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Development of an Automated SMS Alert Mailing System

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ABSTRACT

Information and communication technology have made life smarter by offering services that has generally improve the wellbeing of users. Upon receiving new mails in mailboxes, users do not get notified of this fact. They have to speculatively and periodically check their mailbox content. Most times, users are negligence of their mailboxes which lead to ignorance of important mails/ letters. The evolution of Short Message Services (SMS) has made information available to individuals at their convenience. This study describes the development of an automated SMS alert mailing system to notify mail recipients of mails deposited in their mailboxes. The incorporation of this SMS technology as a solution to ignorance and negligence that causes miseries will improve postal services. Exploring this technology in postal service will ease human life and enhance the importance of mailing systems in the society.

Keywords: Alert, API Gateway, Mailing System, Messaging, Postal Services, Real Time, Web Server.

Introduction

We are living in an era of information revolution, with a lot of devices like computers and mobile devices sprouting everywhere thereby making it easy for information to be communicated. Computers and mobile phones have become unavoidably part of our lives with a lot of things which one can do with these technologies. With the rapid advances of mobile phones come several services like the Short Messaging Service (SMS), Multimedia Messaging Service (MMS) and others, which are readily available and add to the usefulness of mobile phones. The availability of such communication mediums in any institution makes it possible for information to

be passed on to individuals as soon as they are available. Whether to coordinate meetings, alert notification, event reminder and even voting for a contestant [1], [2]. Mail or mailing is part of a postal system wherein written documents, which are enclosed in envelopes, and also small packages, are delivered to destinations around the world. Although, the revolutions on mails have been drastic yet the usage of the conventional mailing system is widely practice through-out the world. Most of our important and official documents are sent by the conventional way [3]. The need for speed led to the invention of the email system which has in part taken over the mailing service but not entirely because, the mailing system is still as important today [4].

All organized system that is dependent on accurate time management; the need to have a system which on its own can aid the purpose of automatically sending text message alerts. This has to do with time management and it plays an important role in the success of any venture in keeping to tabs with reminding members of schedules [5]. Alert messaging (or notification) is machine – to – person communication which is important and timely and most times, its done via the Short Message Service which becomes possible to keep tabs with information that is important. So, to manage organizations into mailing services (mailbox services), notification of delivered mails to the recipients' mailboxes is important to enhance the lack of notification on delivered mails. Hence, the development of an automated SMS alert mailing system to manage this deficiency in the mailing system.

This research work focuses on the development of an automated SMS alert mailing system. This is achieved by capturing the details of mails to be sent, creating a database management system for users and incorporating an SMS alert or notification to the system. This can be applied in the mailing system of mail service organization.

Literature Review

Theoretical Framework

The authors [6] developed different strategies to overcome the challenges associated with mail management and the protection of consumers. Though, their idea centred on emailing, but, can be seen in a more general sense. [7] presented SMS as an idea in communicating anything considering the growing and widely use of mobile phones which can help broadcast information. And, the need for an integration of SMS technology in web-based systems is also gaining popularity in many organizations because of its convenience to the users [8]. Libraries which plays a major role in the dissemination of information makes effort to use the opportunities created by technology and plugging into the use of SMS created new and innovative services in the library [9]. In Institutions, the idea of making information available to student as soon as they are ready helps in overcoming the limitation in dissemination of information [10].

Review of Empirical Studies

Findings reveal that, quite a large number of users agree that integrating SMS to notify customers will facilitate and resolve the problem faced in information dissemination [11] and time required in passing out these information during emergencies

and or critical times eliminates communication barriers [2]. In delivering messages through Short Message services (SMS), the future of businesses is being enhanced through the availability and effectiveness of this tool in marketing [12] and this far reaching mobile infiltration has unlocked this new trend to key players in the Search industry [13]. [14] talked about the personal nature of this technology and its cost effectiveness and efficiency. The advantages, when used in the educational environment cannot be over emphasized [15].

Review of Related Literature

Short Message Services (SMS) was integrated in the development of an automated text messaging intervention to promote adherence to Artemether-Lumefantrine (AL) [16]. [17] presented a mobile monitoring and inquiry system using fingerprint Biometrics and SMS technology to monitor, identify and /or verify schoolers' attendance during schooling. The authors [18] designed and implemented an automated notification system for results of Tests Pending at Discharge (TPAD). The system was designed to notify responsible inpatient physician of the finalized results of TPADs using secure network email. [5] developed an SMS based alert system using Object Oriented Design concept or an automated lecture alert management system which generates updates and reminders from a time schedule stored in a database. A result alert system through SMS and email was developed by the authors [1] that conveniently provides examination results to student by email and SMS to their mobile phones and devices.the authors [11] presents a utilization of short message services (SMS) for library notification system which explores the possibilities of incorporating mobile technology to improve library service. In their paper, [19] they presented the use of SMS base in event notification. Their system was design to work with a specific SMS gateway which result in user-lock-in to an SMS vendor.

