the locality gap of a local search procedure for a minimization problem as the maximum ratio of a locally optimum solution (obtained using this procedure) to the global optimum. Local search is a Meta heuristic method for solving computationally and optimization problems. Local search can be used on problems that can be formulated as finding a solution maximizing a criterion among a number of candidate solutions. For k-median, local search swaps the locality gap with the lower space found in the search. This is the űrst analysis of a local search for k-median that provides a bounded performance guarantee with only k medians [5].

2.9 Distance Browsing in Spatial Databases

The process of finding the nearest k neighbours relies on estimating the network distance of the objects from the dataset, objects cannot be inserted into the middle until their exact distances are known. The distance browsing in spatial database is presented for finding the k nearest neighbours in a spatial network in a best- first manner using network distance. The distance browsing is based on pre computing the shortest paths between all possible vertices in the network and then making use of an encoding that takes advantage of the fact that the shortest paths from vertex to all of the remaining vertices can be decomposed into subsets based on the nearest edges on the shortest paths to them from the given point.

Thus, the amount of work depends on the number of objects that are examined and the number of links on the shortest paths to them from the given point, rather than depending on the number of vertices in the network. The amount of storage required to keep track of the subsets is reduced by taking advantage of their spatial coherence which is captured by the aid of a shortest path quad tree.

The pre computation of the shortest paths along the network essentially decouples the process of computing shortest paths along the network from that of finding the neighbours, and thereby also decouples the domain

S of the query objects and that of the objects from which the neighbours are drawn from the domain V of the vertices of the spatial network [9].

2.10 High Dimensional Spaces: Index Structures

Query processing in high-dimensional spaces provides searching data in a relational database, a content based retrieval requires the search of similar objects as a basic functionality of the database system. The hyper planes are defined by a split dimension (the normal vector of the hyper plane) and a split value (defining the actual location of the hyper plane).Space partitioning is done by an algorithm that is similar to the well- known Quicksort algorithm although operating on secondary storage. This technique is invariant against a specific split strategy i.e., gives the freedom to partition the space according to arbitrary split dimensions and split values. To create an optimized space partitioning that is unbalanced and therefore cannot be achieved by a dynamic index structure.

Although partitioning is unbalanced, the algorithm guarantees that the resulting index structure is balanced. The results show that our bulk-load operation can be done in average O(n log n) time. Hilbert R-tree is created by externally sorting all the data vectors according to their Hilbert value and assigning equally sized, sub sequential portions of the sorted data to data pages.

Finally, the bounding boxes of the data pages are stored in directory pages clustering these directory pages recursively until it reach a single root node. The costs for bulk loading a Hilbert R-tree are obviously in O(n log n) due to external sorting. Partitioning of the data space can be done in a top- down fashion which means that hierarchically divide the d-dimensional space using (d-1)- dimensional hyper planes as borderlines between the partitions[10].

3.1 Problem Definition

- Given a set of data points D, query object Q and query keyword m, a GNK query is implemented to obtain a minimum sum of distances to its nearest points in D.
- To achieve better performance, a widely used method is to represent the data set by a set of samples and then apply the local search heuristics
- The typical process of the local search heuristics finds an solution and iteratively optimizes it with the operation of swap.

3.2 Existing System

The proposed system uses two algorithms: FORWARD SEARCH(FSA) algorithm and BACKWARD SEARCH(BSA) algorithm. Use hierarchical blocks instead of data points to optimize the number of subsets evaluated. This technique aims at minimizing the I/O accesses to the object and feature data sets.

Optimized version provides more efficient technique for computing the scores of the objects. It develops solutions for the top-k spatial preference query based on the temporal data. It minimizes the access and reduces search space. In this work, database techniques are explored to boost the GNG query processing of local search heuristics without any loss on clustering quality.

The duplicates in the set can be identified to refine the solution, the search space in lower hierarchical level is minimized. In FSA, every set of k blocks is evaluated in high hierarchical level and the set with the current best value (i.e., the minimum total distance) are refined by visiting their children in next level. FSA is capable to provide the optimal solution.

3.3 Proposed System

Most traditional spatial queries on spatial databases such as nearest neighbour queries, range queries use CLARNS (Clustering Large Applications based upon Randomized search) of GNG leads to gap of few percentage points missed. The existing system, takes long query processing time and data accuracy problems were identified.

