



Prototype Scalable for Telemedicine Consultation Using SMS /Email for Diagnosing Elderly Patients

¹Abdulganiyu A., ²Yakubu A., ¹Abubakar A. and ¹Awal A.

¹Department of Mathematics/Computer Science, Ibrahim Badamasi Babangida University, Lapai, Nigeria

¹Department of Physics, Ibrahim Badamasi Babangida University, Lapai, Nigeria

ABSTRACT

Mobile telemedicine is a steadily growing field in telemedicine, and it combines recent development in mobile communications and network technologies with telemedicine applications. With the help of Third Generation Partnership Project (3GPP) specified IP Multimedia Subsystem (IMS), next-generation network architecture, aimed to merge cellular and Internet networks and provide integration of different services. This research provides prototype to Monitor Patient's medical diagnosis Elderly and Expectant Mothers with the use of Mobile internet to share Information between doctor and Patient using GSM as a central monitoring system embedded with telemedicine technology. This aimed to send prescriptions SMS to patients contains the requested doctor information's instruction from suitable medical sensors using special commands and send this SMS through the central monitoring system based on doctor request.

Keywords: Health, SMS, E-mails, Consultancy and Patients

INTRODUCTION

Mobile technology has expanded dramatically around the world. This emergence has improved service delivery, empowered consumers, businesses, and entrepreneurs, and changed the way in which people access information and make transactions. This technology is poised to alter how health care is delivered, the quality of the patient experience, and the cost of health care. Mobile technology is helping with disease management, reminding people to take medication at the proper time.

Telemedicine is the delivery of health care and the exchange of health-care information across distances. The prefix 'tele' derives from the Greek for 'at a distance'; hence, more simply, telemedicine is medicine at a distance. As such, it encompasses the whole range of medical activities including diagnosis, treatment and prevention of disease, continuing education of health-care providers and consumers, and research and evaluation. In general, these problems are slowly addressed by telemedicine. As defined by the World Medical Association, "Telemedicine is the practice of medicine over a distance, in which interventions, diagnostic and treatment decisions and recommendations are based on data, documents and other information

transmitted through telecommunication system". With the aid of ICTs, (Information and communications Technology), in the country are connected with clinical specialist which allows medical referrals 24hours 7days, more resources efficiently used and most importantly, more lives saved.

The problem with elderly patients is forgetting to take their prescription drugs at the right time. It is estimated that only 50 percent of patients take their medication as prescribed. (Meredith Cohn, March 14, 2012) this happen when they forget to take the drug or they do not take it at period or dosage set by their doctor. That leads to lose of half of the benefit of prescription of drugs due to human mistake.

Mobile technology has being helping with this and communications gap between doctor and patients. Patients need not to visit doctors' offices frequently or to be reminded to take their drugs. They will be getting personal reminders

Received 01 November, 2016

Accepted 17 December, 2016

Address Correspondence to:

abdulg2009@ibbu.edu.ng,

via e-mail, automated phone calls, or text messages. Telemedicine is therefore aimed at enhancing medical diagnosis at close and far distance.

METHODOLOGY

Modularity was applying coding the program. It involves breaking down of program into series of identifiable, subtask called modules. A module is a distinct set of instructions, which perform specific subtask in the program. Modularity is a very crucial aspect of structure programming which involves Top-Down Design, modularity and structure coding with the following advantage:

- i. Each module can be tested separately thus make debugging easier.
- ii. Proper accuracy of the design can be achieved.
- iii. Easy modification and proper amendments can be implemented.

Proposed Software

Software (functionality that is required) is one of the first things that must be considered when implementing an electronic health record. Electronic health record software is usually very complex and must be constantly maintained and updated. In many rural communities hospitals and/or healthcare providers have difficult time recruiting and retraining talented information technology staff.

Therefore, the new system implements within it some standard modules liken to those found in a

vendor-developed product. Some of these modules are:

- a. Results (a radiology report or laboratory values).
- b. Ambulatory medical record (physician office record that contains chart notes, medications, patient problem list, history).
- c. Scanning (the scanning of various non-computerized documents into the software).
- d. Documentation (the ability to type various types of notes and or template notes).
- e. Nursing (this could include items like Health History, Nursing assessments, progress notes.).
- f. Other care provider (charting from areas like physical therapy, social services, dietary).
- g. Physicians (this could include physician order entry, inpatient consults, progress notes, etc.).
- h. Pharmacy Information, such as electronic prescribing, pharmacy profiles, decision-support tools, adverse drug-drug, drug-allergy, drug-food and drug-disease-checking modules, bar coding and drug administration.

Applications that allow access via the Web are becoming more and more popular and are considered easier to implement both from a technology standpoint as well as from the end-user training perspective.

