

Lecture Notes on Data Engineering
and Communications Technologies 58

S. Smys

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Computer Networks and Inventive Communication Technologies

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Chapter 14

Risk Analysis of Diabetic Patient Using Map-Reduce and Machine Learning Algorithm

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ABSTRACT

Diabetes is one of the four non-communicable diseases causing maximum deaths all over the world. The numbers of diabetes patients are increasing day by day. Machine learning techniques can help in early diagnosis of diabetes to overcome the influence of it. In this chapter, the authors proposed the system that imputes missing values present in diabetes dataset and parallel process diabetes data for the pattern discovery using Hadoop-MapReduce-based C4.5 machine learning algorithm. The system uses these patterns to classify the patient into diabetes and non-diabetes class and to predict risk levels associated with the patient. The two datasets, namely Pima Indian Diabetes Dataset (PIDD) and Local Diabetes Dataset (LDD), are used for the experimentation. The experimental results show that C4.5 classifier gives accuracy of 73.91% and 79.33% when applied on (PIDD) (LDD) respectively. The proposed system will provide an effective solution for early diagnosis of diabetes patients and their associated risk level so that the patients can take precaution and treatment at early stages of the disease.

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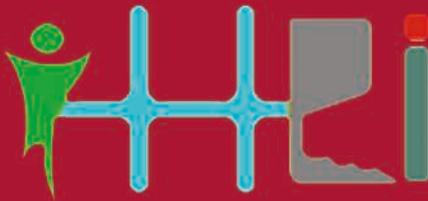
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1
Part I



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Concentration Level Prediction System for the Students Based on Physiological Measures Using the EEG Device

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Abstract. Concentration level plays a significant role while performing cognitive actions. There are many ways to predict the concentration level, such as with the help of physical reflection, facial expressions, and body language. Self-evaluation on the scale of 0 to 1 can also be used to measure the concentration level. In this paper, a publicly available dataset is used for classifying the concentration level using students' brain signals recorded through Electroencephalogram (EEG) device while performing different tasks that require varied concentration level. The study aims to find the appropriate Machine Learning (ML) model that predicts the concentration level through brain signal analysis. For this purpose, five different ML classifiers are used for comparative analysis, namely: Adaboost, Navie Bays, Artificial Neural Networ (ANN), Support Vector Machine (SVM) and Decision Tree. The ANN model gives the highest accuracy, i.e. 71.46% as compared to other classifiers for the concentration level measurement.

Keywords: Brain signals · EEG · Concentration level · ML classifiers

1 Introduction

The performance during cognitive actions is greatly influenced by the level of concentration or degree of focus of a performer. The performer's behaviour while performing repetitive tasks such as mathematical calculations, web browsing can be monitored to measure the level of concentration. In this paper, a performer's behaviour is observed by capturing brain signals through Electroencephalography (EEG). As shown in Fig. 1, brain signals are captured during the performance of the five tasks, namely: (i) Performing Arithmetic Calculations (ii) Reading Technical Articles (iii) Listening to the Technical Podcasts, Reading Transcripts (iv) Browsing Internet (v) Relaxing with Open or closed Eyes.

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Survey on Techniques in Improving Quality of Underwater Imaging



Nagaraj V. Dharwadkar and Anjali M. Yadav

Abstract The quality and appearance of underwater images perform a relevant role in the underwater computer vision paradigm. Wherein, the underwater images are useful in various applications to make a detailed study on underwater life. Despite the hype, the images captured underwater undergoes various challenges like light attenuation, color absorption, type of water, etc. To address these types of issues, many algorithms are proposed. This paper provides a comprehensive study of frequent methods used to intensify the visual nature of underwater images and different underwater image datasets that are used to perform tasks regarding underwater imaging. The different quality assessment measures are also summarized in this research work. The presented methods and their shortcomings are studied to enable the in-depth comprehension of underwater image enhancement. In the end, possible future research directions are also implied.

