Trust-building of Patients' Relatives through an Android App-based Patient Information Tool

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Abstract: The Indian healthcare industry has undergone tremendous changes in the recent past. With these changes have come many issues, one amongst them being that of the lack of trust and transparency between the hospital and the patient's relatives, which has resulted in many instances of vandalism and skirmishes in hospital premises. The Hospital Information System is defined as a massive integrated system that supports the comprehensive information requirements of hospitals[1]. Here we suggest that adding an extra component in the HIS which includes providing information to the patients' relatives may help to solve the problem. In the present study we present a Conceptual design solution to the problem in the form of an Android Mobile Application. Our Primary focus is on the usability of the android application by the end user, along with the other components of the design solution & how the whole setup can be established. Also certain cognitive aspects have been explored & implemented into the design process. The so designed solution for patient information would be a great avenue for transparency and trust building on behalf of the hospital management.

1 Introduction

Hospital Information System can be defined as a massive integrated system that support the comprehensive information requirements of hospitals[1, 2]. It is a platform which works to store and provide a wide range of data about the patient which may include patients medical history, the laboratory tests(which may also include visual results like X-ray, f-MRI etc.), prescriptions, operations ,diagnosis etc. Besides this the organization that is controlling the Health Information system , i.e the hospitals in this case, also have data regarding official documentation , financial situation reports and also personal data.[2]The Health Information System works to provide information to the healthcare professionals, in a seamless manner, so that better care can be made easily available to patients. The data provided by the Health Information System regarding the patient has a large number of benefits; it provides easy information access to doctors which helps them in decision support, improved and transparent finance administration, better and reliable documentation, reduced transcription and medication errors. [3]The benefits of HIS extend to many groups which include physicians , nurses ,allied health professionals and also the administrative staff.

Even though having advanced Hospital Information system in many hospitals, there have been many instances of vandalism and damage to the hospital , its staff or doctors, where the Indian media reported them as mostly cases of miss-communication between the hospital management and the patient party . [4,5]

Here we hypothesize, that the problem may be arising as a result of the ambiguity in the communication of information, or the gap in communication between the hospital authorities and the patient party. In this regard we present a possible design solution where providing information to the patients relatives can also be made a part of the loop in the Hospital Information System , so that they too can be kept updated about the treatment of their patient address this problem of transparency and trust which exists in communication between the hospital and the patients' relatives. As a design solution we have built an android mobile application keeping in mind certain principles from cognitive science.

2 Research Methodology

The study is descriptive in nature and most of the data and information collection was through secondary sources, and personal observations, and interviews with various medical professionals, administrators etc at various medical institutions.

3 Objective

- To understand the information flow between the hospital and the patients relatives.
- To build trust between the hospital and the patients relatives.
- To implement a design solution, in the form of an android mobile application.

4 Conceptual Design Solution

4.1Design brief: the components of the design solution

The framework consists of two components: The Hospital Services (HS) & The End User (EU). The HS component act as the data back end for the design solution, i.e. App Service Database (new addition) is a separate entity of the main database of the hospital. Fig: 1.1 shows the working and the relationship of the two components. App services maintains all the data required for Authentication & Communication purpose such as the patient information, diagnosis, lab reports et cetera which are to displayed to the EU.
The EU component consists of the App interface, usability, classification of the types of information that can be made available to the end user without transgressing the info sharing policies of the hospital management. Based on certain assumptions & heuristic knowledge we have designed the solution. The assumptions for our Approach are:

- The hospital has or is ready to set up the HS component.
- The hospital shall not provide any such information that may be damaging to their management.
- The end user is assumed to have a smartphone, connectivity & internet.
- The suggested App is strictly information providing, i.e. one way data flow