In nearest neighbour queries, an optimization problem is evaluated for finding the closest points in metric spaces. Given a set of S points in a metric space M and query point q εM, finding the closest point in S to q. The informal observation usually referred to as the curse of dimensionality states that there is no general-purpose exact solution for NNS in high- dimensional Euclidean space using polynomial preprocessing and poly logarithmic search time. The current system is unable to view the location of the spot in spatial data when new site is added.

In practice, using local search heuristics for GNG query leads to a gap of a few percentage points between

the obtained solution and the global optimum. In the worst case, the local search heuristics have been proved to achieve at most five times of the global optimum. The existing system reduced the cluster quality compared to proposed system.

3.4 System Overview

The spatial object p is a pair in the form (p.l, p.t), where p.l is a location descriptor in the multidimensional space, and p.t is the textual description represented by sets of keywords. Let D be the universe of all objects in the database. Given a group of query points Q = {q1, q2, . . . , qn} and a set of m query keywords Q_W= {w1, w2, . . . , wm}. A top-k keyword query retrieves k query points from Q with the minimum sum of distances. $\forall$ q $\in$ Q, the nearest keyword w of q is a point p_i ($p_i \in$D) which contains keyword w such that $\forall$ pj $\in$D /p_i and w $\in p_j$. t and dist (P_i, q) < dist (P_j,q). The function dist (q, p_i) is the Euclidean distance between q and p_i. The function nearkey (q, w) present the distance between q and its nearest keyword w. Then the summed distance of q is defined as $\sum_{i=1}^{m}$ nearkey(q,w_i), where $w_i \in$Qw. The GNG query returns the k query points in Q with the minimum summed distance. Here each query point in Q only contains the spatial information.

Given a set of data points D which contains keyword information, a group of query objects Q and m query keywords, a top-k GNG query retrieves k objects in Q with the minimum sum of distances to its nearest points in D such that each nearest point matches at least one of query keywords. It can be widely utilized in various decision support systems and multiple domains like service recommendation, investment planning, etc. For example, consider a spatial database D which manages facilities such as schools, restaurants and hospitals, represented by sets of keywords.

A user wants to GNG the locations with respect to the sum of distances to nearest interested facilities. The user may issue a set of locations and multiple query keywords representing his/her interested facilities, the result returns k best locations that minimize the summed distance to these facilities.

The directed way to obtain the summed distance of q in probing algorithm is to incrementally retrieve its nearest neighbours until all query keywords appear. During the output of nearest neighbours, the distance of every nearest keyword is calculated through modifying the function Nearest Neighbour. It requires to compute the summed distance of every query point q in Q, which in turn incurs multiple accesses to the same node and results in a large number of index and data accesses. Therefore the implementation of FORWARD SEARCH ALGORITHM is carried out. The algorithm is called recursively which is followed by a Depth-First searching strategy.When the BACKWARD SEARCH ALGORITHM is called the data node of r-tree on one hand and an internal node in other hand, downwards propagation stops in r-tree while propagation in the tree continues, and vice versa. When qNode and the nodes pointed by entries in both data node, calculate the nearest keyword of every query point in qNode and get the summed distance.

Wk and γ will be updated when sum of the distance is less than γ which shows that the algorithm is non-incremental, i.e., the user can not have any output until the whole algorithm terminates. The best algorithm for GNG queries depends on both the cardinality of query objects and the number of query keywords.

3.5 Module Description

The project is divided into three modules.

- Data Group
- Group Combination
- Subset Refinement.

3.5.1 Data Group

A real data set of points are collected which consists of the place with the longitude and latitude of the metropolitan city. The synthetic data points were obtained containing the uniformly distributed points around the city.These data sets are unified into a unit region. Q is distributed in an area whose Minimum Bound Rectangle is a percentage of the whole data space, denoted as M. All the data sets are indexed by R-trees for FCA and BCA.

3.5.2 Group Combination

Forward search algorithm minimizes the access and evaluation of potential subsets. The data points in FCA are hierarchically represented by data blocks, e.g., using R-tree. The algorithm process GNG query by treating the blocks as points to find an intermediate solution in

higher hierarchical level. To refine the solution, the search space in lower hierarchical level is minimized by following the guided search direction.

