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Encryption and Decryption Using Elliptic Curves for Public key Cryptosystems

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Abstract— Cryptography is the art of science and is a centuries old technique used to convert an intelligible message into non intelligible message so that when it is transmitted from source to destination in any form, it can't be understood by the unintended persons. Hence, the message is secured from eavesdropping, hacking and deliberate modifications done by the unauthorized persons. The researchers have developed a number of techniques over the decades for protecting the message during transmission over the public networks but, because of the rapid technological growth, the increase of processors' computing power, availability of inexpensive large memory and advancements in VLSI chips, today, these cryptographic methods are not able to sustain. To protect the messages with the existing cryptographic techniques, there is a need to use large number of bits in the keys resulting in slower encryption and decryption speeds and increase in the amount of memory required for computations. In this paper, we discuss a new approach for encryption and decryption using elliptic curves that results in faster encryption and decryption speeds and minimizing the amount of memory required for computations at the same time offering the equal level of security as that of provided by popular public key cryptographic methods.

Keywords----Security; Encryption; Decryption; Symmetric Key Cryptosystems; Public Key Cryptosystem; Elliptic Curves;

I. INTRODUCTION

Cryptography is a decades old technique and is considered as the art of science for hiding the valuable messages from unauthorized persons. Cryptography is the study of collection of these techniques. Cryptographic techniques are used to convert an intelligible message into non-intelligible message so that when it is transmitted over the public networks from source to destination, it is secured from eavesdropping and deliberate modifications done by the unauthorized persons. The researchers have developed a number of techniques over the decades for protecting the message during transmission over the public networks. These techniques include symmetric key cryptosystems and asymmetric key cryptosystems[11].

Symmetric key cryptosystems use only one key for both encryption and decryption. The security of these cryptosystems depends on the secrecy of the key. If the key is known to a third person, the cryptosystem is no more secure. Because of the problems associated with the key distribution among the communicating parties and the lack of support of the present hardware for operations used in encryption and decryption process, the cryptosystems are not being used in today's applications[11]. Symmetric key cryptosystems like DES, TDES, DESX, GDES, CRYPT3, RC2, RC4, RC5, CAST-128, Blowfish and AES are some of the popular symmetric key cryptosystems[11].

Asymmetric key cryptosystems addressed the problems associated with the symmetric key cryptosystems. This cryptosystem was introduced in 1972 by Diffie and Hellman and slowly gained the popularity because of its features[3][11]. These cryptosystems use two related keys, one for encryption and other for decryption. The encryption key, i.e. public key is known to everyone, only the decryption key, i.e. private key is maintained secretly by the owner. It is infeasible to guess private key from the public key even though they are mathematically related. The public key cryptosystems like RSA, Knapsack, Pohlig-Hellman, Elgamal and Diffie-Hellan are some popular asymmetric key cryptosystems[11]. But, because of the rapid technological growth and the increase in processors' computing power, availability of inexpensive large memory and advancements in VLSI chip technology, today, these cryptosystems are not able to sustain with brute-force attack[11][9]. To protect the messages with these cryptosystems, large number of bits in the keys are to be used, this will result in slower encryption and decryption speeds and increase in the amount of memory required for computations. Hence, researchers have invented a new approach for encryption and decryption using elliptic curves that results in faster encryption and decryption speeds and minimizing the amount of memory required for computations[[6][12] and at the same time offering the equal level of security as that of provided by popular public key cryptosystems with large number of bits in the keys[9].

II. ELLIPTIC CURVE CRYPTOGRAPHY

Elliptic Curve Cryptography (ECC) is a new technique and considered as an efficient technique in cryptography. ECC was introduced in 1985 by Neil Koblitz and Victor Miller [1][12]. It is used to implement an asymmetric key cryptosystem. The great characteristic of ECC is that with far smaller size key, it provides a greater level of security[12] as that of provided by RSA with large size keys[1][4][6]. The RSA requires large length keys that increase the computational overhead on the processor as a result, the cryptosystem becomes

New Machine Learning based Approach for Predictive Modeling on Spatial Data

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Abstract—Image classification domain has been an area which has attracted a lot of researchers over past years. Many classification methodologies for spatial image datasets has been developed. Artificial intelligence based approaches are getting popular now a days for getting the image classification task done in more efficient and correct way. The prime goal is to develop a classification mechanism which can handle the uncertainity in more efficient manner.

This paper presents a novel approach for classification based predictive modeling technique for spatial data sets. Advanced machine learning concepts like RST are employed in our algorithmic procedure, which gives a major advantage of reduction in dimensionality of data in efficient way. Experiments are performed on Bhuvan NRSC geospatial repository datasets and simulation results are given.

keywords: Neural network, Pixel-based Feature Extraction, Classification, Rough sets, Support Vector Machines.

I. INTRODUCTION

The process of spatial imaging is evolved as one of the highly influential domain for researchers all over the world. Due to it's need and practical applications in diverse domains, continuously good amount of research is being carried out from research community [1]. Since spatial images are meant as satellite captured images, which consists of pixels in it, here each pixel posses some specific attributes [2]. In recent years, remote sensing is emerged as learning mechanisms based on kernels [3][16], which posses some extra advantages compared to classical image categorization methodologies. In the multi-spectral land classification scenarios, Laxminarayana et. al. [14] suggested the procedure, which is a considerable method with better efficiency. The image pixels information is considered in the form of a two dimensional structure where rows represents the pixels information and columns are the denotion of attribute values. Here, the rowwise and columnwise compaction can be performed to reduce the further space complexity [4].

