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Design and Implementation of Lecture Alert System for Computer Science Department In Imo State University

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Abstract

The aim of this work is design and implementation of a lecture alert system for Computer Science Department which makes use of Short Message Service (SMS) to enable lecturers to know when they have lectures and also deliver the venue, department, day, date and time to their phones. The motivation for this work is due to the challenges of the consistence report of errors in the process of filling and allocating the lectures on the time table, lack of effective record system or database system to store the record of time table and clashes of lecture because one venue can be allocated to different lecturers at the same time. The methodology that will be employed in this study is the object-oriented analysis and design methodology (OOADM) which will make use of the following programming languages; JavaScript for controls and flexibility, PHP for effective linking and communication with the database machine, HTML for browser communicator, a database machine, MySQL, and macromedia flash (11.0) for the video output display. The expected result that will be obtained is to a design a conventional lecture alert system using Short Messaging Service (SMS), also to provide a new method of checking lectures using mobile phone short messaging service work and to alert students ahead of their lectures and inform them of the venue of the lecture.

Keywords: Lecture Alert, Short Messaging Service (SMS), Multi-Media Messaging (MMS), internet of thing (IoT)

Introduction

Computers with the power of the internet have aid communication among people. The telephone system which was invented several years ago, had undergone a great improvement so much that today we have fixed wireless phones mobile phone and the likes with the rapid development of mobile phones came several services like the short messaging service (SMS), Multi-media messaging (MMS) which are readily available and add to the usefulness of mobile phones. SMS is a mobile technology that allows for sending and receiving text or even binary messages to and from a mobile phone (AL-Ali *et al*., 2016). Short Messaging Service (SMS) are now more attractive to service providers and users as a result of the recent mobile phone use penetration and the large-scale adoption of the existing services by users. The major advantage of shot messaging service (SMS) is its cost effectiveness and availability as most individuals own phone. The level of internet availability in less developed countries is where homes are internet access, short messaging service (SMS) is still faster and cheaper means of spreading information. The lecture alert system will not only allow lecturers to know when they have lecturers but it also messages the venue of the lecture and department to be handled. This is done by pushing the alert to the lectures (sending it to their phones) or working on a request sent from a lecturer to produce the alert (pulling) (Bodic, 2015). The aim of this study is to design and implement a lecture alert system for Computer Science Department.

Related Literature Review

The advent of computerization and the internet facilities has taken over almost every activity been executed manually by human in every organization. Scheduling of time and alarm monitoring system play an important role in the management of every activities of human lives which go beyond just to tell the actual time of the day. But development of a smart embedded remote notification and emergency message alert. system implemented with adoption of 6LowPAN platform of internet of thing (IoT) will absolutely render the needed services and shortcomings of digital clock and alarm system in an organization that involved large numbers of people notification. Therefore, an automation notification system can be described as a programmable real-time system dedicated for the remote message and alert system over the global system for mobile communication device using short message services (SMS). It used a central interface to send SMS messages to any-size of audience on any device over any communication channel of Internet protocol version 6 low Personal Area Network (6LowPAN) globally (Morris and Jamie, 2019). During an emergency period or an event threatening situation in a big organization, this system could be fast employed to widespread messages across the people irrespective of their location about the danger IoT as a widespread network technology that allows trillions of things to be associated and interact to each other over the 6LowPAN platform using IPv4/IPv6 addresses. It enables things, devices to be monitoring and control of the physical environment by collecting data, processing data, and analysing the data generated by sensors or smart objects. Therefore, the 6LowPAN is designed for an IPv6 platform to accommodate trillions of things, machine-to-machine (M2M) or human-to-machine (H2M) communication, interconnectivity and sharing of resources over the network globally. Many institutions, governments, industries and public organizations with large population needs to adopt a notification system for the information dissemination across to the people concerned within a stipulated period. This will facilitate the public notice dissemination among the concerned groups in the organization. In 2013, the Turkey Trot Dallas YMCA implemented a new alert system called "RedFlag" design for race of over 40,000 people participants in the congregation Thanks giving. This alert system helps to broadcast signal alert across the thousands of people in the congregation at a go (Heikki, 2015). There are various techniques for broadcasting communication about events across the people which includes a telephone notification service that can be used by a wide variety of organizations like government, businesses and academic world using SMS text messages on mobile devices. Voice broadcast emergency notification systems is the most traditionally popular for message broadcasting either within or public. This notification has the advantage of being instantly available and scalable enough to send out hundreds or thousands of alerts within an hour. It also helps government agencies to send critical notifications, such as weather-related warnings, resource information, extended utility interruption, missing children, fleeing suspects or other police-related operation announcements, evacuation preparation announcements, and other critical alerts (Elektor, 2016).