Research Method

The proposed automated SMS alert mailing system is designed to bridge the gap between the time lag in the existing system. This is done by alerting the customer of a mail that has been placed in their mailbox via the short message service which in turn, the customer decides to get the mail immediately or not. The customer brings in the mail to be sent to the post office, the post office attendant collects the mail and booked it for dispatched in the system. The booked mail synchronizes to the confirm mail page of the system awaiting the system admin from whatever city that the mail is being sent to for confirmation. The mail is dispatched from the sending city to the city the receiver is and the mail attendant officer there receives the mail and confirms the receipt of the mail. Immediately the mail officer confirms that the mail has been delivered, the short message service (SMS) alert notification will be sent to the registered phone number of the mailbox that the mail was sent to and the customer then decides on whether to pick up the mail immediately or not. Figure 1 presents the architectural design of the system.

Figure 1: Architectural Design of Automated SMS Alert Mailing System

Figure 1 shows the schema of the proposed system. The mail to be sent is registered into the system: registered mails are visible to the admins of the various locations that the mails are sent to. The receiving location gets the mails from the delivery vans, bikes, etc., sorts the mails into the various mailboxes and confirms that these mails have been received in the system. Immediately the confirmation of these mails, the recipients of these mailboxes receives an SMS Alert on their phones notifying them of the mails they have just received in their mailboxes. It is now left for their (the owners of those mailboxes) discretion to or not to get the mails immediately. This system is further explained using the use case and sequence to show the workability of the system.

This research work employed the object-oriented analysis and design (OOAD) methodology. In the author [20] publication, he tried to present the diverse merits as well as a variety of use of UML. He gave a full range of the diverse templates and other information required. He brought about the misconceptions that are related to the OOAD method and that it's among the best resolutions in any static, dynamic and also interactive environments. Object – oriented analysis and design are crucial to the success of a software project which include understanding the application, requirement elicitation and

production of the design that fulfils the requirements which is also called the thinking process [21]. The proposed system is designed to enable the sending of SMS alert notification to the customer's registered phone number. This is achieved by an SMS API gateway that enables the text message to be sent through the platform. This is further demonstrated through the UML diagrams.

Use Case Modeling

The use case diagram of the proposed system is used to model the various use cases of the automated SMS alert mailing system. The system is being operated by two (2) major admins, which include the admin responsible to register mails for posting and the admin that confirms the received mails. Figure 2 presents the use case diagram of the proposed system.

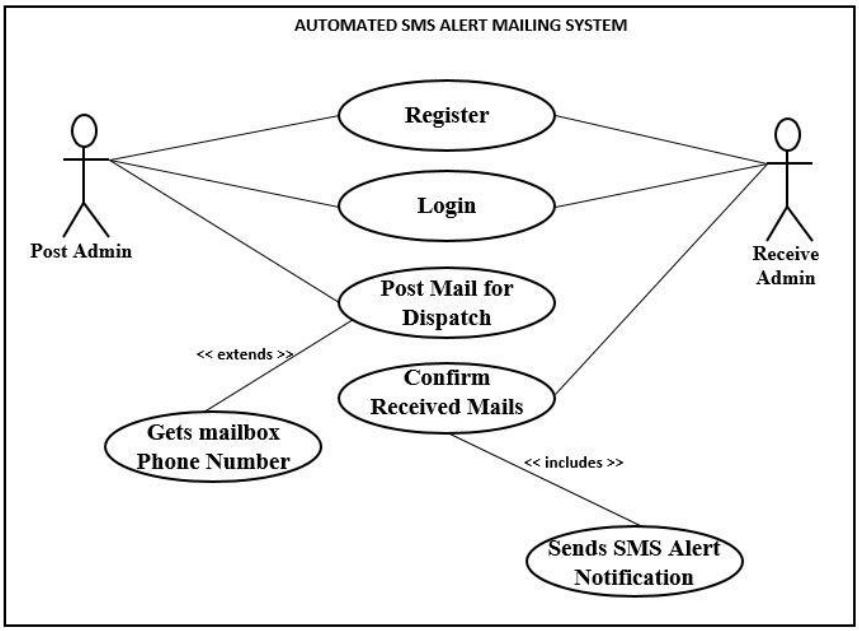

Figure 2: Use Case Diagram of the Proposed Automated SMS Alert Mailing System

Figure 1 shows that, the Post admin (registration of mail admin) has the ability to register into the system, login and post mails for dispatch. The Receiving Admin can also register, login and confirms received mails. The system automatically gets the mailbox phone number that the mail is sent to and sends the SMS alert notifications when the received mail has been confirmed in the system.