3.5.3 Subset Refinement

Backward Search Algorithm is a local search heuristic with support of the database techniques. In higher hierarchical level, each block is treated as a point by BCA to replace every element in the subset, and the resultant subset with the current best value is refined by visiting the children of the block. The solution of BCA is usually close to the global optimum and guaranteed to be within a factor of at most close to the global optimum.

In this refinement process the data duplicates are avoided using query analyzer process. This method protect the original data from the duplicate data.

3.6 Algorithm

3.6.1 Forward Search Algorithm

The algorithm retrieves the query result by computing the summed distance of every query point in Q. Initially, the data's are fetched from the database. In the front end, the data (nearest features) corresponding to the input query object is fetched from the database. Next, the distance calculation takes place for the interested neighbours of the selected data. The minimum distance of the interested neighbour with respect to the input object is obtained. Then the summed distance of the neighbours are calculated, which is done by the sum of distances of the three nearest neighbours. It is given by,

Σ (q1) = q1.a + q1.b + q1.c

Σ (q2) = q2.a + q2.b + q2.c

Σ (qn) = qn.a + qn.b + qn.c

Where,

Σ (q1) = summed distance of the input object q1.

Σ (q2) = summed distance of the input object q2.

Σ (qn) = summed distance of the input object qn.

q.a = distance of 1st nearest feature of q.

q.b = distance of 2nd nearest feature of q.

q.c = distance of 3rd nearest feature of q.

The summed data is then sorted, so as to display the result of the object in the ascending order. The map overlay can be obtained with the input object, plotted to its nearest key features. The directed line in the map

The summed data is then sorted, so as to display the result of the object in the ascending order. The map overlay can be obtained with the input object, plotted to its nearest key features. The directed line in the map links the object to its key features, which is displayed in a small rectangle of differentiated colors. The individual map display can also be obtained for the separate interested object of the user which displays the directed line linked with object and its features with its measured metrics (kms) from the object.

Algorithm FCA(Dataset D, Query set Q, Integer K)

1. Assign Threshold value to infinity and H=∅
2. begin
3. compute the entries in root node of R-tree in dataset
4. do
5. for each subset ů of K entries in ξ
6. compute $\sum_{lb}^{\omega}$ and $\sum_{ub}^{\omega}$
7. H ← {$\sum_{lb}^{\omega}$ and $\sum_{ub}^{\omega}$ ω }
8. γ = the minimum $\sum_{ub}$ in H
9. for each subset h ∈H
10. if h. $\sum_{lb}^{\omega} \geq \gamma$, prune h from H
11. remove h ∈ H where h. $\sum_{lb}^{\omega}$ is minimum
12. if h. ω consists of entries referring to leaf nodes, break
13. ξ=∅
14. for each entry E ∈ h. ω
15. ξ= ξ + entries in node referred by E
16. while true
17. return h.ω
18. end

3.6.2 Backward search Algorithm

The algorithm computes the upper bound of the summed distance, which significantly reduces the number of query objects and the data points to be examined. The first step involves the method of clustering, i.e. grouping of similar data objects. The clustered data is developed to form a tree called as hierarchical tree which is then followed by fetching of data in the database. In the front end, based on the index, the data (nearest features) corresponding to the input query object is fetched from the database. Next, the distance calculation takes place for the interested neighbours of the selected data. The distance between each interested neighbour with respect to the input object is obtained. Then the summed distance of the

neighbours are calculated which is done by the sum of distances of the three nearest neighbours.

The summed data is then sorted so as to display the result of the object in the ascending order. The map overlay can be obtained with the input object, plotted to its nearest key features. The directed line in the map links the object to its key features, which is displayed in a small rectangle of differentiated colors.

After the calculation of summed distance of the above two algorithms, the graph is obtained which displays the node access and efficiency .The lesser the node access is greater the efficiency. Therefore the report displays the graph, which shows the cardinality of the algorithms.