This developed university lecture scheduling and notification system consist of several components in its framework for the purpose of acquiring, storing and distributing data. It includes the users, hardware, software, procedures and data as depicted in the (Fig.1). Involvement of these components aids the communication processes and speed the broadcasting of SMS messages and alert through the gateway provider. With the implementation and development of both software and hardware technology based on remote university lecture and audience notification, the system can improve accuracy of the information, reduced the cost, effort and time expended on searching for information with ultimate accesses. In University time table scheduling system was developed using android web apps which coded in visual basic language. The system automatically schedules the university time table according to faculty, and based on the number of courses offering by various department in each faculty. Although, this system is automated, the notification capability and remote access of information are not included. A mobile University Notification System for educational institutions using the Jabber Protocol or Extensible Messaging and Presence Protocol (XMPP) for distributed messages between the client-server architecture. The system was operated in a real-time basis in the attempt of distributing messages to the client so that it is less expensive to implement but require mobile phone with java application program. Intelligent agent based Student-Staff Scheduling System was also developed by Krishna *et al*. (2018). The main purpose of this proposed system is to reduce the waiting time needed towards

appointment scheduling between lecturers and students and also for appointment scheduling among the fellow lecturers within the organization. The success of this system has been made possible through the use of android based mobile phone application. The proposed system utilizes the functionality of software agents to perform its feature functions such as scheduling, re-scheduling, update and cancellation of appointments. All these features are implemented using the JADE-LEAP agent development kit. An android web application was created for academic calendar scheduler by (Elekor, 2017). This application designed mainly focuses on minimizing the difficulties encounter by the institution management during academic planning and management of student activities over a period of time. This application used a system administrative (server) to connect with the student android application (client) for accessing data or student profile for any activity. The application was designed to be simple, interactive and self-explanatory interface, thus making it easy to use and navigate through different modules. However, the shortcoming of this application program is the privilege interaction giving to the user that can make it vulnerable to the hacking attack and other cyber-crime. The automated lecture alert management system, where combination of high level programming language of Java and C program was used in the system coding. The hardware system includes Sony Erickson K700i mobile phone and GSM module for sending a Short Messages Service (SMS) alert over the circuit switched GSM network. The database was designed, updated and maintained using MySQL, which is always used to check the database for the lectures scheduling. Although, this system was proposed, but it's complex architecture which can results to error during message forwarding, and its efficiency also depends on the network facilities. Kind. An automated time table at a click was developed to generate a complete computerized time table scheduler sheets which when details information is provided (such as courses title and code, lecture venue, laboratory unit, lecturers' name and students' level). In this system, notification and remote message are not considered. Also, this system can only generate scheduled time table for a unit (Archibald, 2018).

