

## **NEXT GENERATION APPOINTMENT SYSTEM OF PATIENT USING ANDROID APPLICATION**

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### **Abstract**

Managing patients and keeping track of their appointments is one of the most challenging parts of any clinic /hospital management platform/solution. This proposed solution is an online patients' appointment management system using android mobile application that can be adopted by any clinic with minimal changes. It provides a unique experience to the customers as they can just send just a SMS using their mobile to keep complete track on their appointments 24x7. It also provides an extremely easy user interface to the doctor's assistants to manage their patients using just a few clicks. Patients would be able to track their appointments and receive regular updates about the status of their appointments over email/SMS. Doctors would be able to generate reports showing booked and executed appointments for specific time frames. By using this patient can easily track and manage their appointments in easy way. We can eliminate the waste of time to call the assistants to book appointments

**Key Words:** *SMS Technology, Appointment System, Android Platform, Hospital Appointment.*

### **1.1 Introduction**

An analysis of the scope, usability and volatility of the problem must be done. The boundary of the system may be ill defined or user may specify some unnecessary technical details that may confused, rather than clarified, overall system objectives. In addition, customer may not be completely sure what is needed, have poor understanding of the capabilities and limitations of their computing environment don't have the full understanding of the problem domain, omit information that is believed to be obvious. To overcome this problem, the software developers must approach the task of defining problems in an organized manner.

Managing clients and keeping track of their appointments is one of the most challenging parts of any service provider management platform/solution. This proposed solution is an online clients' appointment management system that can be adopted by any service provider like clinic, restaurant or salon with minimal changes. It provides a unique 2 experience to the customers as they can just send SMS/Email using their mobile to keep complete track on their appointments 24x7. It also provides an extremely easy to user interface to the service providers' assistants to manage their clients using just a few clicks. Clients would be able to track their appointments and receive regular updates about the status of their appointments over email/SMS. Service providers would be able to generate reports showing booked and executed appointments for specific time frames. By using this client can easily track and manage their appointments in easy way. We can eliminate the waste of time to call the Service Provider Assistant and book appointments.

This will save efforts and give unique experience. When a client needs to book an appointment he/she just needs to send an SMS in a particular format and appropriate Appointment would be booked and client would be communicated immediately by a reply SMS. Clients can book today's first available or last available appointment or even future appointments as required. This system is in operation round the clock so clients can track and manage appointments 24 x 7Service Providers can mark their holidays and weekly offs in the system so that these days would be excluded from booking appointments. In case Service Provider needs to go for an urgent work then system would cancel all.

### **1.2 Paper Based Appointment System:**

Before considering technology advancement for healthcare industry, we must understand what healthcare Standard Operation Procedure (SOP). It is a written set of instructions that healthcare staff should follow to complete a job safely, with no adverse effect on personal health or the environment, and in a way that maximizes operational and production efficiency. SOP in outpatient clinic includes registration procedure and appointment scheduling process, which currently paper-based. Files and patient's health records are stored in physical storage, and will be transferred by nurses' or administrator to the doctor's office for consultation.

This system is obviously inefficient and time consuming, and the risk of misplacing records is transparent. Registration process using paper-based system mostly requires patients to fill up the forms and submit to the registration table or they could simply place their identification card or appointment card in the box provided and wait for their name to be called. The question is what if the card is misplaced or taken by any unauthorized personnel? One of the issues being presented is that if patient's records are not to be found or unregistered patient, the current admission staff will delay his/her consultation time. Based on the survey report in 2007 [1], the most complaint issues are the time spent in the waiting room and 19% of the patients complained that they could not get an appointment within a week time. In addition, thousands of patients' appointments are changed to the later date for more than once. Outpatient satisfaction with healthcare procedures was not only associated with waiting times but over one-third chose to not fulfil the appointment schedule as they expected to have to wait for long periods. This issue still remains a challenge to healthcare industry worldwide.

### **1.3. Online Appointment System**

One of the applications being introduced is online scheduling and registering system (RegisterPatient.com). This is a 24 hours and 7 days per week system whereby healthcare administrator is notified automatically on upcoming appointments and registered patient via online system. It allows patient to complete registration forms at their own convenience without having to queue. Once it has been completed, the patient will be notified with a map to the nearest healthcare facility. However, there are some consequences towards this system.