Basically, the phenomenon of classification of images falls in either of the below mentioned two categories - supervised and unsupervised learning methodologies. The classification issue of images in different orientations, illumination and surface conditions can be considered as the recognition problem of stochastic signals [22][23]. Class membership function is applied in supervised learning process to classify image pixels into corresponding classes. So, to handle uncertainity, exploration of data dependencies, attributes reduction, finding of patterns, rough set theory is employed as an efficient methodology over past recent years.

A. Motivation and Contribution

Image classification has been a challenging and interesting task, in which the research is being carried out over past several years. Variety of methods for classification of images like - neural networks, support vector machine procedure, genetic algorithms, fuzzy logic, decision trees etc. [6][11][14][21] are evolved in past years. Even though the various available techniques are there to classify the image or textual data in an efficient manner, still there should be further improvement in the methods for more efficiently classifying image data.

The model of rough sets can be utilized to solve the challenges of exploring data dependencies, pre-process the available unstructured data into structured and meaningful format, explore the patterns in the available images data, reduction in the number of attributes and attributes selection along with dimensionality reduction.

Our contribution in this paper is -

- The state-of-the-art and developments in this area are summarized in consecutive section.
- We have proposed a new advanced machine learning based approach for the classification of spatial image data.
- We have also presented complexity analysis of the proposed procedure along with that we have also presented the comparative analysis of our scheme with other existing schemes.

B. Related Work

This section presents the overview of state-of-the-art developed in this area. Basically the categorization for learning approaches is done in two ways, one is supervised and other is unsupervised classification. The supervised learning methods, which are existing in literature, are Neural networks [5][6], SVM [7][9], Fuzzy logic [8] etc. are utilized for classification purpose. U. Stanczyk, in 2010 [10] given a procedure to

An Approach for Imputation of Medical Records Using Novel Similarity Measure

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Abstract. Missing values are quite common in medical records. Fixing missing values is a challenging task to data mining analysts as any error in imputation process leads to potential hazards. In the present research, the main objective is to impute missing values using a new similarity measure and applying class based cluster approach which is used to perform dimensionality reduction. The proposed approach is demonstrated using an effective case study. The results show the proposed measure performs better and is efficient.

Keywords: Prediction · Classification · Clustering · Medical record · Missing values · Distance measure

1 Introduction

Medical data records are challenging to handle because of various hidden challenges which are generated under various practical conditions. Many times when we aim to mine medical records, we have first challenge of imputation. This is mainly from the obvious and widely accepted fact that medical records are not free from missing attribute values. In this scenario, the process of imputation received wide range attention from data mining and data analysts. Medical data records must be also normalized and scaled to perform any analysis. The process of normalization must be done before imputation so that the imputation process yields correct results. This affects classification accuracies. There are several preprocessing stages a medical record must be processed before analysis is performed. Dimension of record is also a concern when it must be analyzed. We must see that dimensions which are not affecting the final accuracies be only eliminated or discarded. In [1], the researchers debate whether to consider missing values or simply eliminate them from consideration for analysis. They discuss these using decision tree concepts. Clustering data records is a known problem and is also used for medical data. The work of authors in [2] mainly targets how to handle missing values using clustering. The support vector regression and clustering are used in [3] to perform imputation. The authors [4,5] discuss various problems with missing values and how to handle mixed attributes respectively.

Anomaly Detection Using New Tracing Tricks on Program Executions and Analysis of System Data

Goverdhan Reddy Jidiga and P. Sammulal

Abstract Now the security of information and applications is getting abnormal attention in the public. Because the millions of expenditure spending to combat on continuous threats. The threats (anomalies) are widely occurred at programming scope by exploitation of coding and other side is at application scope due to bad structure of development. Today various machine learning techniques are applied over application level behavior to discriminate the anomalies, but not much work is done in coding exploits. So in this paper, we have given some rich extension work to detect wide range of anomalies at coding exploits. Here, we used some standard tracing tricks and tools available in Linux platform, which describe how to observe the behavior of program execution's outcomes and model the necessary information collected from system as part of active learning. The experimental work done on various codes of artificial programs, Linux commands and also compared their performance on artificial datasets collected while program normal runs.

1 Introduction

The security of information is addressed by advanced technical concepts to satisfy the users due to different levels of attacks. Today different malicious codes are injected into programs, applications and those are run into machine in an authentic way, but are not able to find their vulnerable entries [1, 2]. Now we are using several methods and algorithms at application level, still unable to identify the narrow-level attacks due to similar signatures and profiles. So we need to go with

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A Personalized Recommender System Using Conceptual Dynamics

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Abstract E-commerce applications are popular as a requirement of emerging information and are becoming everyone's choice for seeking information and expressing opinions through reviews. Recommender systems plays a key role in serving the user with the best Web services by suggesting probable liked items or pages that keeps user out of the information overload problem. Past research of the recommenders mostly focused on improving the quality of suggestions by the user's navigational patterns in history, but not much emphasis has been given on the concept drift of the user in the current session. In this paper, a new recommender model is proposed that not only identifies the access sequence of the user according to the domain knowledge, but also identifies the concept drift of the user and recommends it. The proposed approach is evaluated by comparing with existing algorithms and perhaps does not sacrifice the accuracy of the quality of the recommendations.