Review of Related Literature

In every organised system which is dependent on accurate time management, there is a need to have a system which can on its own serve the purpose of automatically sending alert text messages. Time management plays important role in the success of any venture like a university environment where limited spaces (lecture halls), time and people have to be managed for effective lecture delivery. It is important to remind or inform lecturers and students of lecture schedule so as to make them arrive early for their lectures. People can easily be reached through their handheld devices such as mobile phone irrespective of their location. Hence, there is the need to develop a system that will combine available resources and reach people via short message service (SMS) using GSM module (AL-Ali *et al*., 2016). Mohammad and Norhayati (2017) developed an SMS service system for student collaboration on campus. The approach achieved quick message communication and delivery among students. Krishna *et al*. (2018) presented a model which focuses on the use of SMS as a way of sending data and substituting packets in a network. The system was to improve existing levels of communication between teachers and students of an academic institution. Bin-Haji (2018) stated that an SMS application system along with corresponding server was developed. It was aimed at providing a system that can avoid the reliance of content delivery SMS application for student examination result to SMS gateway provider and the commercial SMS application develop which can be managed totally by the school staff. Markett *et al.* (2015) proposed an SMS technology that supports classroom interaction between students and the lecturers. Students send SMS via their mobile phone which are viewed, replied and addressed by the lecturers through a developed software connected with modem. The system was closely related with mobile notice board project for the delivery of urgent information of students but could not ascertain a feedback module in the deployment. AL-Ali *et al*. (2016) and Al-Shaikh (2015) also proposed a patient and house monitoring system to ease the ordering and delivery of house equipment using SMS technology via mobile phone the system contributed immensely to the use of SMS technology foe message delivery but was limited by high implementation cost. Obea and Fernandez (2016) argued that an SMS tool to exchange information in medical area was proposed and the work was developed as a radiological information system where physician can send messages to their patients.

The Concept of Information System in Lecture Alert System

As related to lecture alert system, an information system is a system composed of people and computers that processor interprets information in relation to lectures (Kroenke, 2017). The term is also sometimes used in more restricted senses to refer to only the software used to run a computerized database. An information system is a work system whose activities are denoted to processing (capturing, transmitting storing, retrieving, manipulating and displaying) information. As such, information systems inter-relate with data systems of the one hand and activity systems on the other. An information system is a form of communication system in which data represent and are processed as a form of social memory. An information system can also be considered a semi-formal language which supports are the primary focus of study for organizational information.

Methodology

The object-oriented analysis and design methodology (OOADM) was adopted for the analysis, design and implementation of this system. Object-oriented Analysis and Design Methodology (OOADM) is a technical approach for analyzing and designing a web-based application, system, or business by applying object-oriented as well as using visual modeling throughout the software development process to guide stakeholder communication and product quality. OOADM in modern software engineering is typically conducted in an iterative and incremental way. The outputs of OOADM activities are analysis models and design models respectively. The intention is for these to be continuously refined and evolved, driven by key factors like risks and business value.

Waterfall Model

The Waterfall Model is the classic software life cycle model. This model was the only widely accepted life cycle model until the early 1980s. This model represents the software life cycle using processes and products.

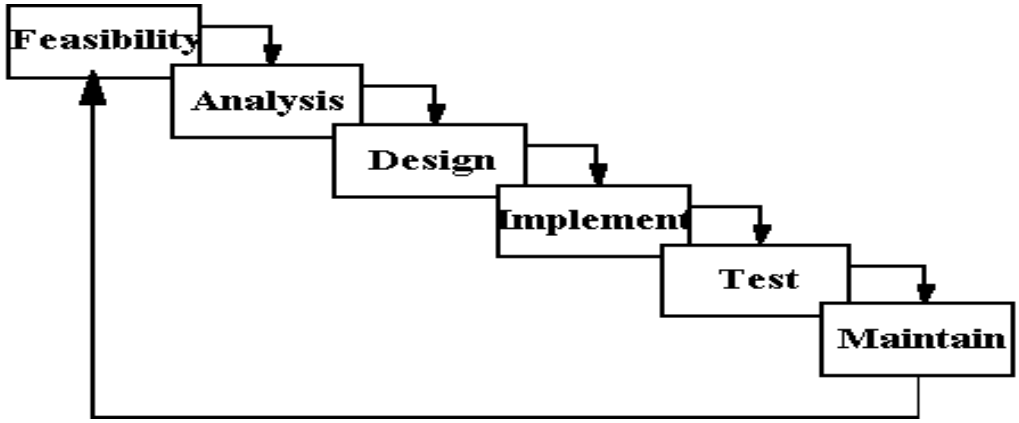


Fig.1: The Waterfall Model, Source: http://tryqa.com (2011)