Sequence Diagram

The sequence diagram of the proposed automated SMS alert mailing system demonstrates the step by step working principle of each of the admins (post and receiving admin). Figure 3a and Figure 3b presents the sequence diagram of the post admin and the receiving admin of the proposed system.

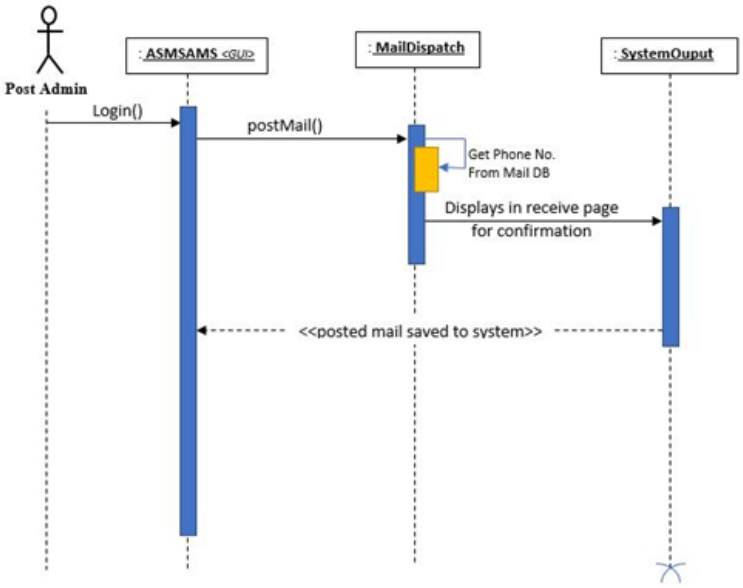

Figure 3a: Sequence Diagram of Mail Dispatch Registration of the Proposed Automated SMS Mailing System

Figure 3a clearly shows the process the post admin follows to register a mail brought in for to post. The post admin login to the system registers the mail and postMail; this automatically get the mailbox registered phone number from the database and display the entered information including the recipient phone number on the receive page for confirmation by the receiving admin while the information is saved into the system database. The process for receiving admin is shown in Figure 3b.

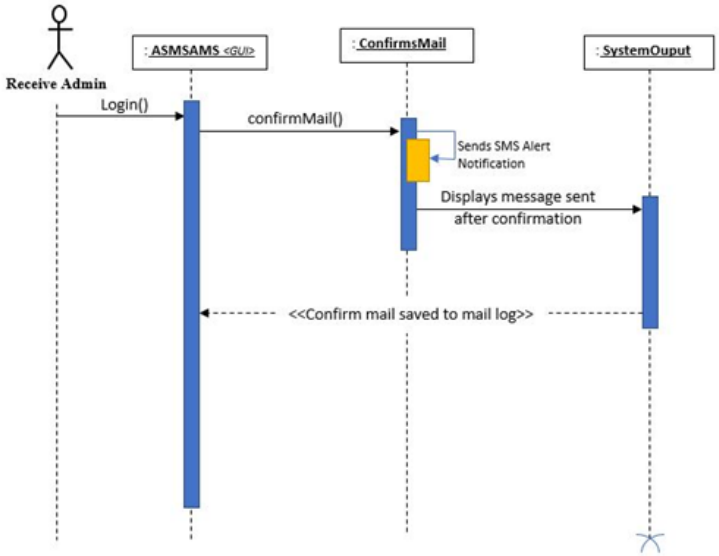

Figure 3b: Sequence Diagram for Receiving Admin of the Proposed Automated SMS Mailing System

Figure 2b demonstrates the procedure taken for the receiving admin and the sending of the SMS alert notification to the recipient's phone registered number. The Receiving admin logs into the system, goes to the received mail page and confirms the mails that has been received and sorted into their mailboxes and automatically, the SMS alert notification is then sent to the recipient phone number displaying a message sent after confirmation and the confirmed mail saved in the database of the system.