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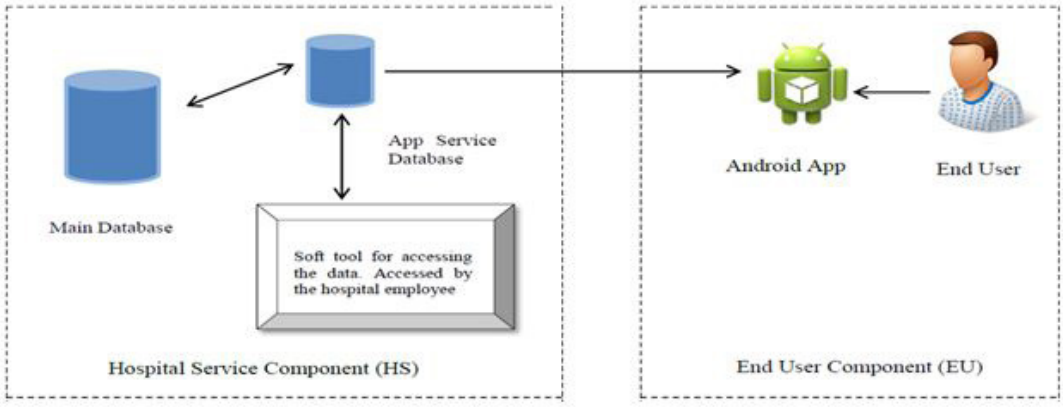
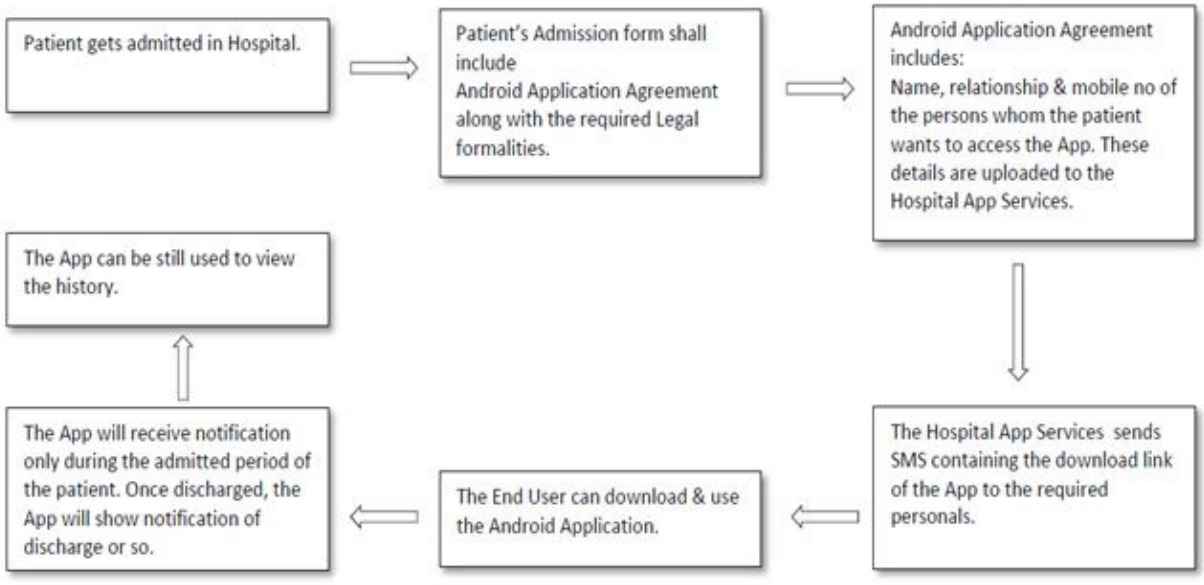


4.2 Life Cycle of the Application



4.3 Platform for development of EU interface

- The Android app is developed on Eclipse IDE, Version: Luna Service Release 2 (4.4.2) platform (http://www.eclipse.org/platform) with the following features:
- Android Development Toolkit, Version: 23.0.6.1 & Android Studio Bundle, Version: 141.19 (http://developer.android.com/sdk.html)
- Intel(R) Hardware Accelerated Execution Manager (HAXM) with Intel(R) Virtualization Technology (VT) for faster Android Emulation.
- An HAXM Emulator with Virtual Device 'Nexus_5_API_22_x86' is used to virtually simulate the application.

4.4 Interface of the EU component

4.4.1 Patient information Tab

This is the page (fig 1.3) that is to be displayed as the app starts to function. This page

includes:

1. Primary information of the patient admitted, name, age, admission date, tentative release date & The doctor who in charge of the patient.
2. Diagnosis & treatment, this panel is to be kept short revealing only preliminary diagnosis & only basic information regarding the treatment.
3. Medical History is only displayed if the patient is willing to.
4. Next check-up & Diet, almost all admission cases have routine check-ups & diet restrictions.

4.4.2 Daily Report Tab

This page (Fig 1.4) is to provide notification regarding the patient's daily health. Here only routine checks done by the nurses are reported along with the lab results.

1. The bar theme gives a clickable appearance to the user. On click activity, a toast message panel is displayed showing the respective content. Fig 1.5 shows toast displays of Lab report, Temperature, Blood pressure & Medication.
2. In the Medication toast display, the line pattern is similar to those used by doctors in their prescriptions pad. This will help the user to understand the toast message better.
3. The toast display may seem to be personalized for each patient but in effect from the HS component, its' just a matter of soft tool design, in which these information can be easily feed into.