Keywords Underwater image enhancement · Deep learning · Underwater image dataset · Generative adversarial network · Convolution neural network · Residual network

1 Introduction

Exact, high-resolution undersea images are crucial in tracking sea nature, inspecting the underwater world, and detecting sea bed objects. Despite that, it is difficult to accomplish such an objective because of the light attenuation and scattering and deformation of image color in the underwater scene. Water contains sea organisms, floating particles called marine snow [1], and other different obstacles. Because of the depth of water level, types of water, light conditions, and different wavelengths of light, the quality of underwater images is rapidly degraded. According to the light wavelengths, a light that has the longest wavelength disappears first. Hence, the

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in the

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Communication, Computing and Electronics Systems (ICCCES 2020)

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Artificial Neural Network for Identification and Classification of Natural Body Marks



Dayanand G. Savakar, Danesh Telsang, and Anil Kannur

Abstract Natural and artificial body marks like mole and tattoos are used to identify the victims, such as suspected, and unidentified bodies like in mass death in a plane crash and the tsunami it is a very complex situation to identify the body; in recent years, classification and identification have taken a lot of attention. This paper presents the classification and identification of natural and artificial body marks like mole and tattoo. Active contour segmentation is used to segment the image. There are 28 features extracted from each mole and tattoo image, where 18(color features), 4(texture features), 6(shape features). The artificial neural network is used to classify natural and artificial body marks, and classification accuracies obtained 88.7%. The designed algorithm works based on the features that are being extracted. Several different forms of the process exist to notify the different forms of the naturally identified body marks. The designed and proposed algorithm within this paper incorporates such kind of techniques to identify the natural and artificial body marks.

Keywords Artificial neural network · GLCM—gray-level co-occurrence matrix · BPNN—backpropagation neural network

1 Introduction

Moles are little sores in the skin. They are normally tanned and found on any portion of the body that is chest, face, hands, leg, and so on. A few moles are a lot darker, and some others are skin shaded. They might be harsh, level, raised, round, and

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Analyzing the Adoption of Recent IT Technologies in Undergraduate Engineering Project Course

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Abstract: Outcome-based professional education processes are a new standard for all stakeholders and knowledge economy. Majority of the time the IT services/consulting industry demands graduates who shall be billable from day one of joining the enterprise. According to the National Employability Report Engineers 2019, only 3% of engineers possess new-age skills in areas such as AI, data analytics and mobile technologies. Academic project works shall be seen in the light of aforesaid observations and therefore suggests treating this as an opportunity to initiate undergraduates to more hands-on experiential learning considering the advancements in technology and market need. The objective of this paper is to identify the gap between the needs of the market/job trends and undergraduate CS/IT student projects areas. The second objective is to identify the factors affecting the project selection process.

Our empirical study in general spanning over seven Engineering Institutes in western Maharashtra. The statistical data is collected from a controlled group of 4000 students. The data consists of project topics completed by students in the last nine years (from the year 2011 to the year 2019). Two indicators are used to understand the IT market. First, Gartner strategic technologies present the worldwide trend of technologies. Second, student project areas are compared with job trends in India. The student's feedback on technology adoption theory presents the challenges in adoption of recent IT technologies in academic projects. 62% of students have reported unavailability of resources at the institute to encourage the adoption of the recent technologies. The student's perception about the adoption of recent technologies needs to change.

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However, 85% of students agree that online resources can overcome the problem of availability of expert and guidance.

Keywords: CS/IT academic project selection, Gartner strategic technologies, CS/IT job/market trend.

1. Introduction

The current pandemic situation proved the significance of information and communication technology adoption in different sectors. According to IDC forecast cloud computing, mobile technologies, analytics and IoT are contributing significantly for enterprise growth. In the next few years robotics, artificial intelligence and AR/VR will reach 25% of ICT spending (IDC - Global ICT Spending: Forecast 2020 - 2023, 2020). Government of India has taken different initiatives for technology adoption in educational institutes. MHRD and AICTE have started different faculty development programs for improving the faculty competencies in different thrust areas such as artificial intelligence, data analytics, robotics, blockchain. AICTE promoted different new programs in recent technologies of artificial intelligence, machine learning, blockchain, data analytics, cybersecurity, Internet of things etc. IIT Mumbai, IIT Chennai, IIT Delhi and many more have taken initiative in this direction.