Implementation Architecture

The implementation architecture of the proposed automated SMS alert mailing system describes the working principle of the system. The process that started from when the customer visits the post office to post a mail. Figure 4 illustrates the implementation of the proposed system.

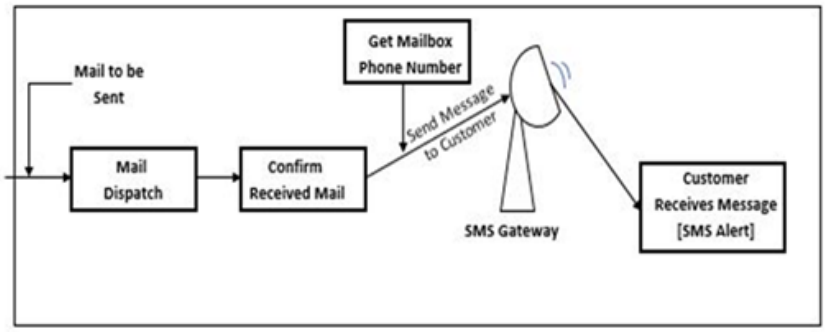

Figure 4: Implementation Architecture of the Proposed Automated SMS Alert Mailing System

Figure 4 is a pictorial illustration of the implementation architecture of the proposed automated SMS alert mailing system. This illustration presents the system from when the customer approaches the post office to post a mail. The mail is collected and registered for dispatch, it gets to the location and the admin there confirms that the mail has been received and placed in their mailboxes. Immediately after confirmation, recipient receives an SMS alert notification; notifying him/ her that a mail has arrived his/ her mailbox.

Results and Discussion

The proposed automated SMS alert mailing system was simulated using an offline server that enables web application running PHP to be executed without hosting it to any dedicated online servers. The system was simulated and testing was done for the different aspect of the system which include: Registration of new mails, Confirmation of delivered mails. The system performed well and optimally except for the SMS alert on the user's mobile phone.

Registration of New Mails

Logged in admin are able to register new mails brought by customers for posting. This is done by clicking the 'New mail' link on the side navigation bar and fill the form

provided; giving every details necessary for the successful delivery of the mail which must include the zip / postal code and the P.O. Box number. The registered mail is then posted by clicking the save button that saves the mail to the database of the system.

Confirmation of Delivered Mails

The New Mail that was registered is then retrieved from the database and is now visible on the deliveries page. The user/ or admin clicks on the deliveries page on the side navigation bar and on the deliveries page is a table showing all the mails that was sent to that location. And, after sorting out the mails that were delivered to their mailboxes, the admin confirms them on the deliveries page and the confirmed mail filters to a new table for confirmed mails. This table is displayed in the deliveries page below the table that shows unconfirmed mails.

SMS Alert on the User's Phone

Immediately the mail has been confirmed by the admin, an SMS alert notification will automatically be sent to the recipient of the mailbox that a mail has been deposited on his/ her mailbox and a success notification alert is then displayed on the system notifying the admin that a message has been sent the recipient number with the number displaying on the screen.

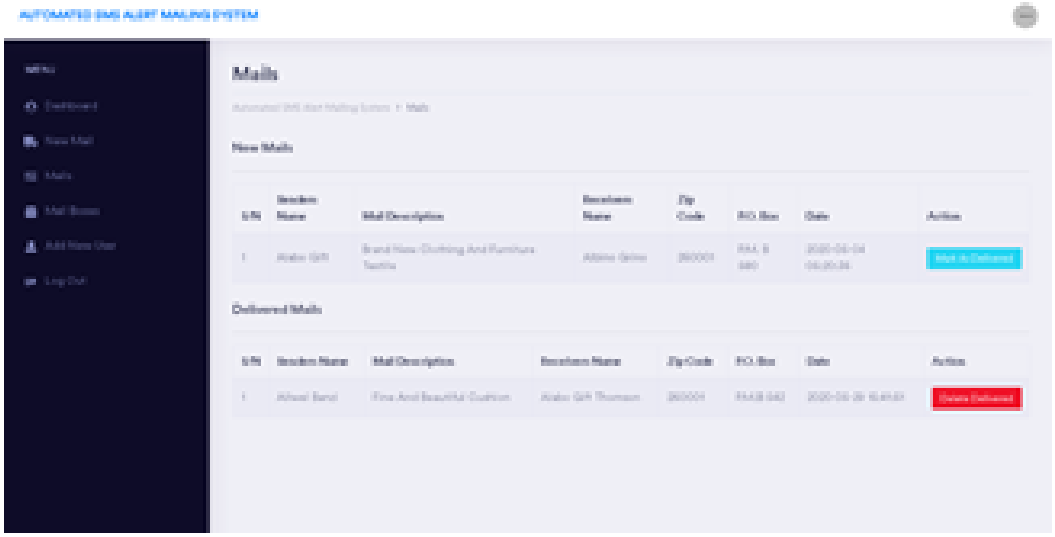

Figure 5: Interface Design of Already Registered Mail in the Receive Page Waiting for Confirmation