4.4.3 Lab Report Tab

This page (Fig 1.6) enables the user to know which test is scheduled for the patient, the scheduled date, the date in which the report will be available.

1. It enables the user to download an online version (possibly a pdf format) of the test report; this is a helpful setup for the patient's kith & kin who are far away from the patient.
2. On click activity of the bar, a toast activity displays basic information regarding the test. For many test are unknown to people & people do have common belief that hospital or doctors simply write away too many unwanted tests. This is to bring transparency by revealing what the test is for.

4.4.4 Financial Details Tab

This page (Fig 1.7) displays billing details of the hospital for the corresponding patient.

1. The description of the page as well as details related to billings which may tend to be miss-communicated later on.
2. Click activity on each bar gives a drop down list (also in linear layout) displaying any corresponding information.

4.4.5 Cognitive aspects considered during the design process

While designing the Application certain Cognitive aspects have been taken into considerations. The aspects borrowed are largely based on heuristics. The End User component of the App is different from most of the Android application available in the market, as it is a value added service provided by the Hospitals.

1. Target user is meant to use the App for a brief period which means no time for memorizing. Hence overall design is kept simple & uniform.

1. The action bar is on Top with always visible format, for no memorizing.
2. Visual noise is kept as less as possible, so the entire background against which the UI has been built is white.
3. Short sentences are used to convey information instead of figures. This is to bring a sense of assurance, clarity plus a personal touch to the patients' health.
4. Uniformity is used throughout in Action bar, Layout, Dropdown, Icons, buttons, colours et cetera.
5. The only priority given is to the order of the information display with Top-high priority to the Bottom-Low priority

5 Discussion

5.1 Limitations

1. Installation of HS component in hospitals means extra cost & man power.
2. Sensitive issues associated with ailments like cancer, psychiatry, ICU cases et cetera, the functionalities of the App can be redesigned as per hospital norms.
3. Legal Aspects of the information provided in the Application has to be formulated.

5.2 Future Works

The design solution can be completely developed, i.e. both Hospital Services & End User components, then we can proceed for experimental validation by using techniques like usability testing and heuristic evaluation.

We can include functionalities (as mentioned before) to store & share medical records, which will eliminate the need for multiple lab testing et cetera. This will enable sharing of medical records amongst various hospitals/clinics.

Also in the long run if the App is integrated with unique Ids, the App can be made to be accessed by hospitals/clinics all over the country.

6 Conclusion

This is a conceptual design solution, and we believe that by providing information in a continuous & standard manner, trust & transparency can be built between the Hospital and the Patients kith and kin upon slowly.

References

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protest. Retrieved from http://www.thehindu.com

The figures shown in this page are screenshots of the Emulator.

The highlighting & numbering are drawn upon to highlight its features.

The corresponding explanations are given in the respective sections

Fig 1.3, Screenshot of Patient Information

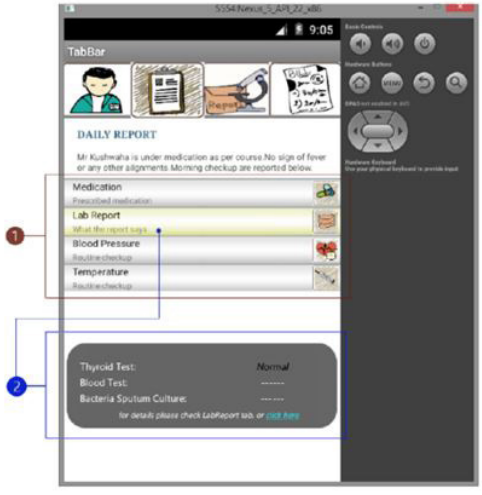

Fig 1.4, Screenshot of Daily Report Tab

Fig:1.6, Toast view on click activity of Blood Pressure bar.

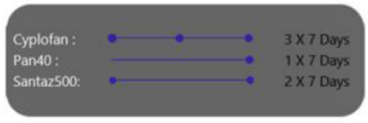

Fig:1.7, Toast view on click activity of Medication bar.

Fig:1.8, Toast view on click activity of Temperature bar.

Fig 1.5, Screenshot of Toast messages

Fig 1.6, Screenshot of Lab Report Tab

Fig 1.7, Screenshot of Financial details Tab

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