



Patient Management System PMS

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ABSTRACT

Observing the problems of patients waiting in the queue for hours and sometimes not able to get an appointment with the doctor, the idea of PMS (Patient management system) can address this issue and solve it with the help of a pre-booking application where the patients can book a consultancy with their respective doctor with the respective time slots allotted in the application. The idea proposes the use of Digital pass (Also called as EMERGENCY PASS (EP)) with a uniquely integrated QR code, these will allow the patients to skip the waiting time and visit the doctor within a short period of time. The patients will be allotted with a limited number of slots who book on the application, so it does not interfere with the general appointment in the hospital's reception. With the help of this application doctors will be notified that how many number of patients has arrived at the hospital and proceed with the consultation.

Keywords: PMS, Emergency pass, QR code, Waiting time.

1 Introduction

Numerous businesses, including those in the medical field, have seen notable growth as a result of scientific and technological advancements. Patient information and recommended therapies are still recorded using the outdated file record system in many hospitals. The use of hospital management systems to improve patient care is evident in a small number of hospitals, the majority of which are privately held.

Waiting in a hospital queue is very exhausting, and many patients find it difficult to wait in a queue when they do not have any caretaker. To reduce the waiting time, implementation of patient management system (PMS) for reducing the waiting time in the queue to book a consultancy in hospitals. The primary issue affecting the provision of healthcare services in facilities with limited capacity is queuing. ^[4]

PMS reduces the waiting time in the queue with the help of **Emergency pass (EP) with an autogenerated QR code**. This is done with the help of a mobile application where the patient downloads the mobile application, logs in with the most basic information such as Name, phone no, age, and the patient is good to go with their online consultancy with the respective doctor. The patients can choose their doctor. Once a consultancy is booked, the patient receives a digital pass with an Auto generated QR code with the photo, name, age of the patient, and the name of the doctor they have consulted. These QR codes are later scanned by the hospital receptionist. Once the QR code is scanned by the receptionist, the particular doctor will be notified that their patient has arrived and the payment processing can be done online. If the payment is in cash then the payment can be done to the receptionist. The patient can visit the doctor and have their consultation. This reduces the waiting time in the queue and with the help of EP the patients who book on the mobile application will have the first priority. This reduces the



amount of people waiting in the queue and would make it easier for the doctor to know how many patients are going to visit him/her through the mobile application beforehand. Only limited number of slots will be allowed per doctor as the booking of the slots should not interfere with the general booking in the hospital. Hence this idea makes it more efficient for the hospitals and the doctor, and there is another advantage for the doctors, we can help the doctors get more patients and the patients to reach the most nearby doctor in some cases, and we are implying that the application makes it very easy for the patients to find their respective doctors if not find a new one for according to their health issue. The patients will be given the option to choose a hospital of their choice and choose the doctor of their choice, the doctor listed in the application will be observed and verified, with these features in the mobile application we can reduce the waiting time in a hospital queue and make an emergency pass which will help the patients book an appointment beforehand have an efficient consultancy with the doctor.

2 Related Works

Due to the delicate nature of the healthcare system, the issue of queuing has garnered significant attention from academics. To solve this issue, researchers have produced a great deal of work in this field. ^[3]

A powerful mathematical method for analysing the performance of waiting times in the healthcare system is queuing theory. The application of queuing theory and modelling to decrease costs associated with different elements of healthcare and improve waiting times Healthcare system and enhancing its functionality. Unfortunately, many public hospitals in Nigeria and other poor nations have long waiting lists, which is a sign of inefficient healthcare services. Unless an appointment system is in place, the queue discipline in the majority of healthcare facilities is either first in, first out, or a series of patient classes with varying priorities (e.g., emergency department, which treats patients with life-threatening injuries before others). Prioritising customers who need shorter service times can help reduce wait times, as demonstrated by Preater. The impact of primary care patients using the emergency room on patient waiting times is examined by Ndukwe et al. Priority discipline was suggested for several patient types, and thereafter discipline for each category that is first in, first out ^[5].