Algorithm SHA(Dataset D, Query set Q, Integer K)

1. begin
2. ω_{cur}= find w_{ini}
3. γ = Compute sum based on w_{ini}
4. N= root of R-tree on D
5. H=$\varnothing$
6. for each entry E in N
7. for each $p \in \omega_{cur}$
8. compute sum when E replaces $p \in \omega_{ini}$
9. if sum < γ, H $\leftarrow$ {sum, p, E}
10. if H=$\varnothing$, BCA terminates by returning ω_{ini}
11. remove h $\in$ H where h. $\sum_{h}^{\omega}$ is minimum sum
12. p=h.p
13. N=Node referred by h.E
14. While N is a non-leaf node
15. for each entry E in N
16. Compute sum when E replaces $p \in \omega_{cur}$
17. if sum <γ, H $\leftarrow$ {sum, p, E}
18. if H=$\varnothing$, return ω_{cur}19. remove h$\in$H where h has the minimum sum
20. p=h.p
21. N=Node referred by h.E
22. ω_{cur} = replace $p \in \omega_{cur}$ by N
23. γ = h.sum goto line 3
24. end

4.1 Experimental Setup

The experiments were conducted using group Query with its minimized distance: sum of the nearest keyword features with respect to the input query object. The experiments implemented in a database of Coimbatore.

Our experiment on GNG Query was implemented by the universe of objects in the database, which is created in a standard environment visual studio 2008 with framework 3.5 by the language of vb.net.

The records in the database consist of feature, category, place, latitude and longitude. Initially, the data is fetched from the database for record matching. Next, the records of input object matches with its nearest features. Then the minimized distance of the input object with respect to its nearest features are calculated which is then followed by the calculation of summed distance and will be displayed in the sorted manner.The records in the database consist of feature, category, place,latitude, longitude and index. Based on the index, clustering is done and the data is fetched from the database for record matching. Next, the records of input object matches with its nearest features. Then the minimized distance of the input object with respect to its nearest features are calculated which is then followed by the calculation of summed distance and will be displayed in the sorted manner.

4.2 Results

4.2.1 Data Query Points

The input query is processed and the result of nodes with the nearest group points are displayed. The data points near to the mimimal distance are calculated by exhaustive hierarchial combination algorithm.

Query Points

4.2.2 Result Map

The nearest distance of query points are displayed in the map. The mimimal number of paths from the source location is connected by the lines in the graph.

4.2.3 Node Access Report

The node access report generates the number of nodes accessed in exhaustive hierarchial combination algorithm and clarns algorithm. The number of nodes accessed is denoted by the graph. The duplicates in the dataset are pruned and the nodes can be accessed based on the nearest group. The graph denotes the access points for each query passed in the nearest group.

5. CONCLUSION AND FUTURE WORK

The Group Nearest Group Query retrieves number of objects from Query keyword Q with minimum sum of distances to its nearest Data points. FORWARD SEARCH and BACKWARD SEARCH ALGORITHM, prunes the query objects and finally the minimized summed distance is calculated.The number of node accesses is also reduced which reduces the query response time, which exhibits good scalability with the query objects and the number of query keywords.

Forward search and Backward Search algorithm provide good scalability and accuracy which is implemented by geographical data sets of Coimbatore. In future plan the time constraint will be introduced to improve the accuracy level, response time and further the data sets of other cities based on their geographical location with its graphical map points of the scale (x, y axis) will be updated to prune the search time of the algorithm.

REFERENCES

(1) M. Yiu, N. Manoulis, and D. Papadias, " Aggregate Nearest Neighbour Queries in Road Networks", IEEE Transactions on Knowledge and Data Engineering, Vol.17, No.6, 2005, pp.820-833.

(2) A.Civilis, C.S. Jensen and S.Pakalnis, "Techniques for Efficient Road-Network-Based Tracking of Moving Objects", IEEE Transactions on Knowledge and Data Engineering, Vol.17, No.5, 2005, pp. 698-712.

(3) D. Papadias, Y. Tao, K. Mourstidis and C.K. Hui, "Aggregate Nearest Neighbour Queries in Spatial Databases", ACM Transactions on Database Systems, Vol. 30, No. 2, 2005, pp. 529-576.

(4) K.E. Rosing, "An Empirical Investigation of the Effectiveness of a Vertex Substitution Heuristic", Environment and Planning B: Planning and Design, Vol. 24 No. 6, 1997, pp.59- 67.

(5) V. Arya, N. Gary, R.Khandekar, A. Mayerson, K. Munagala and V. Pandit, " Local Search Heuristics for k-Median and Facility Location Problems", Proceedings 33rd ACM Symposium on Theory of Computing, 2001.