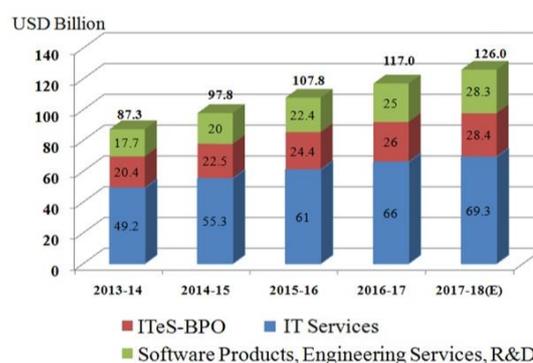


Fig.1 Top job roles in CS/IT in India (Ernst and Young, 2017)

Figure 1 shows the top job roles in the Indian information technology sector. From 2013-14 the jobs in IT services are increasing. The product development, engineering services and R&D increased rapidly. It creates the need for efficient manpower in recent IT technologies (Ernst & Young, 2017). Aspiring Minds conducted and published an annual employability survey in 2019. According to the report, 80% of Indian engineering graduates are not fit for a job in the current knowledge economy. This report shows that the small changes in the education system will not address the

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Developing Logic Building, Problem Solving, and Debugging Programming Skills Among Students

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Abstract: Computer programming course has become integral part of first year curriculum in all engineering disciplines. The effectiveness in delivery of this Course largely impacts on student's curiosity in the field of programming and software development. Many students lose their interest in the coding at very early stage of their professional career if this Course is not taught effectively. The proposed work aims to improve academic delivery of the computer programming course.

This work identifies loopholes in existing method of teaching computer programming course. Further we attempt to address these identified problems with different approaches. The approach focuses on development of logic building, problem solving, and debugging skills among the students. It is observed that if these skills are addressed properly then realistic improvement in programming skills of students can be achieved. We observed improvements in academic results of computer programming course after implementation of the proposed method. The approach proposed here can make learning computer programming a joyful experience for the students.

Keywords: First Year engineering, Computer programming, logic building, problem solving, debugging, effective academic delivery.

1. Introduction and Motivation

A. Introduction

Information Technology (IT) has become integral part of various types of industries and businesses. IT has applications in various industries like manufacturing, constructions, electric power, telecommunication, automobile, chemical etc. Further, IT is integral part of various scientific and research jobs. All these industries are recruiting employees who are having at least basic programming skills. Due to this industrial significance, computer programming course has become integral part of first year curriculum across various engineering disciplines. AICTE model curriculum for first year engineering also recommends this Course to be taught in first year.

The syllabus of computer programming course generally covers C programming language. C is considered as fundamental programming language. It is believed that a candidate who is expert in C programming can acquire expertise in any other programming language or

technology quickly. This is particularly necessary in IT industry wherein technologies are changing rapidly and there has to be quick migration of new technologies time to time. Following are Course Learning Outcomes of first year computer programming course given by AICTE [2].

The student will learn

1. To formulate simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs (in C language).
3. To test and execute the programs and correct syntax and logical errors.
4. To implement conditional branching, iteration and recursion.

In our Institute many students are from rural background. These students are having less exposure to computer systems before they join engineering studies. Many of them faces various issues while handling computer systems in effective way. To address this issue, we made few revisions in course syllabus. Besides the C programming we included following topics in the syllabus of this Course are – Introduction to Computer Hardware and System Software's (Operating System basic administration).

Making students expert in the programming is an ultimate course learning outcome of this course. Following are revised Course Learning outcomes for the Computer Programming course in our Institute.

1. To be able to operate computer systems in effective way.
2. To formulate Algorithm for given problem statement.
3. To translate given algorithm in C program.
4. To apply advanced C topics like Arrays, Pointers, and Structures.
5. To debug given code for identifying logical errors in the program.

The syllabus of this course is inspired from Dennis Ritchie [11] and E. Balaguruswami [12] text books.

The rest of paper is organized as follows. Section 2 discusses literature survey related with this topic. Section 3 presents motivation behind proposed approach. In section 4 the details of proposed approach to improve academic delivery of computer programming course are given.

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Increasing students Engagement during Virtual Classroom Teaching through Effective use of Online Tools

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Abstract: Nowadays, the entire world is facing the problem of pandemic i.e. COVID-19. Hence it is a challenging task for educators to engage students during virtual classroom activity. Many online tools are available to take instant feedback from students to measure their involvement levels like Quizzes, Polls, Surveys, etc. Hence, in this paper, the use of two online tools like InterviewBit and Slido is being addressed. These online tools are used to ask the questions during online lecture delivery that may help in measuring the overall involvement of the students. The mentioned tools are described in detail along with its incorporation in teaching Data Structure and Algorithms course for second year B. Tech in Computer Engineering students (around 120 Students). Also, the learning of students before and after the usage of the Tools have been compared and analysed. It has been observed that there is approximately 20% improvement in the overall learning outcomes after the usage of the Tools. Also, the cognitive and affective learning domains are considered to measure the overall impact.