Keywords Recommender system · Ontology · Usage patterns · Conceptual dynamics

1 Introduction

Internet has left a significant mark in all fields, such as e-commerce, science and technology, education and research, and telecommunication. From the past couple of decades, the research and development of the Web services hasbecome exponential and accelerated by many cutting edge technologies such as big data and

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N-gram approach for gender prediction

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Abstract—The Internet was growing with huge amount of information, through Blogs, Twitter tweets, Reviews, social media network and with other information content. Most of the text in the internet was unstructured and anonymous. Author Profiling is a text classification technique that is used to predict the profiling characteristics of the authors like gender, age, country, native language and educational background by analyzing their texts. Researchers proposed different types of features such as lexical, content based, structural and syntactic features to identify the writing styles of the authors. Most of the existing approaches in Author Profiling used the combination of features to represent a document vector for classification. In this paper, a new model was proposed in which document weights were calculated with combination of POS N-grams and most frequent terms. These document weights were used to represent the document vectors for classification. This experiment was carried out on the reviews domain to predict the gender of the authors and the achieved results were promising when compared with the existing approaches in Author Profiling.

Index Terms— Author Profiling, Gender prediction, POS N-gram, Text classification, Term Frequency

I. INTRODUCTION

The internet has become unmanageably big and day-by-day it is increasing exponentially through social media, blogs and reviews. Most of this information is written by various authors in different contexts. The availability of such anonymous information challenges the researchers and information analysts to develop automated tools for analyzing such information. In this regard, Author Profiling is a popular technique to extract such information from the texts by analyzing author's writing styles [1].

Authorship analysis is performed in three different ways such as Authorship Identification, Plagiarism Detection and Author Profiling [2]. Firstly, Authorship Identification is the process of finding the author of a given document. It is performed in two ways that are Authorship Attribution and Authorship Verification. Authorship Attribution predicts the author of a given anonymous document by analyzing various documents of multiple authors [6]. Authorship verification finds whether the given document is written by a particular author or not by analyzing the documents of a single author [3].

Secondly, Plagiarism Detection detects the author's contribution in the given document. It is performed in two steps. The first is source retrieval and the second is text alignment [13]. Source retrieval process retrieves the possible sources of suspicious documents that contain the content of a given document from document collections. Text alignment finds the matching percentage of a given document content from suspicious documents [13].

Author Profiling is an important technique in the present information era which has applications in marketing, security and forensic analysis [1]. Social web sites are an integral part of our lives through which, crimes are cropping up like public embarrassment, fake profiles, defamation, blackmailing, stalking etc. Forensics is a field to analyze the style of writing, signatures, documents, and anonymous letters. Author Profiling helps in crime investigation and forensic analysis to identify the perpetrator of a crime with the characteristics of writing styles. In the marketing domain the consumers were provided with a space to review the product. Most of the reviewers were not comfortable in revealing their personal identity. These reviews were analyzed to classify the consumers based on their age, gender, occupation, nativity language, country and personality traits. Based on the classification results, companies try to adopt new business strategies to serve the customers. Author Profiling is also beneficial in educational domain by analyzing a large set of pupil. It helps in revealing the exceptional talent of the students and also helps in estimating the suitable level of knowledge of each student or a student group in the educational forum.

The authorship attribution task has traditionally been carried on data from small set of documents written by various authors [5]. This task is more difficult to identify an author for larger data sets, involving more number of authors. In such cases, Author Profiling is a good alternative solution and provides clues to find the identity of authors. Author Profiling is also used to find the characteristics of the author even when the documents of the given author are not in the training data.

In general every human being has his own style of writing and it will not be changed while writing in Twitter tweets, blogs, reviews, social media and also in documents. Men use more number of determiners and quantifiers and woman use more number of pronouns than men in their writings [1]. Similarly the male authors stress more on topics related to sports, politics and technology whereas the female authors write about topics like beauty, kitty parties and shopping [2]. Prior works [2, 4] found that the male authors use more

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Attendance Recording System Using Partial Face Recognition Algorithm

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Abstract In today's world, recording the attendance of a student plays an important role in improving the quality of educational system. The manual labor included in the maintenance and management of the traditional attendance sheets is tedious as it costs quite a time for the lecturer. Thus, there is a requirement for robust computerized biometric-based attendance recording system (ARS). Face recognition-based methods are a potential replacement for conventional systems, in case if the students to be addressed are more. This chapter gives an overview of the existing attendance recording systems, their vulnerabilities, and recommendations for future development. A smart attendance capturing and management system based on Viola–Jones algorithm and partial face recognition algorithms is introduced for two environments: controlled and uncontrolled. While the proposed system proved 100 % accurate under controlled environment, the efficiency under uncontrolled environment is quite low (60 %). It is observed that the face recognition rate varies from frame to frame. Further, the performance of the proposed attendance system completely depends upon the database collected, the resolution of the camera used and the capacity of students. Further work can be carried out to make the system more efficient in the real time scenario.