In the waterfall model, each process takes a product as input, transforms these products and produces another product as output. The verification and validation (V & V) boxes represents the testing activities conducted during development to ensure the accuracy of each product. To emphasize the iterative nature of software development, products are connected with irrational arrows. These arrows show how products undergo multiple refinements during development. Finally, the dashed arrows represent the maintenance state of the product during which the software product continues to evolve through changes and improvement

System Analysis

Computer science department in Imo State University is one of the departments that have a big population numbering hundreds of students every semester. They offer provisional admission for the award of Bachelor of Science Degree. The department also runs a post graduates' studies for Masters and Doctorate degree programs. The performance of students is evaluated using quiz, continuous assessment and exams which students are graded accordingly. Computer science department is practical based; students learn different programming skills through practical session conducted. They also have

qualified lecturer and staff who worked so hard to elevate the department at the level they are now. In existing system lecture alert system is done manually using pen and paper, it will be drifted on a paper in a tabular form with columns and row which contains lecturers name, department, days, course code, course table, programme, venue and time which usually subject to errors and duplicate allocation of course to a particular time and day. There is no existing alert system. The lecture depends on his own ability to remember and may consult with time table etc. some of them who have sophisticated phones or who are friendly with using their phones alarm system may use phone alarms, reminders, to do list etc. on their phone as a form of alert system. Others wait to get call from students reminding them of the lectures. Since experience has shown that using a system brings to light its short comings. The suggest improvement especially in a case where the system is no longer satisfactory to the user. So in this case a lecture alert system is suggested in replacement of manual based system which already exists. A lecture alert system will help to increase the effectiveness and efficiency in service and reduce the problem associated with the current system.

Results

Main Menu/Control Center

This is where all the sub system that are developed from, it shows the sequence in which the system design is maintained and achieved. It also specifies all programs that will run the identified modules. It also shows how each component is related to others forming the sub system.

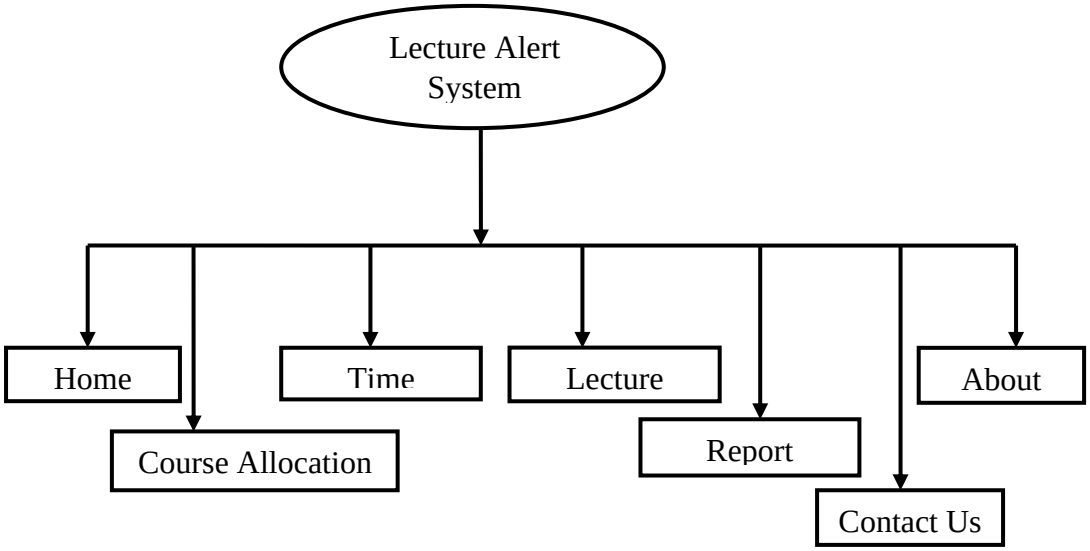


Fig 2: System Control Center

The Sub Menus/Subsystem

The system is composed of the following modules as explained below:

