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Development and execution of a notification system for lectures in universities

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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: Short Message Service (SMS); Computer integration (CTI); Electronic Messaging Association System (EMAS); Hypertext Pre-Processor Program

1. Introduction

Today we are witnessing fast changes in telecommunications computer and telephone technologies that have made significant revolution in communications (Archibald, 2018). The fast development of communication and computer technology led to the merging of the public switched telephone network (PSTN) and the internet to become global information network of integrated services. Network services are becoming a more important way of information exchange and communications turning telephone and mobile telephone toward internet service one of the efficiencies of mobile phone are the availability of network services. The result carried out before the development of the short messaging service (SMS) alert system show that mobile phone users receive an average at five to six SMS every day (Bin-Haji, 2018). Computer integration (CTI) is a system application that integrates advantages of telephone and the internet by connecting phone services together. System application is any program, or group of programs, that are desired for the end-user (Bodic, 2015).

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

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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. The problem faced or noted in the course of studying the existing systems of lecture alert system, lack of effective record system or database system to store the record of time table, the consistence report of errors in the process of filling and allocating the lectures on the time table, there will be clashes of lecture because one venue can be allocated to different lecturers at the same time. The aim of this study is to design and implement a lecture alert system for Computer Science Department.

2. Literature Review

SMS forms an integral part of signaling system NO 7 (SS7) and it is a state with a 160-character data, coded in the ITU-T text format, that has a sequence lead in to determine different languages codes. Elektor (2016) and Elektor (2017) said some amateurs have also built their own system to control some of their appliances via SMS. Other methods such as group Messaging, which was patented in 2012 by the GM of Andrew Ferry, Devin Peterson et al are used to involve more than two people into a text message conversation. A flash SMS is a type of text messaging that appears directly on the main screen without user interaction and is not automatically stored in the inbox. It can be useful in cases such as emergency (e.g. fire alarm). Some practical uses of text messages include the use of SMS for confirming delivery or other tasks e.g. communication between a service provider and a client and for sending alerts. Several universities have implemented a system of testing students and facilities campus alert (Penn, 2018).

2.1. The Concept of Information System in Lecture Alert System

As related to a lecture alert system, an information system is a system composed of people and computers that process and interpret 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 are represented 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.

2.2. File Security Technologies in a Lecture Alert System

These are different ways to secure the data in a file such as:

- **Disk encryption:** refers to encryption technology that encrypts data on a hard disk drive. Disk encryption typically takes place either in software or hardware.
- **Backups:** Backups are used to ensure data which is lost can be recovered.
- **Data masking:** Data masking of structured data is the process of obscuring (masking) specific data within a database table or cell to ensure that data security is maintained and sensitive information is not exposed to unauthorized personnel.
- **Data Erasure:** Data erasure is a method of software-based overwriting that completely destroys all electronic data residing on a hard drive or other digital media to ensure sensitive data is not leaked when an asset is retired or reversed.

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 an 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 an academic calendar scheduler by (Elektor, 2017). This application designed mainly focuses on minimizing the difficulties encountered by the institution management during academic planning and management of student activities over a period of time. This application used a system administrator (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 a hacking attack and other cyber-crime. The automated lecture alert management system, where a combination of high-level programming language of Java and C program was used in the system coding. The hardware system includes a Sony Ericsson K700i mobile phone and GSM module for sending a Short Message 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).

2.3. System Block

Java is a portable object-oriented programming (OOP) language which can be used to develop large-scale enterprise applications, to provide applications for devices like cell phones, pagers and personal digital assistants among many other purposes. In addition to using this OOP programming language for developing the application, C# programming language was also used to develop the desktop SMS application which generates updates and reminders from a time schedule based on contact details of members of staff and helps automate and document the process of sending information across an organised system at a reduced cost. The system architecture is shown in figure1 and it employed the use of SMS over circuit switched GSM network that allows the application to send and receive messages over the modem interface. The mobile operator charges for the message as if it was performed directly on a mobile phone by supporting an extended AT command set for sending and receiving SMS messages according to defined specifications (Bodic, 2015).

A GSM module can be a dedicated modem device or a standard GSM mobile phone with a serial, USB or Bluetooth connection and software driver to connect to a serial port or USB port of your computer or server as a cost-effective solution for sending SMS messages. The system is to function with a database which contained the contact information of each lecturer such as names and telephone numbers, along with other information such as the courses they handle, the start time of each lecture, location of the lecture and number of eligible students. This would be created by making use of MySQL and then installed to run on the server which would house the program. At the initiation of the program, the system is going to check the database to see which lecture on the time table falls within a 10 minutes start time and in the event of a lecture starting within the time; it forwards the constructed message to the GSM module for sending. AGSM module is a type of modem with provision to accept a subscriber identity module (SIM) card and operates over a mobile operator network just as a mobile phone would function. It can be a dedicated modem device with a serial, USB or Bluetooth connection, or simply a mobile phone that provides GSM modem capabilities. GSM modules are very similar to modems except that GSM modems are external equipment, whereas GSM modules can function as embedded pieces of hardware. They are designed to support an extended set of AT commands which are defined by the GSM standards. With these extended AT commands, one can read, write, delete SMS messages, send messages, monitor signal strength, charge level of the battery and search phone book entries (Krishna *et al.*, 2018).

