Development of a Mobile Feedback System for Health Institutions in Nigeria

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ABSTRACT
Feedback is very essential in any organizational set up and this does not exclude health institutions. With feedback an institution is able to stay in touch with the needs and expectations of their customers and to also improve on service provision. However, the process of collecting feedback is of importance. After thorough investigation and observation it was discovered that most health institutions in Nigeria did not have the necessary means of getting consistent feedback from their patients and customers. This paper therefore introduces a mobile application that serves as a feedback mechanism between patients and their health institutions.

Keywords- Feedback mechanism, mobile device, health institutions

1. INTRODUCTION

The way and manner in which health care services are delivered in any nation goes a long way in determining the well-being of the citizens of that nation. There is need among other things for continual innovation in order to foster improved quality, value and patient experiences in health care delivery [Shih et al., 2008]. Innovation will come when feedback is taken seriously [Cirillo & Fisher, 2005]. Feedback is a necessity in every organizational setup and this does not leave out health institutions. Through feedback, health institutions will get to identify with their patients' experiences and expectations. Being armed with this information, they would be better informed on how to improve their services.

In recent times, communication is being enhanced through electronic means such as emails, text messages, and phone calls. Mobile devices are also becoming ubiquitous among all and sundry especially across the nations of Africa and Nigeria in particular. After thorough investigation and observation it was discovered that most health institutions in Nigeria did not have the necessary means of getting consistent feedback from their patients and customers. As results of this, many institutions have not given their patients the satisfactory care and services they need in order to improve their health.

Research however, shows that by employing electronic means, feedback collection could be greatly enhanced [Powney & Hall, 1998] especially by leveraging on the mobile platform [WHO, 2011]. This paper therefore introduces a mobile application that serves as a feedback mechanism between patients and health institutions. The rest of this paper is structured as follows: section 2 reviews the existing systems in this domain, in section 3 the methodology adopted in the research is reported while in section 4, the results are discussed. Section 5 concludes the work and gives the scope for future work.

2. EXISTING SYSTEMS

2.1 Email Feedback System

One interesting approach in this feedback system is that it can be evaluated by clients and users. Email is not a new concept, but its use for feedback communication is worth considering [Keil & Johnson, 2002]. **Nicereply** is an example of an email feedback system [www.nicereply.com]. This application turns an email into a customer service feedback system [McCarthy, 2010]. It functions by inserting a link at the bottom of every mail sent by an organization to its customers. With this link, the customers can rate the response of the organization. It is common to find today persons who possess at least one email address which makes them reachable through this channel [Milev, 2010]. The drawback of this method is spam filter. Oftentimes, emails which get sent from one and the same server in short periods of time and to a big mass of recipients are marked as spam. Such messages get hidden from the user or else directly deleted [Milev, 2010]. This may bring about a break in communication.

2.2 Telephone-based Feedback System

Survey Crafter [www.surveycrafter.com] is a well-known example of a telephone-based feedback system. It is software that strives to make writing, administering, and analyzing web, paper and telephone-based surveys easy. This however is not a mobile feedback system, but rather a "direct approach" method to feedback collection. The clients of the system rent international phone lines to directly call the potential target groups. This brings fast results. Owing to the direct communication between the companies which started the feedback process, its consumers can directly tell their opinion on the stated questions and can even place questions on their own. This method has two big drawbacks.

As a result of the of the rented international phone lines, such method costs a lot of money, which cannot be covered by smaller companies. The second drawback is the need for trained professionals in this sphere, who can carry out the feedback on the line. The direct approach to the target group demands a measured approach, big confidence and calmness during the talk and instantaneous evaluation of the results [Milev, 2010].

2.3 Mobile Health Surveys

This involves the use of mobile devices for health-related data collection and reporting. A survey conducted by World Health Organization (WHO) shows that the use of mobile devices for health surveys was low across the six WHO regions [WHO, 2011]. However, among the six regions, the Americas had the highest with 42%. This is closely followed by the African Region with 31%. The two regions reported the highest proportion of Member States with this mHealth initiative [WHO, 2011]. With the increased ubiquity of mobile devices into the African continent, the use of mobile health surveys as a means for collecting feedback can only be on the increase.