The homepage module: This is the first page that appears when the system is launched from the browser. It provides navigation to other modules of the system such as the administrator interface and the reminder interface. **The Administrator Module:** The administrator is saddled with the responsibility of adding new users (recipients) he can as well update, delete the user record. It is also the duty of administrator to send out notification to users when they have a pending message in their boxes. **The lecturer module:** The user of the system (Recipient) will be able to log in and out of the system, view notifications about the information they have in their boxes. They can as well accept the message on pick up of their messages in the box which will also be verified by the administrator. **The reminder module:** The reminder module checks from time to time if a specific message has been picked up by the user and confirmed by the administrator. This module checks pending messages over duration of time specified.

Overall Object Diagram of the New System

This is the overall comprehensive diagram of the system indicating the flow of data within the whole system. It is illustrated using Use Case diagram.

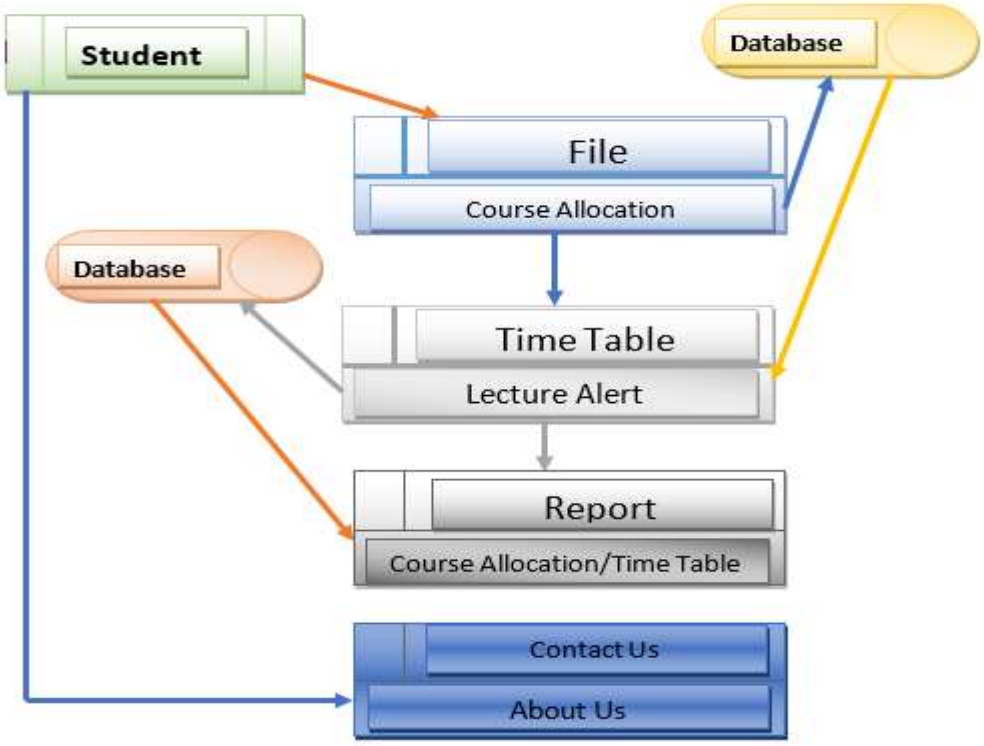


Fig.3 Overall Object Diagram of the New System

Database Design and Structure

The database structure is made up of the system which contains a platform with the following. User, Admin, Message and Message details.