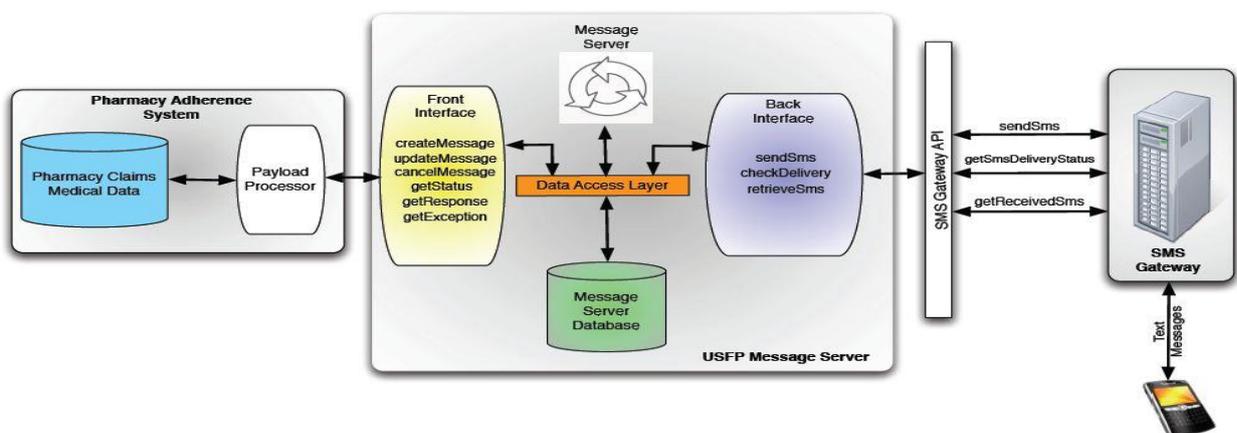


Figure.1: Architecture of the tele-message.

Proposed System Design

The design of the message server on the following requirements:

- i. Self-Containment: The message server must contain all the computing resources it needs to separate its responsibilities from those of the software applications of the company.
- ii. Logging: This capability is needed to keep track of various events taking place between the software applications and the message server. The purpose of this tracking is to help the company determine the most important user, service and business requirements.
- iii. Error Handling: This capability is need to record all errors and exceptions between the SMS gateway server of the network service provider and the software applications of the company. Recording these errors can provide a rich perspective on the reliability of the service offered by the network service provider.
- iv. Configurability: This capability allows the benefit management company to manage the message service in different ways in order to explore requirements that are not clearly understood in normal operating conditions of the message server.

Based on these initial requirements, the architecture of the message server has been developed and refined over several iterations to include the following components as shown in Figure 1:

- i. Front Interface: This interface provides methods that can be called by the software

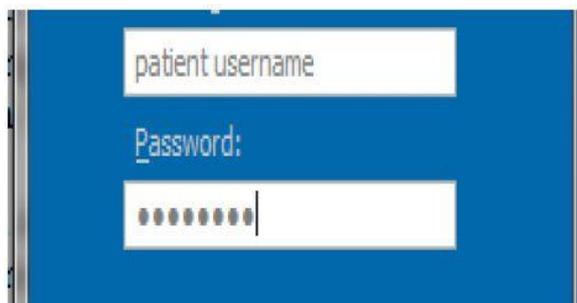


Figure 2: Log in Interface

- ii. After Logging in, the patient initially interacts with the Medical Expert System through by a Medical Diagnostics Interface on his/her mobile device.

applications of the pharmacy benefit Management Company to perform tasks related to communication with its customers via SMS messages.

- ii. Message Database: This database is a persistent store sued to record sent messages, received messages, errors and exceptions generated during SMS message exchange between the software applications and customer cell phone.
- iii. Data Access Layer: This layer consists of dynamic libraries responsible for passing data from and to the message database on behalf of the front interface, the message server and the back interface.
- iv. Back Interface: This interface provides methods to the messages, and checking the delivery status of sent message via the application programming interface (API) of the SMS gateway of the network service provider.
- v. Message Server: This server is a process that runs continuously to record all the events related to SMS communication between the software applications the Customers such as sending message, retrieving reply messages and checking the delivery status of sent messages.

The proposed System Scenario involves the following steps:

- i. Patients logs into the System with mobile device through cloud server, after registration through the Hospital administrator.

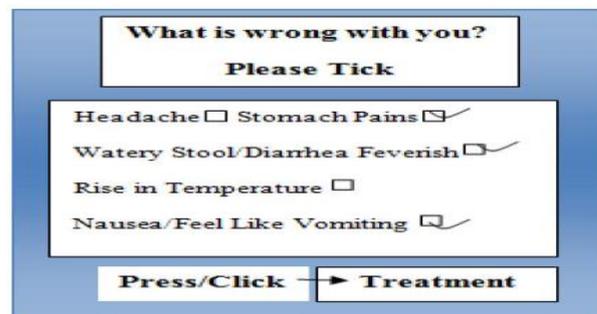


Figure 3: Medical Diagnostic

- iii. After clicking of “Treatment”, the next interface if the patient’s Prescription and Treatment advice. This is depicted below in Figure 4.

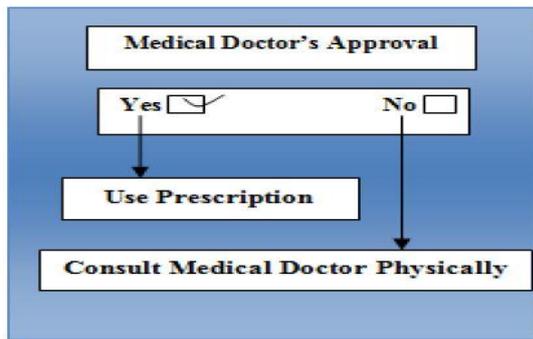


Figure 4: Medical Doctor Approval

Conclusion

This research provides prototype to Monitor Patient's medical diagnosis Elderly and Expectant Mothers with the use of Mobile internet to share Information between doctor and Patient using GSM as a central monitoring system embedded with telemedicine technology. This aimed to send prescriptions SMS to patients contains the requested doctor information's instruction from suitable medical sensors using special commands and send this SMS through the central monitoring system based on doctor request.

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