(6) R. Ng and J. Han, "Efficient and Effective Clustering Method for Spatial Data Mining", Proceedings 20th Very Large Data Bases Conference, 1994.

(7) K. Mouratidis, D. Papadias and S. Papadimitriou, "Tree-Based Partition Querying:A Methodology for Computing Medoids in Large Spatial Datasets", The Very Large Database Journal, Vol. 17, No. 4, 2008, pp. 923-945.

(8) K. Deng, H. Xu, S. Sadiq, Y. Lu, G. Fung and H. Shen, "Processing Group Nearest Group Query", Proceedings 25th IEEE International Conference on Data Engineering 2009.

(9) G. Hjaltason and H. Samet, "Distance Browsing in Spatial Databases", ACM Transactions on Database Systems, Vol. 24, No.2, pp.265-318, 1999.

(10) C. Bohm, S. Berchtold and D. Keim, "Searching in High Dimensional Spaces Index Structures for Improving the Performance of Multimedia Databases", ACM Computing Surveys, Vol.33, No.3, 2001, pp. 322-373.

(11) K.Cheung and A.W.C. Fu, "Enhanced Nearest Neighbour Search on the R-Tree", ACM SIGMOD Record, Vol. 27, No.3, 1998, pp. 16-21.

(12) Baihua Zheng, Jianliang Xu, Wang-Chien Lee, "Data Management in Location Dependent Information Services", IEEE Pervasive Computing, Vol. 1, No.3, 2002, pp. 65-72.

(13) K. Deng, X. Zhou and H. Shen, "Multi- Source Skyline Query Processing in Road Networks", Proceedings 23rd IEEE International Conference on Data Engineering 2007.

(14) M. Sharifzadeh and C. Shahabi, "The Spatial Skyline Queries", Proceedings 32nd Very Large Data Bases Conference 2006.

(15) D. Papadias, Q. Shen, Y. Tao and K. Mouratids, " Group Nearest Neighbour Queries", Proceedings 20th IEEE International Conference on Data Engineering 2004.

(16) J. Hafner, H.S. Sawhney, W. Equitz, M. Flickner and W. Niblack, "Efűcient Color Histogram Indexing for Quadratic form Distance Functions", IEEE Transactions on Patte Analysis andMachine Intelligence, Vol. 17, No.7, 1995, pp.729-736.

Secure Communication Based on Video Steganography

R.Umadevi
Vivekanandha College of Arts and Sciences for Women (Autonomous) - Tamil Nadu
E-mail: mail2deviuma@gmail.com

Abstract

In the rapid sharing system has much kind of inputs like text, image, audio or video, but the user's needs are mainly focused on secure communication over the internet and intranet. We well thought-out for this kind problem and our research are conceded for improving the security sharing. We proposed the system called Unified Mesh Steganography (UMS) technique. In this techniques some modern fashion used for implementation and the experimental evaluations are made using MAT lab. Our technique attains some parameters like Embedding Capacity Level (ECL) and Transmission Ratio Level (TRL).

Keywords: *Embedding capacity, Secure Communication, Steganography, Transmission, Video.*

1. INTRODUCTION

The network has various methods for sending and receiving information from one place to another place and one network to another network. But it needs some basic deliberation like security with tolerable data transmission. Mainly, in our method focuses security and capacity of data. in [3], the author presented the video steganography for secure communication in irreversible manner. In [4], the network based steganography has implemented. In [5], video files are taken for the experimental evaluation. But in this paper only concentrating the video files for achieve the better secret communication. In [6], the enhanced most significant method developed for secure communication. In [7], the hash polynomial function based steganography has been developed to tighten the multilayer security. In [1] edge detection technique in addition to LSB substitution resulted in the improvement of stego object quality. Though LSB substitution is considered as the most popular method, the range of embedding load in the cover image is partial broadly by pseudorandom number generator. In [2] an edge adaptive method is obtainable that useful the embedding portion on the basis of size of secret message and the cover image. The edge adaptive method though proved to be efficient, it did not considered the adjacent pixel values.