Keywords Biometrics · Face recognition · Face detection · Viola–Jones algorithm · Gabor ternary pattern · Sparse representation

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Multi-fingerprint Unimodel-based Biometric Authentication Supporting Cloud Computing

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Abstract Cloud computing is one of the emerging technologies that transfers network users to the next level. Security is one of the critical challenges faced by cloud computing. Biometrics proves its efficiency to achieve secured authentication. A new attribute should be created to handle authentication information in the infrastructure. The proposed system model presented a new idea for biometric security system based on fingerprint recognition. It automated the verification method to match between two human fingerprints, where fingerprints are considered a commonly used biometrics to identify an individual and to verify their identity. The proposed system presented a new model of a security system, where the users were asked to provide multiple [two] biometric fingerprints during the registration for a service. These templates are stored at the cloud providers' end. The users are authenticated based on these fingerprint templates which have to be provided in the order of random numbers that are generated every time. Both fingerprint templates and images were provided whenever encrypted for enhanced security. The proposed multi-fingerprint system achieved superior accuracy of 98 % compared to the single-fingerprint and manual-based attendance management systems.

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Review of Clustering Techniques

G. Sreenivasulu, S. Viswanadha Raju and N. Sambasiva Rao

Abstract Clustering is the procedure of consortium a set of entities in such a manner those similar entities should in the same group. Cluster analysis is not one specific approach, but the general process to be observed. Clustering can be viewed by different algorithms that differ independently, in their view what is meant by a cluster and how to find them perfectly. Popular notions of clusters include groups with minimum distances among the cluster members. The clustering problem has been discussed by researchers in different things with respective domain. It reveals broad scope of clustering and it is very important in the process of data analysis as one step. However, it is very difficult because of the researchers may assume in different contexts. Clustering is one of best approach of data mining and a common methodology for statistical data analysis. It is used in all major domains like Banking, Health care, Robotics, and other disciplines. This paper mainly aims to discuss about limitations, scope, and purpose of different clustering algorithms in a great detail.

Keywords Data mining · Clustering (un-supervised) algorithms · Categorical data

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Weighted Co-clustering Approach for Heart Disease Analysis

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Abstract A Co-clustering approach for heart disease analysis using a weight based approach is presented. Towards the performance improvement in database mining, co-clustering approaches were used to minimize the search overhead. For the co-clustering of data, information based co-clustering (ITCC) has been used as an optimal means of clustering. However, in this co-clustering approach, elements are clustered based on Bregman divergence criterion, following the convergence of Bregman Index optimization using Euclidean distance (ED) approach. The ED approach works over the magnitude values of the elements, without consideration of the data relations. In many applications, relationship between elements played a significant role in making decision. In this paper, a relation oriented co-clustering logic following weight allocation process is presented. The proposed Weighted ITCC (W-ITCC) method/technique is applied over Cleveland data set for heart disease analysis to do performance comparisons.

Keywords Co-clustering · Weighted co-clustering · Cleveland data set · Bregman divergence criterion

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An Improved Analysis of Heart MRI Images using the Morphological Operations

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Abstract— Heart disease is the most prevalent kind of disease even among the young people, which has logged the maximum number of lives so far. Earlier it was a disease which claimed people above 50 years of age, but as of now it has it is consuming even the lives of small children with congenital heart diseases. This part of the work also has focused on the cardiac MRI images related to congenital disorders among children in the age group of 2 years to 17 years of age. Medical image enhancement technique is the need of the hour for quick and accurate diagnosis of heart ailments and for medical intervention to take over accordingly. In this paper we focused more on the morphological operations in continuation of our research work in our earlier paper. Different morphological operations were tried over the pre-processed images and the experimental results showed that the opening operation gave a least error measure of all. Various error estimates over these operations were taken, like MSE, RMSE, MAE, etc. were calculated for all MR images and was found the opening operation had a less error compared to other operations, which implies that opened images have more clarity than the other operations.

Keywords— *cardiac MRI images, congenital heart diseases, segmentation methods, morphological operations, erosion, dilation, opening, closing.*

I. INTRODUCTION

Heart disease is the leading cause of death in most of the countries. Although it varies geographically and by ethnicity, it claims 610,000 lives every year in United States of America, which is 1 in 4 deaths that occur at that place. Asian countries also have taken a lead in this, where the death rate due to heart attacks is around 22.2 percent. One in hundred babies are born with heart defects in United States of America every year. According to American Heart Association, United States of America is challenged with two times the number of children dying with congenital heart than all the other childhood diseases including the childhood cancers. The survival rate of infants suffering from CHDs depends on the severity of defect and also the efficiency of diagnosis within a short period of time, since an infant can die within 28 days after birth, if the defect is not diagnosed and attended properly. This clearly indicates that fast and accurate diagnosis is the need of the hour. The diagnostic inputs for such defects are received from cardiac MRI images which is normally a non-invasive method. Therefore, for this cause, a dataset that containing 33 different images for variety of congenital heart diseases was donated by York university of Canada comprising of patients' whose age ranges from 2 to 17 years. Although two of those cases have missing parameters, still images were present to study the nature of the defects using morphological operations. In our previous part of the work, various filtering methods, segmentation methods were used to enhance the quality of the image.

This paper is organised as: II part containing Literature Survey, followed by III part containing the methods used for further enhancement, followed by Experimental results that were obtained in this work presented in part IV and part V contains the conclusions drawn from this study.