3. Methodology

3.1 Design Architecture

The mobile feedback system presented in this paper was modeled using the Unified Modeling Language. It is structured as a 3-tier application. This consists of a client, middleware and database server. The client refers to mobile devices with which users send feedback to their health institution. The middleware serves as an intermediary between the client and the database server. As an intermediary, it receives the data from the client and forwards it to the database server of the health institution where it can be promptly acted on.
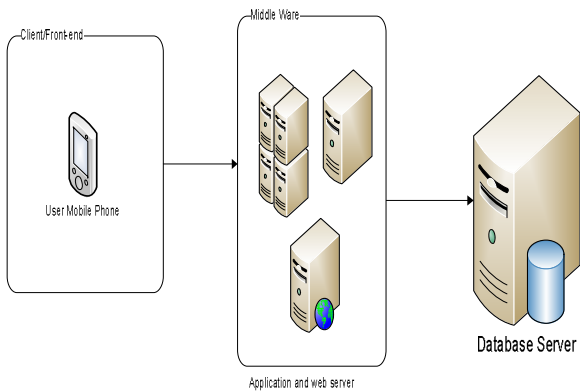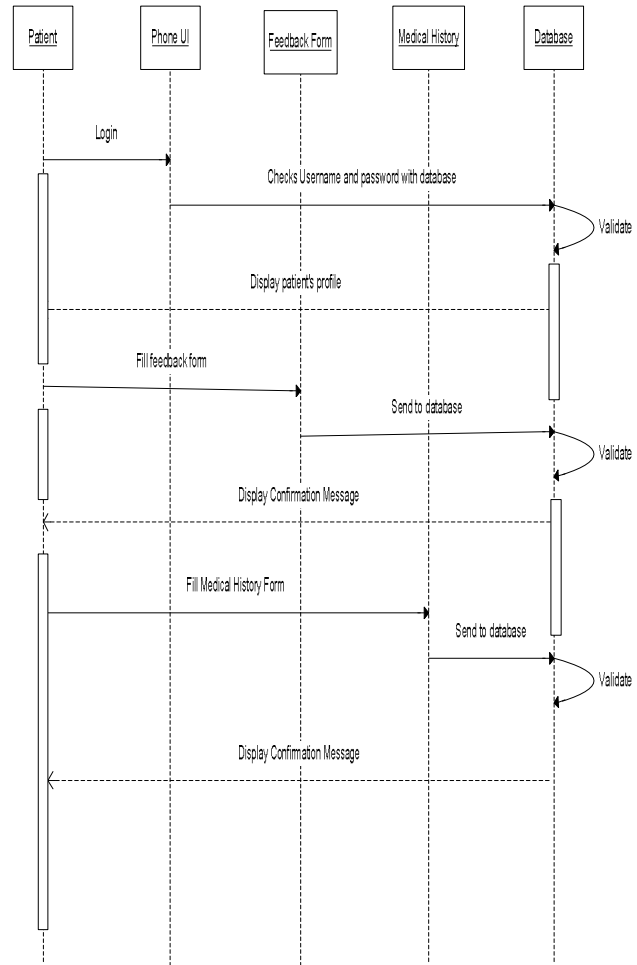
Fig. 2: Sequence Diagram for a Patient's feedback transmission

A sequence diagram was used to show the flow of feedback from users to their health institutions. A class diagram on the other hand was used to show all the entities involved in the feedback system and the relationship between them.
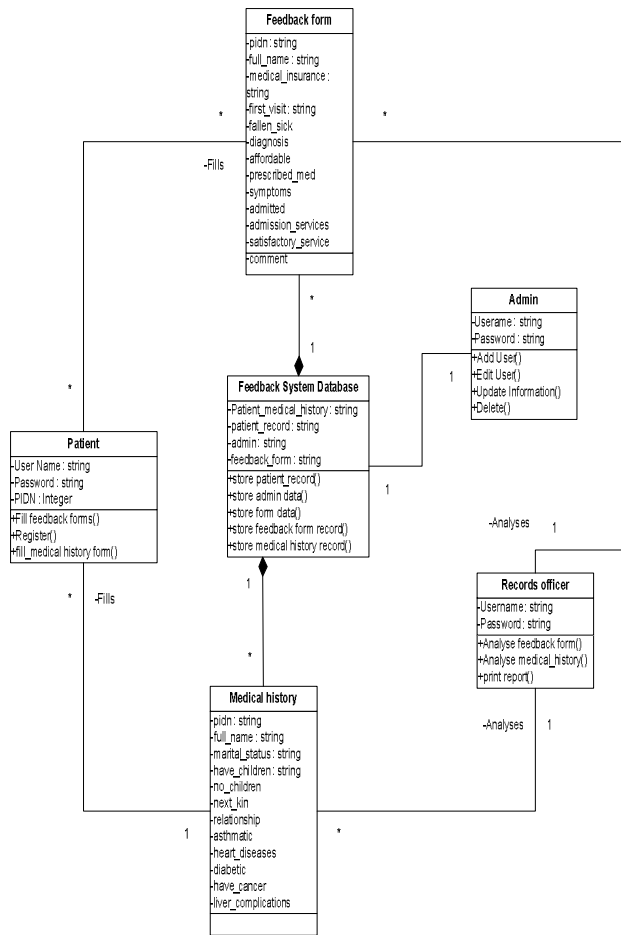
Fig 1: Architecture of the mobile feedback system