Firstly, registration required patients to fill in important data such as credit card number, identification card number and etc. Since the system is web-based, these numbers can be hacked by malicious websites. Secondly, most of the online registration and scheduling appointment system requires payment to the provider per month. Third, online scheduling system is only limited to less diagnosed symptoms such as abdominal pains, nausea, vomiting, diarrhea and etc. So if there are symptoms which are not included on the list, patient has to call in for any available appointment slots and wait for confirmations. For such cases of emergency and urgent need of consultation, this inefficiency may lead to problems for both patients and healthcare staff.

Finally, this system does not provide any prioritization towards scheduling the appointments, which aims to enhance the management of patients' information in all healthcare industry as a centralized national system. It includes the development of clinical access and appointment slot scheduling. This system provides validation of availability and non-availability slots for both parties:

Patients and medical professionals (i.e. doctors, nurses and pharmacists); and allows instant retrieval of patient information on nurses' and doctors' workstations. Appointments for every healthcare facility in the country will be scheduled from a centralized desk and can be distributed across multiple locations whereby each healthcare location can schedule appointments independently through the appointment administrator. This system will reduce the wastage of time slots due to non-availability of either party. Hence, from the above statements, this system helps in managing patients flow by scheduling appointments beforehand and supports advance preparation of healthcare locations. However, it has been found to have such drawbacks and inefficiency to the system. First, scheduled patients must present their appointment cards which embedded with barcode to be scanned for alerting presence.

The problem will arise when the card is accidentally misplaced, and as a result, patients are to be entered as outpatient instead. Secondly, in the case of urgency needs or any means of appointments,

the patient is required to schedule physically at any healthcare facility or by call in and waits for the confirmation from nurses for available slots. Third, there will be a delay of consultation due to slow access to the current electronic system. In accessing patient's records and data, one must set and present his or her identification card to the administrator and queue.

Finally, priority levels are set manually according to age and status of registration, but not the level of sickness. Currently there is not much research work available in the development of prioritization in any healthcare facilities around the globe

#### **1.4. Mobile Appointment System**

Recently, healthcare industry has slowly moved towards implementing cloudbased platforms, regardless of security issues that may or may not happen. With the existence of such system, storage size and ability to manage records and data centrally will be tackled. This system will not only increase the efficiency of shared data between healthcare practitioners nationally, but may also reduce the operational costs of the healthcare industry generally as there will not be any redundancies.

However, cloud networking is still raw that only some IT professionals has ability to comprehend the database structure and security aspects. "Application of Intelligent Agents in Hospital Appointment Scheduling System" developed employs some intelligent agents which eliminates the needs of human agents towards performing the similar search activities in scheduling processes aims to improvise the work flow and thus saving the healthcare staff's time and effort.

This system provides the negotiation and scheduling of appointments using mobile application, Android 2.2 Froyo. This system is based on fixing the priority level of patients in appointment scheduling. The agents developed are based on using fuzzy preferences, to gather information from patients and schedules appointment with the healthcare facility. The 5 implementation and validation was carried out using JADE-LEAP in Android 2.2 Froyo mobile operating system. there are some drawbacks found in this technology. First, nonregistered patients are required to schedule an appointment at least 24 to 48 hours before the scheduled time.

Once approved, they will automatically become a registered patient. In urgency cases, this technology obviously cannot be applied. Secondly, it only considers one central healthcare facility, regardless of clinics and other location of healthcare facilities nearby. Finally, there are no automatic system calls as reminder before the schedule date which is as much important since it is a paperless network transaction.

#### **1.5. Mobile Android Application:**

Inspired by the design initialized from "Application of Intelligent Agents in Hospital Appointment System", we are able to point out the main features of using Mobile Android devices for appointment schedule. Only registered patients are given username and temporary password for accessing the application. Figure 1.1 shows the main page and validation process as shown in Figure 1.2. If the validation is not true, the screen will notify that user are not found as shown in Figure 1.3.