2. PROPOSED METHOD

In this paper, the number of node connected for communication should be identified. The particular networking system may be connected to ready for communication. This implemented for small size of the network. Network has more security but using our proposed UMS method the result is better. The following algorithm is proposed for the method Unified Mess Steganography. Network steganography has some factors to be concealed for communication with fastness. By provide the secret key the system has achieves good results.

```
    Algorithm:
    Begin
Select the required nodes
Allocate the nodes i<=n
    Connect the nodes
        Choose the first node (default)
    Embedding side:
    For every transmission
    Get original data
    Make Embedding form with key
    Extracting with key to destination node
    End for
    Extracting side:
    For every transmission
    Get covered data
    Make extracting with key
    Store the original data for processing
    End for
    End
```

3. ALGORITHM FOR EMBED AND EXTRACT

The simple algorithm clearly explains the process of the UMS method. And it is compared with High payload Steganography (HPS) and LSB matching revisited method, our method gradually achieves the better results.

4. EXPERIMENTAL RESULTS

4.1 Embedding Capacity Level (ECL)

The ECL factor calculated with size of the data (SD) and Time Taken for Embedding. ECL measured in terms of percentage (%).

$$ECL = \frac{SD}{TTE} * 100 \quad (1)$$

Table 1 Embedding Capacity Level (ECL)

Size of Data (MB)	Embedding Capacity Level (%)		
	UMS	HPS	LSB -MR
1.0	2.8	2.0	1.9
1.5	2.7	2.2	2.4
2.0	3.0	2.6	2.2
2.5	3.2	3.0	2.6

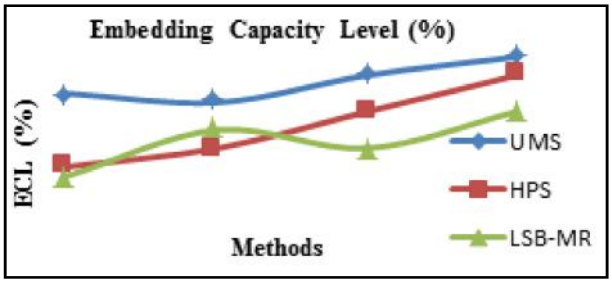


Fig.1 Data embedding capacity level

Figure 1 clearly illustrates the performance of capacity of embedding level inside the video files using data hiding method is increasing.

4.2 Transmission Ratio Level (TRL)

After embedding process, the file can be transmitted to required node. This can be measured by time taken for transmission and extraction time to be considered. The following formula is used to calculate the TRL in terms of milliseconds.

$$TRL = \forall TT / \sum \exists N \quad (2)$$

Here TT for Transmission Time and N for Node, for all transmission time is taken for all the nodes.

Table 2 Transmission Ratio Level (TRL)

Size of Data (MB)	Transmission Ratio Level (ms)		
	UMS	HPS	LSB -MR
1.0	20.5	36	35.4
1.5	24.3	30.5	40.5
2.0	28	44	51.2
2.5	33	49.5	53.5

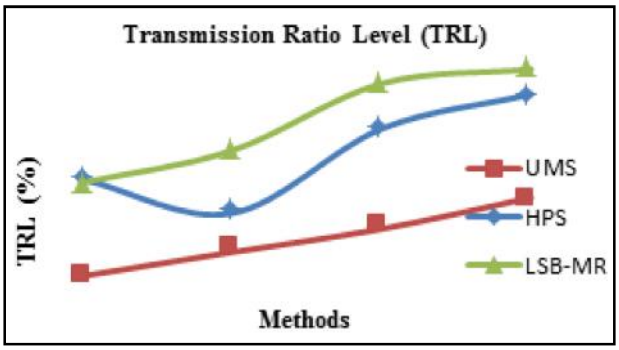


Fig.2 Data transmission level

5. CONCLUSION

This paper concluded with ECL and TRL values compared with previous work, our method shows the better results based on the network inference. The experimental results are done using MAT Lab simulator. In future the work carried out towards the increasing size of the data with similar factor to achieve speedy process.

REFERENCES

(1) Wen-Jan Chen, Chin-Chen Chang, T. Hoang Ngan Le, "High Payload Steganography Mechanism Using Hybrid Edge Detector", Expert Systems with Applications, Elsevier, Mar 2010

(2) Weiqi Luo, Fangjun Huang, Member, and Jiwu Huang," Edge Adaptive Image Steganography Based on LSB Matching Revisited", IEEE Transactions On Information Forensics And Security, vol. 5, no. 2, June 2010.