II. LITERATURE SURVEY

Many researchers in the Literature have worked on morphological operations in a wide array of applications, including segmentation approaches, cancer detection in Retina, Lung, Brain, in finger print or forensic applications etc. Very few or scarcely any work has happened on the application of heart MRI images. Bernhard Burgeth, et. al., in [1] have experimented on morphological operations over matrix valued images. Dr. K. Satya Prasad et al., in [2] have worked on Diabetic Retinopathy using morphological segmentation and Fuzzy Logic. Showkat Ahmad Dar et al., in [3] have worked on applying the morphological operations over the forensic images. Many researchers have focused on Brain MRI images, like B. V. Kiranmayee et al., in [4] have worked on finding the area of tumour after enhancing the MRI images using morphological operations. Leela G A et al., in [5] have experimented on brain MRI images using k-means and fuzzy c-means clustering along with morphological operations. V.Sagar Anil Kumar et al., in [6] and Rohini Paul Joseph et al., in [7] have also worked on k-means clustering based on morphological operations for detecting the brain tumours. Ravi S et al., in [8] have worked on understanding

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PRINCIPAL

Real-time Implementation of Reversible Watermarking

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Abstract In today's Internet-connected world, tampering of digital images by malicious users has become very common. This clearly is a direct violation of one's intellectual property rights, and hence, image protection by resolving rightful ownership is gaining utmost importance. Reversible watermarking (RW) techniques are a potential replacement for conventional watermarking systems, in case if the images to be protected are very sensitive. Studies have suggested that these methods offer greater balance among the requirements of watermarking such as invisibility, robustness, and capacity. This chapter gives an overview of the RW techniques, their vulnerabilities, and recommendations for future development. Performance issues related to the real-time implementation of watermarking systems through various algorithms are also featured. Finally, an extension of real-time implementation of RW approach based on asynchronous architectures is introduced.

Keywords Watermarking · Copyright protection · Intellectual property · FPGA · Asynchronous clock

1 Introduction

The wide outreach of Internet has resulted in a steady rise of transmission of digitized images, audio, and video. Due to this, the odds of an unauthorized person tampering and misusing the images (audio or video) also are on a steady rise [1–3].

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Automatic Street Light Control System using Wireless Sensor Networks

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Abstract Energy consumption due to the street lights needs proper monitoring and control to reduce wastage of power. Conventional street light systems suffer from certain drawbacks as they are manually controlled and are powered through the electrical board power station. This may lead to more power consumption if not monitored properly. In this paper, an automatic street light control system is implemented based on wireless sensor networks (WSN). The street lamp post forms the WSN node. It uses an Arduino Uno board and various sensors to detect traffic on the road. A Raspberry Pi3 computer is used as a web server at the central base station to monitor the status of the street lights. The lights are turned on based on the sensor signals only during nighttime and when traffic is present. A webpage is developed using HTML and PHP language for uploading the sensor data and web control of the street lights. Solar cells are used at each node to power on the street lights.

Keywords—Wireless Sensor Network; Automatic Street light control; Webbased Control; Sensors; Solar power

I. INTRODUCTION

A Wireless sensor network (WSN) consists of various sensor nodes that transmit sensor information among other nodes in the network and to a central node. In this investigation, a WSN architecture is used to implement an automatic street lighting system. Each street lamp post is designed as a node. The sensors at each node collect data regarding the traffic conditions, day or nighttime information, current, etc. and transmit to the central base station. The street lamp post uses LED lights and solar cells to help reduce power consumption. The street lights are turned on or off according to the presence of traffic. The base station is used as a web server, which uploads the sensor information and status of lights turned on or off on to the developed web page. The various sensors used include light dependent resistor (LDR), ultrasonic sensor, and a passive infrared (PIR) sensor.

II. LITERATURE SURVEY

Buratti et al presented a survey of various WSN technologies, design aspects and evolutions [1]. Swathi and Manoj have used the GSM technology to monitor and control the street lights. Use of GSM enables ease of fault detection and repair as information is sent to nearby control terminal [?]. Shahzad et al have proposed a traffic flow based LED lighting system with adjustable illumination for improving the energy efficiency [3]. Fabiolecees proposed a high efficient automatic streetlight system using ZigBee networks. WSN is used to transform the information between lamp post and base station [4]. Luyi Ling et al developed a photovoltaic cell and microcontroller based intelligent LED street light system. A wireless communication module is used to remotely operate and control the dimming of LED lights [5].

III. BLOCK DIAGRAM AND DESCRIPTION OF HARDWARE

Figure 1 shows the block diagram of automatic street light control system using WSN. It consists of lamp stations and a base station. Each lamp station consists of Arduino Uno board as microcontroller, PIR sensor, emergency switch, LDR sensor, nRF24L01 transceiver, ultrasonic sensor, relay, LED light and a solar panel as energy source. The base station consists of Raspberry Pi as processor, nRF24L01 transceiver, and a GSM module.
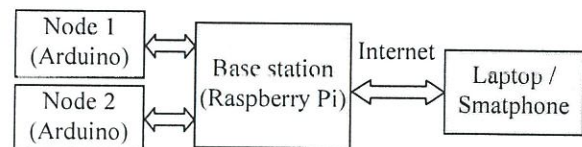

Fig.1 Block diagram of Automatic Street light Control System using WSN

The automatic street light turns on under three conditions. Firstly, when PIR sensor detects a human or a moving object (vehicle), LED light is turned on. Secondly, an ultrasonic sensor is used to detect distance objects and turn on the light accordingly. Lastly, a switch is included for manual operation in case of maintenance work. The LDR sensor is included to measure the light intensity, for identification of day and night. The nRF24L01 wireless transceiver transmits the sensor information and the light status to the Raspberry web server to upload on the webpage. Also, it receives commands sent from the webpage to turn on or off the light at a particular node. The entire system is powered using solar cells, making it more energy efficient. This system is a traffic aware system.