For the case of registered users and validation process is true, user will be directed to main page as shown in Figure 1.4 which contains two buttons: (1) List of appointments, to view CONFIRMED appointment list as shown in Figure 1.5, and (2) Schedule an Appointment, for scheduling new appointments as shown in Figure 1.6

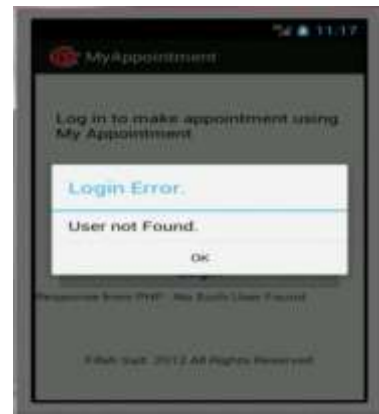
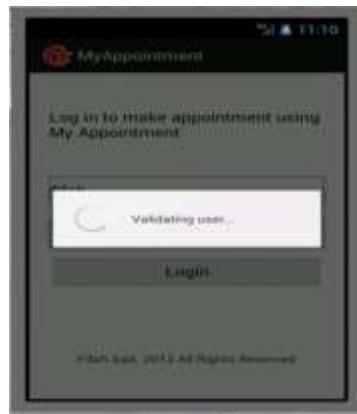


Fig. 1.1 Android Application Login Fig. 1.2 Validation process Fig. 1.3 User not validated

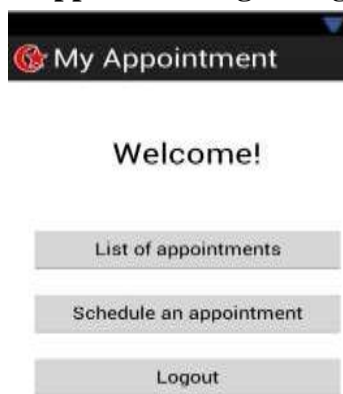


Figure 1.4 Welcome Page



Figure 1.5. Confirmed Appointment



Figure 1.6. Mobile Appointment Scheduling



Figure 1.7. Patient Search and Add Value

### 1.6. New vs Existence Appointment System

The existing appointment provides the old ideas about appointment and through by the telephone and the in written case. The every appointment takes much of time to fix that appointment but by using our application it overcome your time and money delays. In that case you have no need to go in any cafes or office point to take the appointment, you just type the code and you get your appointment done on your cell. The main advantage of our system is that, it 7 gives you more simplicity to handle

the appointment process. In case of any modification or cancellation of appointment, you have an option to cancel within time.

### **1.7. Appointment System Architecture (basic)**

Project Architecture is n-Tier Spring managed Java App running on Jetty with PostgreSQL as backend database. Key Features of this Appointment Management System are the Data Security and Reliability, Time Efficient, Cost Effective, Data Validations, Analytical Reports, Simple and Easy to track and manage appointments 24 x 7, User Friendliness.

### **1.8. Problem Statement**

An analysis of the scope, usability and volatility of the problem must be done. The boundary of the system may be ill defined or user may specify some unnecessary technical details that may confused, rather than clarified, overall system objectives. In addition, customer may not be completely sure what is needed, have poor understanding of the capabilities and limitations of their computing environment don't have the full understanding of the problem domain, omit information that is believed to be obvious. To overcome this problem the software developers must approach the task of defining problems in an organized manner. Managing clients and keeping track of their appointments is one of the most challenging parts of any service provider management platform/solution.

This proposed solution is an online clients' appointment management system that can be adopted by any service provider like clinic, restaurant or salon with minimal changes. It provides a unique experience to the customers as they can just send SMS/Email using their mobile to keep complete track on their appointments 24x7. It also provides an extremely easy to user interface to the service providers' assistants to manage their clients using just a few clicks. Clients would be able to track their appointments and receive regular updates about the status of their appointments over email/SMS. Service providers would be able to generate reports showing booked and executed appointments for specific time frames.