(3) R.Umadevi, G.M.Nasira, "Secure Irreversible Rapid Fourier Transform For Secure Communication In Video Steganography, International Journal of Computational Intelligence and Informatics Vol. 5: No. 1, June 2015

(4) Yu et al, “Digital Watermarking Based on Neural Networks for Color Images”, Elsevier Signal Processing, 81 (2001), p.p. 663-671.
(5) R.Umadevi, G.M.Nasira, “Achieving Secret Communication on Video Files Using Steganography, International Conference on Computing and Intelligence Systems Volume: 04, Special Issue: March 2015, Pages: 1290 – 1294 ISSN: 2278-2397 and International Journal of Computing Algorithm (IJCOA) PP. 1290.
(6) R.Umadevi, G.M.Nasira, “Video Steganography Secure Communication System Using Enhanced Most Significant Bit Irreversible Method”, International Journal of Applied Engineering Research, ISSN 0973-4562 Volume 9, Number 23 (2014) pp. 19453-19468,© Research India Publications.
(7) R.Umadevi, G.M.Nasira, “Video Steganography Based on Hash Polynomial Function for Secure Communication”, Indian Journal of Science and Technology, Vol.8 (23), September 2015.
(8) G.M.Nasira, R.Umadevi,” A Secure Communication System Using Skin Nature Images Based Steganography” in the National Conference on Soft Computing in Association.

Indian Journal of Engineering, Science, and Technology (IJEST)

(ISSN: 0973-6255)
(A half-yearly refereed research journal)

Information for Authors

1. All papers should be addressed to The Editor-in-Chief, Indian Journal of Engineering, Science, and Technology (IJEST), Bannari Amman Institute of Technology, Sathyamangalam - 638 401, Erode District, Tamil Nadu, India.
2. Two copies of manuscript along with soft copy are to be sent.
3. A CD-ROM containing the text, figures and tables should separately be sent along with the hard copies.
4. Submission of a manuscript implies that : (i) The work described has not been published before; (ii) It is not under consideration for publication elsewhere.
5. Manuscript will be reviewed by experts in the corresponding research area, and their recommendations will be communicated to the authors.

Guidelines for submission

Manuscript Formats

The manuscript should be about 8 pages in length, typed in double space with Times New Roman font, size 12, Double column on A4 size paper with one inch margin on all sides and should include 75-200 words abstract, 5-10 relevant key words, and a short (50-100 words) biography statement. The pages should be consecutively numbered, starting with the title page and through the text, references, tables, figure and legends. The title should be brief, specific and amenable to indexing. The article should include an abstract, introduction, body of paper containing headings, sub-headings, illustrations and conclusions.

References

A numbered list of references must be provided at the end of the paper. The list should be arranged in the order of citation in text, not in alphabetical order. List only one reference per reference number. Each reference number should be enclosed by square brackets.

In text, citations of references may be given simply as "[1]". Similarly, it is not necessary to mention the authors of a reference unless the mention is relevant to the text.

Example

[1] M.Demic, "Optimization of Characteristics of the Elasto-Damping Elements of Cars from the Aspect of Comfort and Handling", International Journal of Vehicle Design, Vol.13, No.1, 1992, pp. 29-46.

[2] S.A.Austin, "The Vibration Damping Effect of an Electro-Rheological Fluid", ASME Journal of Vibration and Acoustics, Vol.115, No.1, 1993, pp. 136-140.

SUBSCRIPTION

The annual subscription for IJEST is Rs.600/- which includes postal charges. To subscribe for IJEST a Demand Draft may be sent in favour of IJEST, payable at Sathyamangalam and addressed to IJEST. Subscription order form can be downloaded from the following link http:// www.bitsathy.ac.in./ ijest.html.

For subscription / further details please contact:

IJEST
Bannari Amman Institute of Technology
Sathyamangalam - 638 401, Erode District, Tamil Nadu Ph: 04295 - 226340 - 44
Fax: 04295 - 226666 E-mail: ijest@bitsathy.ac.in Web:www.bitsathy.ac.in

Indian Journal of Engineering, Science, and Technology

Volume 10, Number 2, July - December 2016

CONTENTS