Keywords: InterviewBit, Slido, virtual classroom activity.

INTRODUCTION

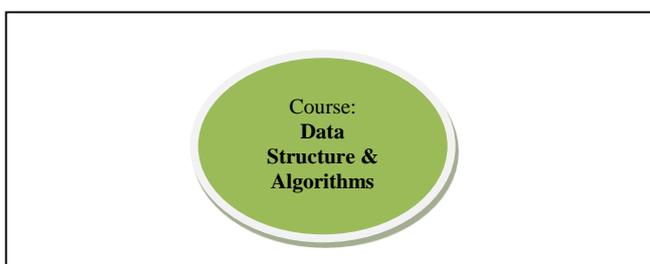
A virtual environment has its own advantages and limitations as compared to the physical classroom environment. To ensure student engagement during online classroom activity is a challenging task. Hence, in this paper total six online Tools have been discussed, namely: InterviewBit[1] and Slido[2]. Here, Data Structure and Algorithms (DSA) course has been considered as a case study to apply above mentioned online tools. This course is for second year B. Tech students in Computer Engineering department. As shown in Figure1, during the course teaching in virtual platform using Microsoft Teams Learning Management System [3] (LMS), various tools have been applied to check the engagement of the students. The details of activity plan for each online tool are explained in the next section. The second section covers the result analysis part and concluding remarks are given in the last section.



Fig.1 Online Tools to ensure students engagement

ONLINE TOOLS

There are many online tools available to assess students on the distance education platform. Many researchers [4-7] had contributed their work for the tool-based learning approach. On the physical classroom environment as face to face conversation is possible, it is easy for instructors to get live feedback from students. Hence, the instructor may change his/her teaching strategy as per the responses received. But in online mode, there are many limitations like it is difficult for an instructor to predict the percentage of concept understood by the students. The below list of online tools may help instructor to measure the student involvement during the online classroom teaching activity. Here, the details of the tool used along with its application to teach DSA course is being explained.



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Dear Author(s): Pratik Jadhav and Sachin Patil

Paper ID	TJCME-2083
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Acceptance Letter

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Quality Circle: A Case Study on Automatic Token Generation System for RIT Library

Gautami Shingan^{1*}, Sachin Patil¹, Varsha Lokare¹, Sadanand Howal¹, Chhaya Khambalkar¹

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Abstract : Quality Circle is one of the platform where group of people in the organization solves the problem exist in their workplace. This activity improves teamwork, creative ability within the employees of the organization along with the growth of the organization. This paper represents a case study on transformation from manual token generation to automatic token generation system for library to collect fine and photocopy fees. Library is a core component of any educational institution. Libraries give people the opportunity to find jobs, explore research, experience new ideas, get lost in wonderful stories, while at the same time providing a sense of place for gathering. It's never just a random collection of books. In our institute's central library, we were working with a traditional manual method of issuing token for photocopying facility and book fine collection. The current method uses paper and pen mode for the token generation. It consumes a lot of time to tally the accounts and generate report. We have taken this problem into consideration to make the system fully automatic by building a web application. The proposed system consists admin-user modules comprising mainly two modules for xerox utility and fine collection. The system also keeps the track of daily transactions. Additionally, the system has helped to reduce the paper work with human efforts and time, generating the reports on a click with easy tally of accounts.

Keywords: Quality Circle, teamwork, Library E-token generation System etc.

1. Introduction

Quality Circle [1][2][3] is a group employee from the organisation collaborate together, identify a problem faced by the organisation and try to find a solution to resolve it.

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We started our journey from Problem identification to collect real time problems exist in the organization. We used brainstorming and rating method to finalise the same.

The Institutes of Higher education have accurately been considered as the main foundation for development and progress of any country. Library is a core component of any educational institution. They are important cornerstones of a healthy community. Libraries give people the opportunity to find jobs, explore research, experience new ideas, get lost in wonderful stories, while at the same time providing a sense of place for gathering. It's never just a random collection of books. Library is key component of students and faculties to upgrade the knowledge to trained technical staff, research scholars, students and teachers. Every educational institutes have some protocols to distribute and collect books from all users. In traditional system, students get the limited books from their account and they have to submit the book to library within deadline. Different user has different deadlines like students and outsiders can take benefit of issued book for fifteen days while faculties can take benefit of issued book for two months. If any user will not be able to return the books on time then they have to pay fine. On the other side, in Rajarambapu Institute of Technology photocopy facility is also available in the Library where students can take photocopy of required material. User has to pay fine or amount of photocopies which is time consuming because of manual token generation. .