The primary issue affecting the provision of healthcare services in facilities with limited capacity is queuing. Due to a lack of resources, lines form when the number of patients arriving surpasses the rate at which services are provided. Waiting time is the primary quality assurance metric in outpatient departments. Waiting and service times are taken into account to enhance service quality. In healthcare facilities, lengthy lines or wait times can exacerbate illnesses and result in socioeconomic expenses. According to the findings of certain studies on patient satisfaction, waiting times and patient satisfaction are directly correlated, and lengthy wait times have an indirect detrimental impact on patients' overall perceptions of the quality of the services they get. Long lines are an unwelcome and needless nuisance to the general public and hospital employees, and result in a cycle of limited facilities that puts significant strain on the



Hospital's current infrastructure. In addition to being a significant cause of worry, the lengthy queue of patients waiting for services at medical facilities has placed an unnecessary load on hospital staff and contributed to a bad perception of the hospital stay, which is inevitable under the current system. Existing research on queue management in healthcare systems was taken into consideration in this section. Administration within the healthcare system. ^[1]

Along with an existing queue management system, Tetramer and Yerlekar created a model that can lead people to the closest hospital, book appointments via an Android application, and provide alarm notifications. The reality is that patients have a variety of problems, and occasionally they will choose particular physicians based on recommendations to manage their condition. This is particularly true for non-tertiary healthcare, since patients are typically familiar with the hospitals they visit. In this instance, the generalized model might not adequately describe our situation because we are more interested in patients who are already confident about a specific medical facility. It will be challenging to select a certain physician

Figure 1: Work process of PMS



Figure 1: Work process of PMS

to handle one's situation. Furthermore, these physicians have various schedules, and it's not always the case that one's appointment will fall on the preferred doctor's timetable. ^[2]

3 Proposed Work Explanation

Implementation of patient's management system (PMS) reducing the waiting time in the queue to book a consultancy in hospitals.

Step 1: Installation of the mobile application Step 2: Booking **Emergency pass (EP)** (before half an hour of the consultancy)

Step 3: Get the EP (with the **QR** code)

Step 4: **Payment process** at the reception office in the hospital by showing **EP**

Step 5: On payment completion, **push notification** to the doctor

Step 6: Consult the doctor.



4 Usage of Decision tree

In queue management systems, decision trees are effective tools that offer an organized method of generating decisions based on a variety of input data. Here is how to use them efficiently:

4.1 Estimating Wait Times and Queue Lengths

Data Input: Decision trees are capable of analysing past data, including peak hours, service timings, and consumer arrival rates.

Outcome Prediction: The decision tree can forecast the anticipated wait periods and line length by analysing these variables, which aids managers in effectively allocating resources.

4.2 Dynamic Staffing

Based on anticipated client flow, decision trees can assist in determining the ideal number of employees needed at various times.

Service Channel Selection: Based on anticipated demand, they can also help determine which service channels to operate.

Behaviour Analysis: Decision trees can assist in customizing services for various consumer groups by dividing up the client base according to their behavior (such as the frequency of visits or the size of transactions).

Targeted Strategies: By using this segmentation, it is possible to create strategies that are specifically designed to cut down on wait times for valuable clients.

5 Analysis of the feasibility of the idea

Technical Feasibility: The proposed PMS in hospitals is technically viable leveraging Mobile application and QR code technology

Operational Feasibility: Prebooking reduces the number of patients in queue for consulting the doctor, and helps the elderly patients from standing in the queue.

6 Results and Conclusions

In conclusion, by cutting down on wait times and simplifying the patient experience, the use of a Patient Management System (PMS) greatly improves the effectiveness of hospital consultations. The method prioritises patients who have scheduled their visits in advance by using a mobile application that lets patients choose their preferred doctors, make appointments, and receive an Emergency Pass with an automatically generated QR code. In addition to reducing the number of people in queue, this gives doctors earlier notice of their patient load, which helps them manage their time more effectively. A more individualised and accessible healthcare experience is ensured by the application, which also gives users the ability to select their healthcare providers according to their unique needs. All things considered, the PMS is a revolutionary method of hospital patient care that benefits both patients and healthcare providers.



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