WSN Based Automatic Irrigation and Security System using Raspberry Pi Board

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Abstract—In India, a large number of population depend upon agriculture for their livelihood. The ground water levels have come down drastically due to decrease in rainfall and increase in global warming. In the conventional irrigation techniques, farmer has to go to the field regularly for checking the condition of the crops and for watering it. With the improvements in digital and communication technologies, automatic irrigation systems have come into existence. In this paper, a Wireless Sensor Network (WSN) based Automatic Irrigation and Security System using Raspberry Pi is implemented In the proposed system, Raspberry Pi is used as a Coordinator node (CR node), Arduino as End node device, and nRF24L01 transceiver is used for wireless communication and data transfer between the CR node and end node. Each Arduino node collects the various sensor inputs such as soil moisture, temperature, PIR sensor status sends them wirelessly to Raspberry Pi. Based on the sensor parameters and soil status, the water pump is turned on and the various sensor node values are posted on the webpage using Raspberry Pi web server. Farmer can monitor the status of the field on the webpage. Also, there is an option to turn ON/OFF the water pump manually from the webpage. The PIR sensor and a buzzer are used to protect the crop from the cattle entering the field. The system can reduce the water consumption and wastage of water to the crop. It results in increasing yield and more profit to the farmer.

Keywords—Automatic Irrigation; Raspberry Pi; Wireless Sensor Network; Python; HTML; PHP

I. INTRODUCTION

In the last decade, income from agriculture has contributed greatly to the Indian Gross Domestic Product (GDP). Earlier the crop yielding was very good as the ground water levels were high. The major population of India mainly depends upon agriculture for their livelihood. In recent years, ground water levels have come down largely due to decrease in rain fall and increase in global warming. With the conventional irrigation techniques, some risk and problems exists. The farmer has to go to the field regularly for checking the condition of the crops and watering it. In the present day, to reduce wastage of water consumption and increasing the yield is a big challenge. Nowadays, in rural areas, internet connectivity is available at affordable rates as many mobile service providers exist in the market. And many farmers have smart phones. So, WSN based automatic irrigation and security system can help the farmer to monitor and control the condition of crops without continuously monitoring the field physically. Also, we need to protect the crop from the cattle. If cattle enters the field, they can damage the crop. For this, we need to protect the crops from different threat situations. If we have an automatic irrigation system then we can solve these problems so that water is uniformly distributed to the crop.

Wireless Sensor Network (WSN) is a sensor network of multiple nodes which communicate the sensor values from one node to another node wirelessly. WSN can be used in irrigation for monitoring the soil parameters and water flow control to the crops. Using this method, the farmer can monitor the sensed field parameters on a webpage in his smart phone or laptop and also control the flow of water from his mobile without going to the field.

II. LITERATURE REVIEW

Tanmay et al have implemented an Internet of Things (IoT) and WSN based crop security system which can detect rodents and insects, etc. in the field or storage godowns and intimate to the farmer in real time [1]. Satya et al have proposed a water irrigation system that controls the flow of water to the crops depending on the water level and the soil moisture. Also, the farmer receives a SMS notification about the amount of time that water is flown to the crops [2]. Usha Rani and Kamalesh designed a ZigBee and web based automatic irrigation system to monitor the soil moisture and motor status. An SMS is sent to the farmer about motor status [3]. Ghosh et al used cloud computing platform, a microcontroller and an isolated server to store sensor outputs and accordingly turn on or off drip irrigation system [4]. Namala et al implemented an intelligent and smart irrigation system for watering of flowering plants [5].

III. HARDWARE DESCRIPTION

Figure 1 shows the block diagram of the WSN based automatic irrigation and security system using Raspberry Pi board. Here each end node consists of an Arduino Uno board which interfaces to various sensors including soil moisture sensor, temperature sensor and passive infrared (PIR) sensor, a buzzer and nRF24L01 transceiver which is used for sensor data transmission to the Raspberry Pi (RPi). The RPi web server is used as the coordinator (CR) node. The PIR sensor is placed in the field to detect any cattle entering the field. A buzzer turns on to drive the cattle away, whenever PIR sensor

Web Based Environmental Monitoring System Using Raspberry Pi

2017-18

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Abstract—Environmental monitoring is becoming important in today's world due to rapid industrialisation. In this paper, a web based system for monitoring various environmental parameters such as light intensity, carbon monoxide (CO) emission, temperature, humidity, and landslide is implemented. The system is implemented using Arduino Uno and Raspberry Pi used as a web server. Various sensors including light dependent resistor (LDR), MQ7, DHT11, and Accelerometer sensor are used. The measured environmental parameters are uploaded on a webpage along date and time stamp. These can be viewed from anywhere using an internet enabled device such as laptop or smartphone. The software code is written using Arduino Integrated Development Environment (IDE) and Python. The webpage is developed using HTML and PHP languages. The variation of the environmental parameters is observed on ThingSpeak.

Keywords— Sensors; Arduino Uno; Raspberry Pi web server; Python; HTML; PHP

I. INTRODUCTION

Due to rapid industrialisation and increase in the number of vehicles in urban areas, there is increase in the air pollution levels due to harmful gases like carbon monoxide, methane, etc. These harmful gases can lead to serious health hazards to commuters and needs proper monitoring. The CO gas is a greenhouse gas. By monitoring this gas we can keep a check on global warming. In today's modern world, knowledge of weather parameters plays a significant role in applications such as weather forecasting. Humidity levels in the surroundings help the farmers in proper irrigation of the crops. Temperature sensors are often used with drilling machines to sense the temperature while drilling in to the earth for search of oil. Temperature sensor and also can be helpful to notice the deeper levels of ocean or sea in the case of sea divers to capture their way.