By using this client can easily track and manage their appointments in easy way. We can eliminate the waste of time to call the Service Provider Assistant and book appointments. This will save efforts and give unique experience. When a client needs to book an appointment he/she just needs to send an SMS in a particular format and appropriate appointment would be booked and client would be communicated immediately by a reply SMS. Clients can book today's first available or last available appointment or even future appointments as required. This system is in operation round the clock so clients can track and 8 manage appointments 24 x 7 Service Providers can mark their holidays and weekly offs in the system so that these days would be excluded from booking appointments. In case Service Provider needs to go for an urgent work then system would cancel all the appointments on the given day and would generate SMS to alert clients to avoid their visits to clinic and help them making alternate arrangements at the earliest. Clients who book appointments but don't turn up can be tracked using the reports and be warned or de-registered to provide better services to other regular clients.

This automated appointment management platform is really state of the art solution which will really improve the overall efficiency and accuracy of the process. Requirements Specification is the system representation process. Requirements are represented in a manner that ultimately leads to successful implementation. Basically, specifications tell about the model to be developed that incorporates the various factors, which include functionality and environments. It is an abstract of a real situation that is normally quiet complex.

The time bound service providers always struggle to manage the appointments for their clients. This typically includes medical practitioners, personal trainers, dental surgeons, hair salons, driving schools, music teaching schools, guest houses, hotels, restaurants etc. Easy appointment scheduling - Your clients can book appointments with you online. Reminds clients of their appointments Automated appointment reminders sent to clients to prevent tardiness and no-shows.

Notifies you and clients by SMS text and email. How it Works For Small Businesses For service professionals, Appt Genie makes it easy to accept online appointments from new and existing clients. Whether you're looking to grow your business and get discovered by new clients in your local area,

or you're not concerned with growth but simply want a new way to keep your existing clients satisfied; Appt Genie can work for you and your small business.

How it Works for Consumers for consumers, Appt Genie provides an easier and more convenient way to connect with the local businesses you schedule with today. Appt Genie is used by thousands of businesses every day such as: hair stylists, massage therapists, dentists, plumbers, handymen and golf instructors. In fact, Appt Genie can work for practically any kind of service professional in your community. We are developing software and software is a part of larger system, so work begins by establishing requirements for all system elements and then allocating some subset of those requirements to software. This system view is essential when software must interact with other elements such as hardware, people and database. System engineering and analysis 9 encompass requirements gathering at system level with a small amount of top-level design and analysis.

### **1.9 Android Application**

- Useful in big clinics
- Most useful in rural areas there by none of clinic is available.
- Possible to take other appointment employee, minister or any government employee.
- Marketing of android phone.

### **1.10 Process of Making Appointment:**

- Patient send message for getting appointment of doctor.
- Reply of message from application
- Appointment slot.
- Emergency.
- Valid message format
- Message for take Appointment Doctor Conformation Message

### **1.11. Advantages:**

- There's no need to go to the clinic to fix an appointment.
- Increase the number of patients new & Exiting.
- Remind patients about their appointments (Automatic)
- Be remind (Doctor & Receptionist) about the appointment(Automatic)
- Save mobile Number & categorized database (Gender, Nationality, Income, Age, Marital status) about each patient
- Communicate with patients via SMS.
- Have an exact idea about most preferred doctors or clinics.
- Have an exact idea about most preferred times and days of the week for the appointment.
- Have an exact idea about the patients (in the market)

### **1.12. Features**

- Make an appointment.
- The ability to see your medical file online.
- The ability to see doctor`s recommendation online.
- The Ability to get your medical recipe in easy way.
- Reminder Message to your mobile.
- Smart Search Algorithm.
- Advertising.

### **1.13. Limitation:**

- Doctor must have an android based application mobile & tablet.
- Patient is having a register with clinic or concern doctor.

- If any other patient has emergency, then take slot.
- If patient wants its report or document online, then he must have android mobile or tablet himself.

#### **1.14 Conclusion:**

On the basis of development our appointment application software is the sound for future and also it is the hottest technology in mobile system. In this system provide high availability to customer; also provide 24 x 7 services in whole week. Clients can book today's first available or last available appointment or even future appointments as required. This system is in operation round the clock so clients can track and manage appointments 24 x 7. This automated appointment management platform is really state of the art solution which will really improve the overall efficiency and accuracy of the process.

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