Table 1: Course Allocation Database Design

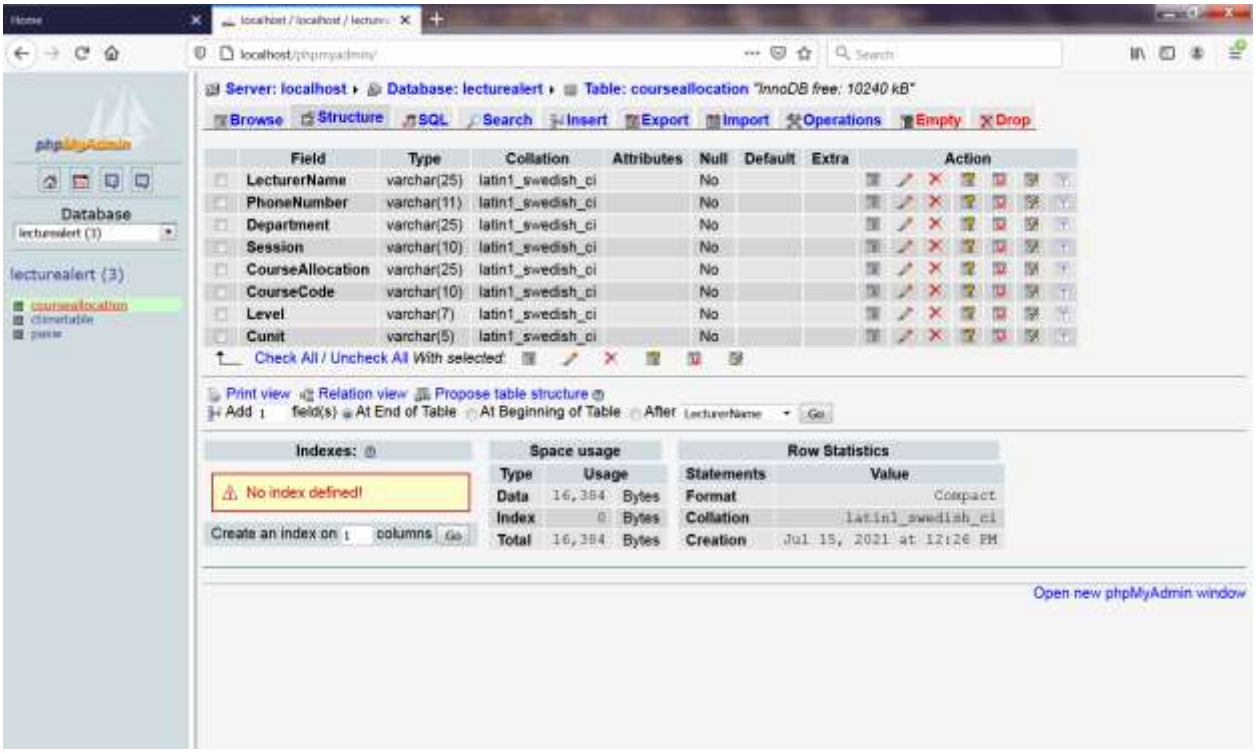
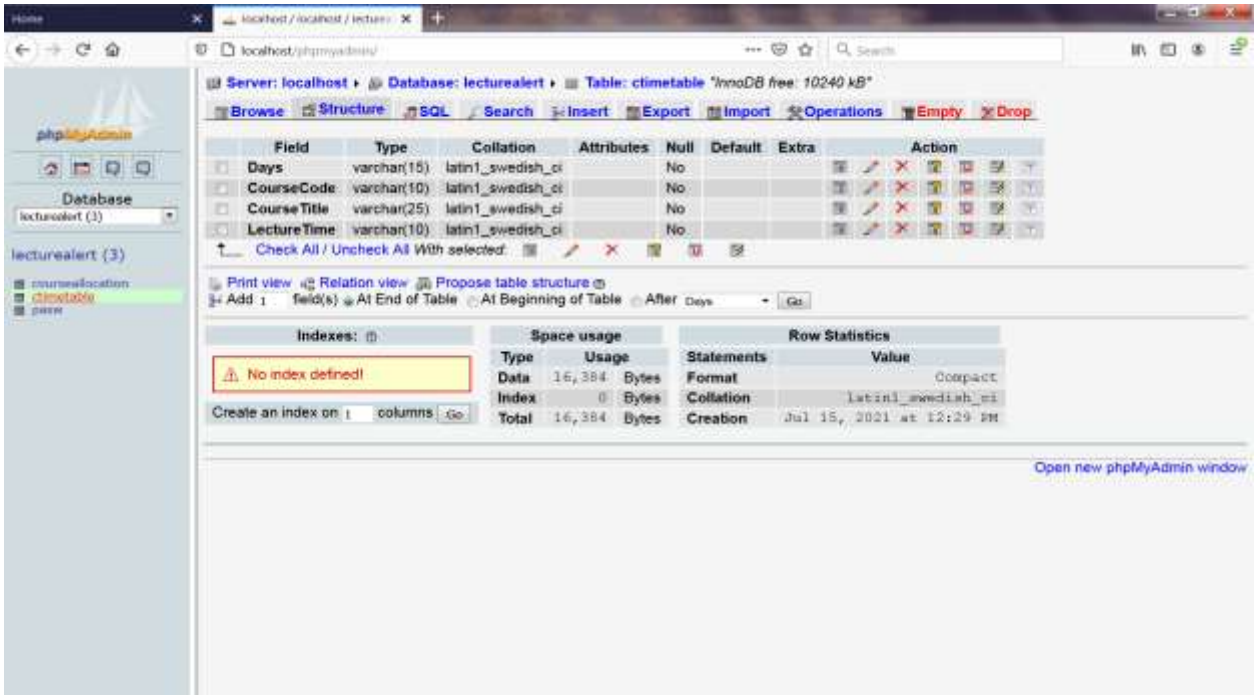