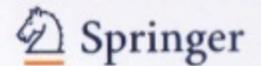
2. Statement of the Problem

The Xerox centre and book fine system at Rajarambapu Institute of Technology's central library are currently using the conventional method of issuing a token for each transaction. This method requires the use of paper for the token, as well as a significant amount of time to tally the accounts and produce the report.

On a regular basis, students make use of the central library's Xerox facility. The traditional method of producing tokens takes a long time, and the library staff spends 2-3 working hours per day tallying accounts for the tokens.



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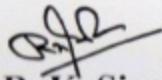
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Literature Review on Agricultural Internet of Things



Anagha Pakhare and Nagaraj V. Dharwadkar

Abstract This review paper focuses on the combinatorial implementation for agriculture and Internet of things (IoT). There are many prototype platforms that are built and demonstrated in order to construct the standard procedures. For the prediction and modelling environment of the field, deep learning and machine learning algorithms are being used. There are different units used for implementation independently like remote monitoring, image analysis, sensor network, irrigation system, cloud-mobile monitoring, drone surveillance, etc. It mainly focuses on the open challenges faced by the farmers and their solutions in the agricultural field. IoT plays a vibrant role in smart agriculture. Monitoring environmental factors is the major factor to improve the yield of the efficient crops, and the details are discussed.

Keywords Internet of things (IoT) · Sensors · Agriculture · Unmanned aerial vehicle · Smart grid · Remote monitoring

1 Introduction

Agricultural field has an indispensable role in human beings' lives as it began thousands of years ago [1–4]. From the middle age's revolution to organic and modern farming, lots of techniques were born. From the survey of USA—Food and Agriculture Organizations, with increasing population, so production of food worldwide should be increased by 70% of the current production within 2050 [5]. Agriculture has been the major source of food; also, it plays an important role in the country's economy growth [6]. Farmers still use some traditional methods of agriculture which results in low cultivation of crops. Besides, there are several new techniques that will be helpful for next generation farming. Many researchers mostly prefer the Internet of things (IoT) because of its prominent results. By implementing IoT in agriculture, farmers can raise the production with low cost by monitoring the efficiency of the

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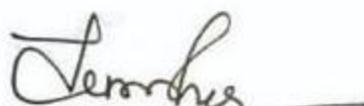
has presented a paper entitled

Survey on Techniques in Improving Quality of Underwater Imaging

in the ***3rd International Conference on***

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Survey on Techniques in Improving Quality of Underwater Imaging



Nagaraj V. Dharwadkar and Anjali M. Yadav

Abstract The quality and appearance of underwater images perform a relevant role in the underwater computer vision paradigm. Wherein, the underwater images are useful in various applications to make a detailed study on underwater life. Despite the hype, the images captured underwater undergoes various challenges like light attenuation, color absorption, type of water, etc. To address these types of issues, many algorithms are proposed. This paper provides a comprehensive study of frequent methods used to intensify the visual nature of underwater images and different underwater image datasets that are used to perform tasks regarding underwater imaging. The different quality assessment measures are also summarized in this research work. The presented methods and their shortcomings are studied to enable the in-depth comprehension of underwater image enhancement. In the end, possible future research directions are also implied.

Keywords Underwater image enhancement · Deep learning · Underwater image dataset · Generative adversarial network · Convolution neural network · Residual network

1 Introduction

Exact, high-resolution undersea images are crucial in tracking sea nature, inspecting the underwater world, and detecting sea bed objects. Despite that, it is difficult to accomplish such an objective because of the light attenuation and scattering and deformation of image color in the underwater scene. Water contains sea organisms, floating particles called marine snow [1], and other different obstacles. Because of the depth of water level, types of water, light conditions, and different wavelengths of light, the quality of underwater images is rapidly degraded. According to the light wavelengths, a light that has the longest wavelength disappears first. Hence, the

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digitally participated in Fourth International Conference on ICT for Intelligent Systems (ICTIS 2020) held during 15-16 May, 2020. The conference was held through Digital Platform ZOOM.

He / She also presented a paper titled

HeronEye: Survey on Coordinated and Efficient Huge Page Management to Fine-grained OS Support

The paper has also been selected for publication in the (ICTIS 2020) conference proceeding as per the fulfillment of guidelines issued by Springer.