In hilly regions, landslides occur during heavy rainfall and extreme weather conditions. It is useful if the travellers are alerted about the occurrence of any landslide or earthquake. An accelerometer sensor is used in this work to identify the occurrence of any landslide. This simple and low cost sensor is very useful to the disaster management authorities to identify occurrence of a land slide in a particular area of an hilly region. As the developed system is web based, it helps in monitoring of the various environmental parameters in real time.

II. LITERATURE REVIEW

Nivedha et al proposed a system for data acquisition and monitoring in hazardous environments. Various parameters including current, voltage, temperature, poisonous gas, water level, etc. are monitored using a ZigBee based wireless sensor network [1] Shah and Mishra proposed a IoT based environmental monitoring system to monitor temperature, humidity and CO_2. An android application also has been developed to monitor the data remotely [2]. Kolomvatsos et al used data fusion and fuzzy logic on sensor measurements for monitoring environment for identification of specific events [3]. Kapoor et al implemented a system for monitoring the landslide. Before they occur, we can't find the occurrence of landslide but the main aim is to alert the people by the monitoring. An accelerometer sensor is used to determine the landslide. The sensor values are transmitted through ZigBee [4].

III. HARDWARE DESCRIPTION

Figure 1 shows the block diagram of the web based environmental monitoring system using Raspberry Pi. In this investigation, various sensors are used to implement the system, viz. light dependent resistor (LDR), air quality, weather, and accelerometer. LDR is used to measure the light intensity; MQ7 sensor is used to measure the air quality, i.e. concentration of carbon monoxide present in the air; and accelerometer (X,Y,Z) position is measured to detect occurrence of any landslide. The above parameter values are fed as analog voltages to the Arduino Uno board which converts them to digital using a 10-bit internal analog-to-digital converter. The Arduino sends these values to the Raspberry Pi board through ZigBee modules. The weather sensor (DHT11) provides a digital output and is directly connected to the Raspberry Pi for measurement of temperature and humidity. The Raspberry Pi is used as a web server. It stores the values of light intensity, CO level, temperature,

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Knowledge Extraction from Software Engineering Repositories

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Abstract—Software engineering processes are hard to understand, and related tasks frequently produce lot of information which can be used for development of strategy for future Projects. In the last decade, a large number of software data sets have been created for different purposes, however as the challenges in the development and maintenance of software are increased the need for novel approaches to make use of the collected data is also increased. The demands for reduced development time and increased reliability of software also necessitated the need for knowledge extraction from the previously collected data sets. In this paper a detailed survey is conducted on the available methods for the knowledge extraction from the software engineering data bases to forecast and aid in improved development and maintenance phases of software.

Keywords—Software engineering repositories; data quality; software engineering data; data mining

I. Introduction

With the competitive landscape of software-intensive companies is changing and intensifying rapidly, the size and complexity of systems is increasing while the speed of innovation is accelerating at the same time [1].

Scientists and Researchers, in this field, explored several software engineering questions using the historic data [2]. Some frequently investigated areas includes software evolution, development models such as Water fall, V process, Iterative, etc. forecast of future programming qualities, utilization of machine learning methods on project data, bug forecast, investigation of programming change pattern, and investigation of code clones. There has additionally been a surge of work on tools and techniques for mining repositories, and methods for visualizing the data [3]. The latest repositories are available as "Promise" from North Carolina University as repository and reference is mentioned below.[1]

This has lead to a situation where many companies are stuck in a fire-fighting mode where the cost of developing new products increases constantly due to increased size and complexity while, on the other hand, the number of products and required customer-specific adaptations increases constantly. This puts an unwieldy strain on the R&D organization, and over time, this causes the competitive position of the company to deteriorate, as it is unable to innovate in its product portfolio and processes due to the singular focus on short-term deliverables to the customers. During the last decade

several industries have attained a threshold where improving the existing process no longer allow the company to maintain the competitive advantage. More industries have convinced that "Working harder" is not going to deliver the expected results, many reached a point that where new ways are in need to be investigated there diverse demands on the organization can be met confidently [4], [5].

Consequently, numerous organisations are not completely understanding the effect of their development and maintenance procedures on the nature of the product that they create or maintain and deliver to the customer organisations. This is by and large not because of insensibility about quality, but rather difficulty in characterization and estimation. Programming quality is not just a component of lines of code, bug check, number of engineers, worker hours, cash or past experience – in spite of the fact that it includes each one of those things – and it is never the same for any two organisations with similar deliverables [6].

Software Programming measurements and Key Process Indicators (KPIs) have for quite some time been a standard practice for surveying nature of programming frameworks and the procedures that create them. In any case, there are pitfalls related with the measurements. Project Management Practitioners often depend on measurements that they can easily obtain without much of a stretch to get and comprehend the same which might be more terrible than utilizing no metrics and KPIS by any means. Measurements can appear to be intriguing, yet be uninformative, unessential, invalid or not significant. Genuinely important measurements might be inaccessible or hard to acquire. Measurements can be hard to conceptualize and changes in measurements can seem random to changes in process. As of late the significance of this field enhanced as today's society and organizations turn out to be more information driven. Industry has solid enthusiasm for changing programming archive information into noteworthy bits of knowledge to highlight better improvement alternatives.