There is an increase in the need for automated reminder/alert system which can on its own generate alerts and send to specific recipients in many organisations. It was explained how time triggered commands were generated by the system to send SMS messages to recipients and how the database of the system functions and the system was interfaced to function with a Sony Ericsson K700i phone which was the selected GSM module used. Also, successful delivery or failure of the SMS sent via the module. However, future research could be to see the system work with its own time reading and not depend upon the PC for its time readings. Provisions could be made to enable users (recipients of SMS) query the system for information at any time and then the system reply them instead of having to wait for the next loop. Meanwhile, in comparison with SMS sent from mobile phones, an average time difference in delay of 20s was observed for the SMS delivered under the same coverage area and the same service provider while it took averagely 50s to receive delivery feedback from a different service provider network. This delay variation can be accounted for as processing delay from the PC and the GSM module.

3. Methodology Adopted

A software development methodology in software engineering is a framework that is used to structure, plan, and control the process of developing an information system. There are various system development methodologies these includes; The systems development life cycle (SDLC) which is a conceptual model used in project management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. Various SDLC methodologies have been developed to guide the processes involved, including the waterfall model; Rapid Application Development (RAD); Joint Application Development (JAD) etcetera. The waterfall model has been chosen for this project and it is described in the following section.

3.1. Analysis of Existing System

Computer science department 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.

3.2. Proposal of the New System

Due to many problems encountered in the lecture time table, a lecture alert system is proposed, it is an online system computerized and designed in a way that it sends SMS to a lecturer for a particular period and venue. The new system if well implemented, it will serve as a remedy to the problems encountered in the old system. 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.

3.2.1. Output

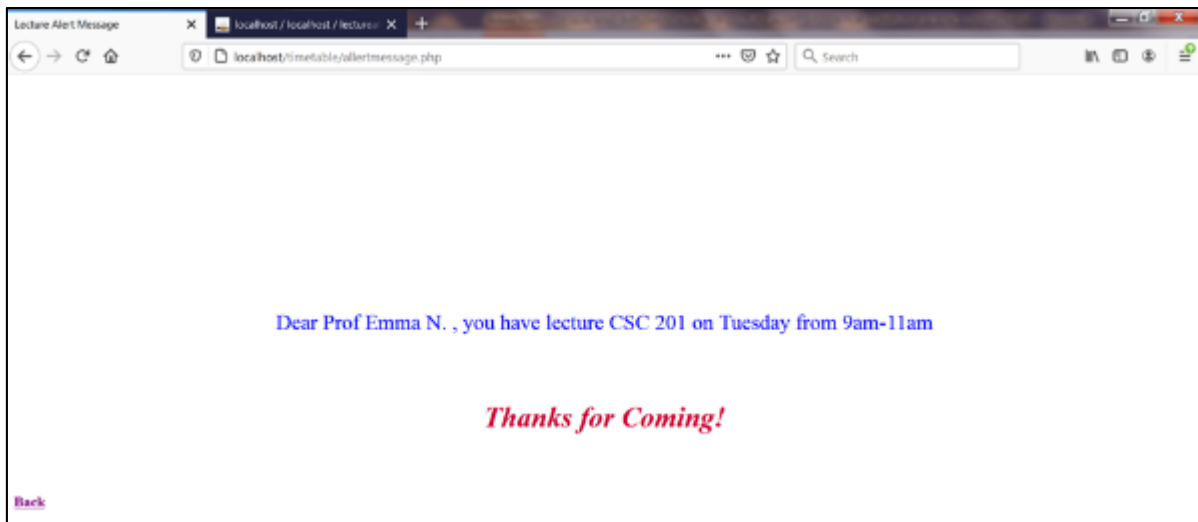


Figure 1 Compose Message Form

The screenshot shows a web browser window with the address bar displaying 'localhost/timeable/coursealrep.php'. The page title is 'Course Allocation Report'. Below the browser window, there is a 'Print' button. The main content is a table titled 'Lecturer's Course Allocation Report' with a yellow header. The table has the following data:

Lecturer's Name	Phone Number	Department	Session	Course Allocated	Course Code	Level	Course Unit
Dr Maxwell Ogu	0806453423	Management	2020/2021	Introduction to Business	BUS 101	100	2

At the bottom left of the page, there is a 'Back' link.

Figure 2 Course Allocation Output

The screenshot shows a web browser window with the address bar displaying 'localhost/semester/timeable/sempt.php'. The page title is 'Time Table Report'. Below the browser window, there is a 'Print' button. The main content is a table titled 'Semester Time Table Report' with a purple header. The table has the following data:

Days	Course Code	Course Title	Lecture Time
Monday	BUS 101	Business Admin.	12pm-2pm

At the bottom left of the page, there is a 'Back' link.

Figure 3 Time Table Output Design

3.3. Contribution to Knowledge

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

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.

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.

4. Conclusion

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).

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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