The major advantage of the mobile feedback system is that patient, health workers, and various governmental and non-governmental organizations can contribute to the effective management of any health institution. Also the system serves as a platform in which provision of ideas especially from patients and medical professionals can be made.
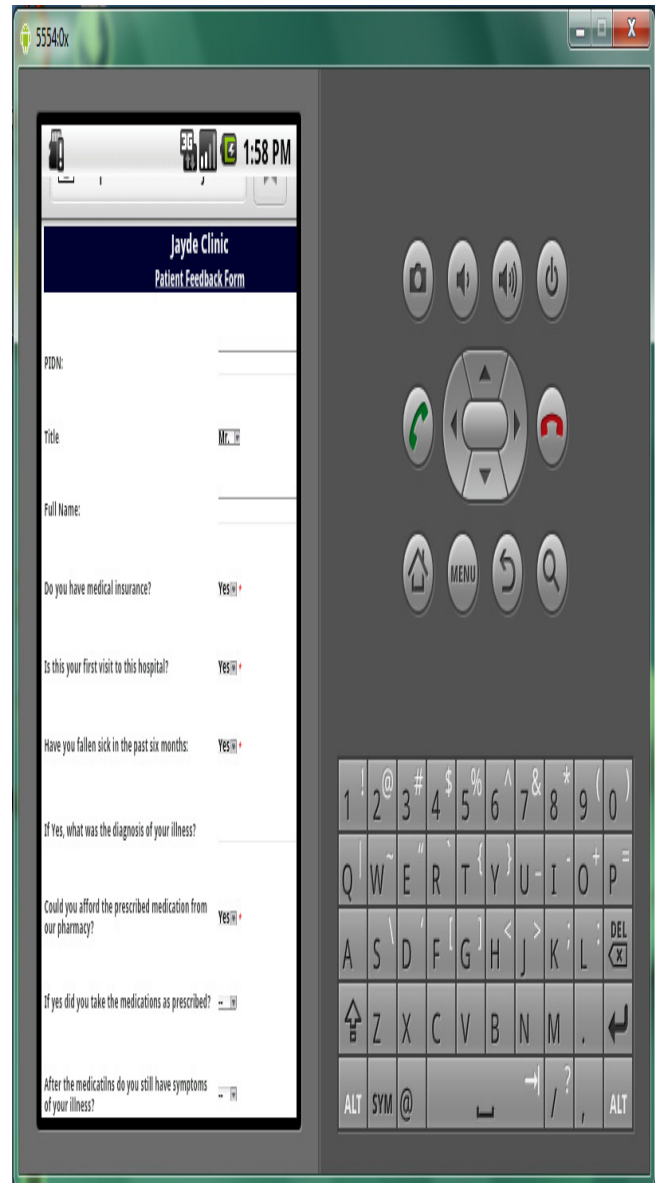

Fig. 3: Class Diagram for the Mobile Feedback System

3.2 Development Tools
The system was developed as using open source tools namely: PHP, MySQL, Hypertext Markup Language (HTML), and Android SDK. HTML was used to develop the user interface of the application and PHP was used as the server-side scripting language that allowed for communication between the user interface and database. MySQL served as the database. The prototype was tested out on an Android emulator.

4. DISCUSSION

There has been great need over the years for the automation of the activities of many health institutions in Nigeria to facilitate work effectiveness, efficiency, reduce cost and increase accountability. There has also been an increase in the need for patients to express their views on the operations of their health institutions. With the adoption of the mobile feedback system, patients are assured of a smooth running and more effective management of various health institutions.

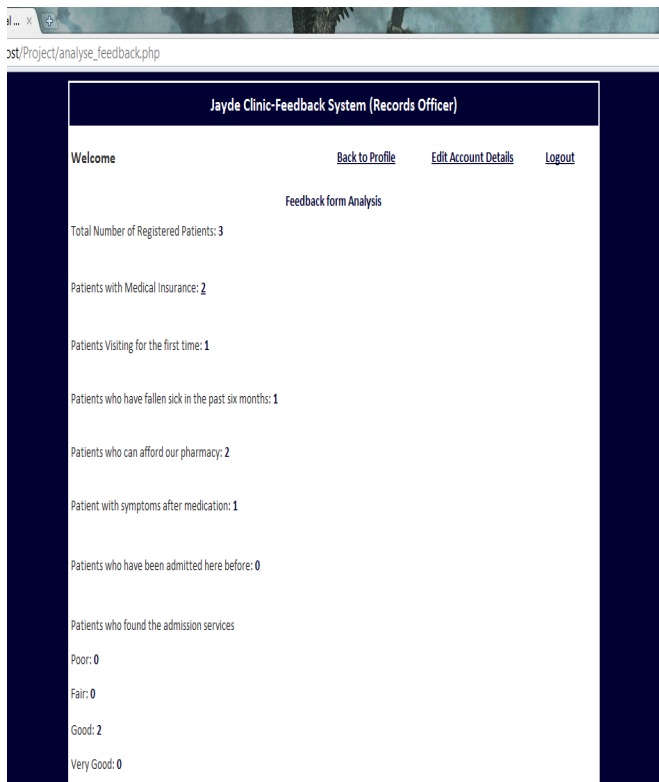**Fig. 4: Screenshot of the Mobile Feedback Form**

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Fig 5: The Feedback Analysis Page

5. CONCLUSION

In order to ensure that the Mobile Feedback System is used to maximum capacity, it is made open for further reviews and enhancements. Some features and functionalities were not fully implemented. Therefore, there is still room for further research. Some suggestions for further research are:

- Implementation of more enhanced security measures and control
- The integration of Short Message Service (SMS) module into the system to enable patients communicate with the system via SMS.

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Authors' Brief

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