Again, software engineering activities produce an inconceivable measure of data that [7], if tackled appropriately through information extraction systems, can give knowledge into numerous parts of Software Engineering advancement forms [8], [9]. Although numerous procedures are domain specific, there are several software engineering tasks which can benefit by re-using such knowledge, and numerous normal sorts of information which can be extracted. Our motivation here is to convey software engineering group that how informa-

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[1] http://openscience.us/repo

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CERTIFICATE

OF PRESENTATION

IFERP

2nd International Conference on Emerging Trends in Engineering, Science and Technologies (ICETEST-18)

BITS
NARSAMPET

16ᵗʰ – 17ᵗʰ February 2018, Warangal

This is to certify that .... Suresh Arjula .... presented the research

of .... JNTUH College of Engineering ....

paper titled .... Application of Collocation Method Using Noris Basis Functions for

1-D Heat Transfer Problems .... during the 2ⁿᵈ International Conference on

Emerging Trends in Engineering, Science and Technologies (ICETEST-18)" held at Balaji Institute of Technology and Science, Warangal

on 16ᵗʰ and 17ᵗʰ February 2018.

Mr. Rudra Bhanu Satpathy

Dr. V.S.Hariharan

Dr. S. Marikandar

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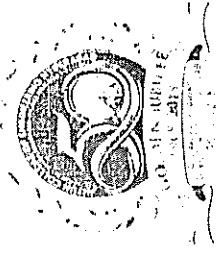
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This is to certify that Dr./Mr. / Mrs. _Suresh Arjula_

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Ritta collocation method for fluid flow problems

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TREND ANALYSIS-A TOOL TO IDENTIFY THE FAILURE & RUN MODE IN PUBLIC TRANSPORT BUSES

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Abstract: The availability of a system, machine or equipment for production or service is the key parameter to improve the productivity of any organization. The failures cannot be avoided completely but can be reduced through proper maintenance programme which can be developed if one can predict the occurrence and mode of failure in advance. Hence, it is the responsibility of managers to keep track of their machines or equipment and make available for maximum run hours with minimum failures. This will also help them in improving the reliability of the machines/equipment. This study is taken up to identify the failure and run modes of TSRTC buses to improve the availability and the customer satisfaction. The data regarding the bus failures and run hours for the period of 32 months has been collected and trend is analysed using graphical methods and also tested for presence of correlation.

Index Terms - Trend, Failure mode, Availability, Time between failures (TBF), CTBF, Run Time

I. INTRODUCTION

The Public Transport Corporations run by the state government are playing a vital role in serving the public for their day to day transportation needs i.e. for going to schools/ colleges, offices and on business works. The major part of the country's economy is from the transport systems like airways, railways, metro rail, roadways, waterways etc. They also created employment to many people directly and indirectly. Private buses, taxis, self-owned cars and auto- rickshaws are now competing with the state run public transport systems which have become threat to their existence. In the context of the competition, it is must that the state run transport operators should be available for failure free service and gain the confidence of customers with safe and satisfactory service.

The failure control of buses or equipment is the challenging task of the Managers of any organization. It is very much essential to maintain the good condition of the buses or equipment in order to provide the failure free service in the field. The maintenance programs to make the system available are of great significance due to a competition and overall operating costs. The performance of system depends on maintenance schedules, working conditions/ environment, technical skills of operators, etc. When the failures of system are low, the efficiency of organization improves and vice versa. So efforts are always needed to reduce the failure rate of the systems.

The failure of systems or equipment is unavoidable but cann be minimized with effective maintenance schedules, which can be designed only if one can predict or assess the occurrence of failure. This can be done by close monitoring of trends of failures. This trend analysis can be used to judge the life cycle characteristics of systems maintenance schedules, replacement analysis and also for designing the reliability of the system.

This study is carried out at one of the bus depots (Uppal) of TSRTC to evaluate the failure and run patterns. The aim of this paper is to investigate and identify whether the buses are deteriorating or improving based on the past run and failure data of buses.

II. OBJECTIVES OF THE STUDTY

The objectives of the present study are as follows
- To investigate failure and run patterns of buses by collecting and analyzing the data.
- To suggest a suitable maintenance program for maximising run hours.
- To improve the availability and reliability of buses.

III. FAILURE AND FAILURE PATTERNS

The Failure is the inability of a system or equipment to perform the specified function under given conditions. It can be non conformance to some predefined performance.

Failures can be as follows:

a) Based on time/age of equipment: (i) Early failures at infant stage (ii) Random failures or rare event failure (iii) Old age or wear out failures b)Based on volume of failure: (i) Small failures (ii) Minor failures (iii) Major failures (iv) Catastrophic failures

c) Based on mode of failure: (i)Sudden failures (ii) Progressive failures (iii) Retrogressive failure (iv) Gradual failures.

Failure Patterns: All systems irrespective of whether they are mechanical, Electrical etc are assumed to behave in the same manner. with reference to failure that occur, they will have any one of these three behaviours: (i) Rate of failure is decreasing (DFR) i.e. The condition of system is improving (ii) Rate of failure is constant (CFR) The condition of system may or may not be consistent but it gives the average output required.(iii) Rate of failure is increasing (IFR) i.e. The condition of system is deteriorating.