Table 2: Time Table Database Design



Conclusion

In summary, the use of computerized lecture alert system makes it possible for data to be processed with great speed and efficiency without delay. Lecture alert system has been developed using web based for its portability. This new system generates updates and reminder from a time scheduled stored in a database thereby making the system a time triggered application. The proposed system allowed for easy and enhanced communication between the operator and the users, to ensure proper spreading of information. In bringing this work to a close, this system has become a very important asset that all should embrace and ensure that it continue to exist so as to allow for easy lecture allocation. In addition, this work has proved that computerized lecture alert system is a better substitute and also a flexible option available to the lecturers at all time if it is properly put to use and based on the guidelines of this research work coupled with the rule contained in the program (new system).

Contribution to Knowledge

The computerized Lecture alert system has been a great benefit and has contributed to the users in the following ways:

1. The use of computer has eased a lot of time wasting in using pen and paper to create lecture time table because computer operators can login and send the SMS of lectures to the lecturers.
2. Since the research is web-based system, it will encourage the computer scientist or investigator more, so as to make the system more responsive easy to use and user friendly.

Recommendations

To further strength this work and for it to enjoy acceptability and popularity, the author recommends the following:

1. The computer system available in the institution should be properly maintained to avoid malfunction.
2. The limitations of this study should be tackled jointly.
3. Consistent power supply should be made available at all time to keep the system running.
4. The administrator account should not be kept open for non-administrator staff to have access to it.

Suggestion for Further Research

The researcher went further to suggest that if more research is made on this project work, it will help to eliminate the use of pen and paper in creating lecture time table for computer science department AIFPU. Also, the computerized system will be more reliable and more efficient, and does not require much from the user but only needs the input.

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