We wish the authors all the very best for future endeavors.

Nilanjan Dey

TPC Chair, ICTIS 2020

Bharat Patel

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HeronEye: Survey on Coordinated and Efficient Huge Page Management to Fine-grained OS Support

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Abstract— Successful HUGE page management working in with different systems is fundamentally require for address translation overheads. Be that as it may, this keeps on staying a troublesome zone in OS plan. The upcoming of latest data storage innovations that have huge and less expensive than product Dynamic Random Access Memory has restored enthusiasm for 2: layered fundamental data storage plans. Inconsistently got to application information can be put away in such recollections to accomplish significant memory cost saving. Past we have large page about on 2: layered primary data storage that need to expected a 32000 bits page extent. Be that as it may, 2000KiloBytes HUGE pages of data execution is been done at cloud applications and will appear enormous data storage impressions, particularly in virtualized cloud situations, where settled paging definitely builds the expense of 4KB page the board. Utilizing both page get to designs and found by the operating system portion which filter the information when hardware execution encounters. We uncover tricky parts of latest HUGE data storage page on board methodologies. In this survey many challenge are expose and to resolve the issue the author has suggest some methodology and named the process as HeronEye/Linux. Author also demonstrate different approaches to deliver issues identified with executing performance, page fault delay and data storage leakage are the challenges which need to track is idea behind HeronEye program. Our assessment shows that HeronEye is more execution, vigorous and more qualified to deal with assorted outstanding tasks at hand when contrasted and current best in class frameworks. We likewise would like to encourage the advancement of extra cloud benchmark suites that speak to different classes of utilizations by making our benchmark instrument accessible by means of open source.

Keywords— Operating systems, huge pages, TLB

I. INTRODUCTION

Current applications now a days providing giant data storage area and place for address space translation expense in all variety of processors [37, 38, 39, 40 and 41]. Trendy architectures implementing giant Multi-stage TLB (Translation lookaside buffer) and memory-stroll caches, every one give assistance to a couple of page memory sizes need watchful operating system process to track appropriate page data expense for various amount of work. Approaching memory technologies, like currently Intel/Micron's introduced 3-dX Point data store memory [24], are forecasted on basis of it huge and less expensive in step with bit than it is in DRAM whereas providing the byte wise placeable load saving by interconnection point of typical main storage system. Become better with limit which result in expense of higher access idleness as processing per bit in

memory, anticipated drop anywhere between 400ns to a few microseconds [24] and restricted from 50ns range to 100ns in DRAM. Up- coming business handiness of such hardware has revived interest in 2 layer physical memory storage, whereby a piece of a framework's physical location zone is implemented with the more slow, less expensive memory innovation whereby a piece of a framework's physical location zone is implemented with the more slow, less expensive memory innovation [17, 33].

Our survey, [1] Thermostat overexamine two-layered primary memory straight- forwardly executing the program though maintaining the upsides that the huge data pages contain which in result have progressively actualizing limits on execution de- basement (e.g., constraining robbery to 3%). Continuing with survey Thermostat engineered for awering activities of huge storage page and might put/relocate 4KB and gaint memory page though restricting execution debasement at interims an objective sure. Earlier work has thought of 2 ways to deal with two-layered memory: (I) a paging instrument [26, 27], whereby gets to slow memory summon a page flaw that needs to move information to brisk memory before partner degree access could continue, and (ii) by means of a relocation system (as in store cognizant NUMA multi- processors) [14], whereby no product bundle issue is required. To give an incidental overhead cold page identification system, Thermostat constantly tests a modest low portion of memory blocks and the accessing rate of paging can be known by plotting dynamic values in graph. Ongoing further methodology prove to be less expense of process and quick responding activity for thermostat. The challenge is to differentiate hot and cold data blocks of page by hardware which lack efficient process of execution by taking single bit to access per data block page and unmanageable overhead. Also during the survey author analyze that the use of translation lookaside buffer fail hit which act on behalf for last level of cache (LLC) fail hit by reserving the bit in os in form of PTE and then can track it later, again it mark the page access rate to calculate the overhead that should have low values.

In this survey we come up with one concept of HeronEye, an automatic operating system level resolution for huge page tracking process. HeronEye is process step to resolve the challenge:

- Efficient way to equalization less performance memory management, tracing interpretation loading, and putting the data page shortcoming inactivity.