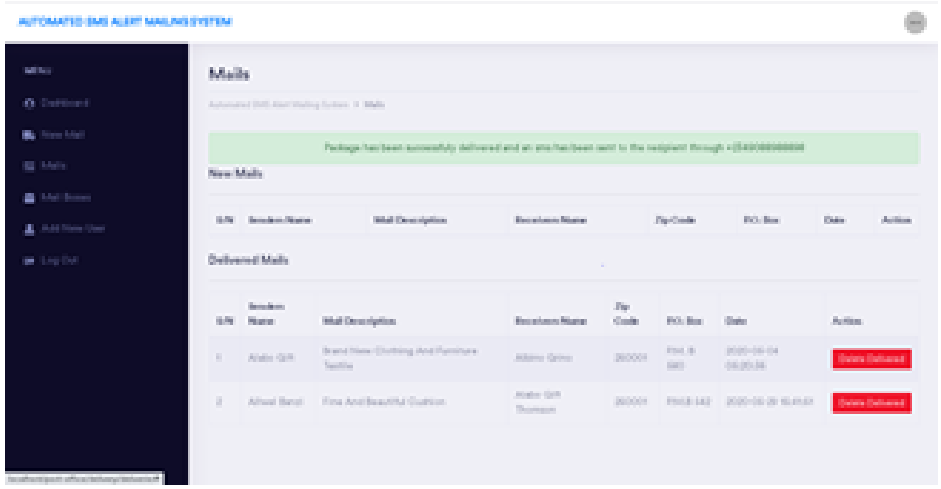

Figure 6: Interface Design of Confirmed Mail and SMS Sent Notification

Discussion of Result

The result from the software testing shows that, the system performance met the objectives of the research work except for the SMS alert that was unable to be sent to the mobile phone because the system was simulated offline and not executed online. From the offline execution of the system, every other aspect worked perfectly and was effectively executed. Figure 5 shows registered mail saved to the database and is displayed on the confirm page of the system. The receive admin after sorting the mails into their mailboxes, confirms the mail in the system as shown in figure 6. The SMS alert is sent immediately the receive admin confirms the mail and a notification is displayed on the screen notifying the admin that the SMS was sent to the recipient of the mail.

In other to bring the system of operation in the postal agencies meet today's realities, there is need to update and or upgrade the system of operation by the introduction of a real time functionality to the delivery processes carried out by the different agencies that offers mailing services. The automation of the delivery part of the mailing system by adding an SMS alert notification to the delivery process is a step into the future of mail delivery services rendered by the postal agencies.

Conclusion

There is an increase in the need for automated alert system which can generate alerts and send notification to corresponding recipients. This project work was developed to alert mail recipients of a mail deposited in their mailboxes to enable them get their mails on time and to be able to return the mail if there is need for reply. The system process was fully explained, how the SMS alert is triggered; from when mails are created in the system and confirmation of the mail, when it gets to the mailbox of the recipient. The system automatically retrieves the recipient's mobile phone number from the database and an SMS alert is then sent to him/ her for their prompt response. The developed system was able to achieved its objective apart from the message notification

in the mobile phone of the recipients which is largely because of cost. textMagic SMS API was used in the SMS alert module to enable the sending of alert. But, it involves web hosting of the system (that is, hooking up the system to the internet server) to enable the SMS alert to be sent to the mobile phone. The other aspect of the system is working fine and there is no doubt that modern gadgets and applications drive the technological boom, but at the same time some age old services like SMS can also prove to be cost effective and at the same time provide the basic need of postal services. The next generation of users is looking forward to these innovative service deliveries to drive their information quest.

However, in the future, studies can be done on SMS alert on failed deliveries. This will have to do with the customer sending the mails and in an event where the mail was not able to get to the recipient, a failure delivery SMS notification should be sent to the customer who is sending the mail.

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