Smart Medication System: A review

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Abstract

The activity of self-treatment among injured patients can be improved. This can be done by developing an application for medication system for users who can self-treat themselves while getting injury. This system focuses on good interface and easy navigation. This paper can enhance accuracy and intercept errors in medication by reliving the user from flawed task of administrating medication and interpretation for medication directions. By using this system, stress of finding hospitals and doctors in rush is decrease while increasing the functional independence. In this system the input for user can be in the form of text or image and if gets recognized by the AI from the dataset then it provides the required prescription to it. The system yields cost effective, realizable solution to injury detection and prescription with the help of simple and easy interface while not devastating a user with discomfited hardware and sensors.

Keywords: injury, android application, medication, react- native, smartphone, diagnosis

I. INTRODUCTION

Violence against oneself or others, car accidents, drownings, burns, falls, and accidents are all caused by injuries. Every year, tens of millions of people get non-fatal injuries as a result of trips to the emergency room and acute care facilities[10]. Road safety remains to be a major issue, also a public health concern and a leading cause of injury across the world. It is a matter of great concern, despite we have not achieved remarkable progress in this field[11]. The majorly risk factors of road traffic accidents includes poor road infrastructures, talking on cell phones, high speed, alcohol, and rash driving. During an accident, the golden hour is the time taken for call-out, travel to the incident site, transport of the patient to hospital. To minimise this time, one can use android application which can help them on-time treatment. An application which provides advantages prevailing to the diagnosis of injury[12]. It is very likely for an individual to get nervous while prone to any accident or injury, especially one who has no clue about medication during this time.

The system will have the potential to improve the existing systems by providing the user every necessary details regarding their injured part or infections going to be caused. Self-care has proven to be not only very successful but also economical. It is specifically intended to get rid of confusion about prescription instructions and the discomfort of strict drugs. The majority of medication mistakes occurred when patients purchased over-the-counter (OTC) or prescribed medications from various drug stores and utilised them with little to no assistance[1]. Previously made technologies for smart medication includes monitoring, reminders, dispensers, alarms and adherence but none of these gave solution for real time medication which prevent the user from future infections (if any).

Proposed system is mainly for real time treatment, as the person gets injured. This system provides all the necessary prescriptions, by the keywords, information or image provided by the injured person. The scope of this application until there is no serious injury, or any sprain.

II. LITERATURE REVIEW

A. *Smart medication adherence*

It is an AR-based application that helps patients with typical drug management issues. It is created and used as a medication coach intelligent agent, which keeps track of patient information such medication regimen, preferences, and constraints. This system's objective is to guarantee that the patient takes their medication at the appropriate time. Observing the maximum number of dosages and the minimal time between doses is another objective. It makes sure that the user does not cross the number of dosages required every day. Medical adherence is the measure of user's medication plan following capability. This is an important information for this system[2].

B. *Artificial intelligence in disease diagnostics*

The significance of AI as a diagnostic component is increasing steadily as the building systems became more practical. AI improve efficiency and accuracy level of diagnosis. Algorithms generate predictions by exploiting medical data. It processes new and updated data to continuously learn and develop over time. By supporting medical professionals, AI is used to enhance disease diagnosis. For example, it helps gynaecologists in their decision about the initial treatment during diagnosis of ectopic pregnancies. This progress due to growing amount of medical data which can be extracted from different sources more rapidly than before[3].

C. *Smart medication for Haemophilia home care*

A lack of clotting factor leads to haemophilia, an inherited bleeding condition. These days, clinical management disciplines depend heavily on smartphone and handheld electronic technologies. A tool for long-term haemophiliac patient monitoring is called smart medicine. Real-time management and patient self-treatment monitoring are made possible by this programme. Additionally, it might increase patient adherence to their treatments and aid doctors in streamlining their treatment plans. There are four parts to this software: an application that a patient uses to record information about his or her therapy on a smartphone, tablet, or computer; an application that HTC uses to track the concentrates that are given to each individual; Patients can access and examine their own personal entries on an internet-based platform, and the HTC can view a summary of all entries for patients who were treated in that particular HTC on the same platform. Additionally, smart medicine enables simple text messaging or direct phone contact with the HTC. The patient can also send a snapshot of the bleeding spot if necessary. I was admitted to the hospital, a single-button message option that enables quick call-back functionality for the HTC, is available in case of emergency[4][14].

D. *Smart medication dispenser*

Prescription errors during ordering account for more than half of all drug errors. Medication errors can occur during the ordering, dispensing, administration, transcribing, and ordering processes. Hospitals and clinics today frequently use CPOE (computerised physician order entry) systems. Up to 80% of prescription errors, or 40% of all drug errors, can be avoided with the aid of CPOE systems. This kind of blunder is guarded against by intelligent medicine

dispensers. It is primarily designed for elderly or chronically ill people who are healthy enough to live alone. Such a user may work long hours, and that too without constant supervision from medical personnel, while also taking numerous prescriptions at home. The two main sources of error that smart dispensers are specifically intended to prevent are the hassle of strict medication schedules and misinterpretation of pharmaceutical instructions. The medication schedule specification (MSS) is used by this intelligent medication dispenser, which is nearly totally autonomous, to schedule individual doses of the user's drugs that are in its charge[5].

E. Mobile application for medical diagnosis

By answering a series of questions, this software may identify users' illnesses. It is created using the Objective-C programming language in the Xcode environment. Using Firebase, the application's elements can be changed. It was primarily intended for those who avoid seeing doctors out of fear and prefer to look up a diagnosis online. It provides free hypothetical medical diagnosis services that are guided by user responses to a number of questions[15]. Furthermore, a doctor in the selected city may be contacted through mobile in order to improve diagnosis accuracy. This application's components are adaptable, thus any diagnosis and Q&As can be changed[6].

F. Medication reminder and healthcare

This application is made for people who are busy and live in place away from home and miss the timing for their dosage. According to reports, the patient may suffer grave consequences from non-adherence. In order to keep patients healthy and fit, this application was created with the goal of reminding them of their dosage timings via an alarm ringing method. To find hospitals and doctors' contact information quickly, they can use the navigation. By entering information in sections such the medical description, time, and date, it allows users to set alarms for several medications at various intervals of time. The notification for the same will also be sent as an SMS or e-mail. Medication reminders help in avoiding wrong dosages and medication dispensing errors[7].

III. PROPOSED SYSTEM

Aim is to develop a software solution to provide medications prescription which benefit patients to utilize the medication correctly at the proper time and in the right way. Taking it at right time can keep patient healthy. When it is not possible to reach doctors physically it can help in preventing spread of infection in case of injury and the user can take quality healthcare for themselves.

IV. MATERIALS

The primary goal of this research is to create a smart phone application that offers real-time results. The application takes input data from the user in the form of Images or text in the description. This application is going to develop in react-native and SQL mainly. Android studio as the IDE for the same.

A. *React native*

For creating actual, natively rendered mobile applications for iOS and Android, use the Java script framework react native. It gives us advantages of intelligent debugging tools and error reporting. React native would be required for designing the frontend of this mobile application.

B. *Python*

Guido van Rossum developed the well-known programming language Python in 1991. Python is used for web development, system programming, arithmetic, and software development. Python 3 is the most recent version, and it is primarily used for developing apps. An integrated development environment (IDE), such as NetBeans, phycharm, eclipse, or thonny, can be used to create Python. These IDEs are especially helpful when managing huge collections of Python files. It will be utilised for this application's backend.

C. *Java*

Oracle founded the well-known programming language java in 1995. It is an object-oriented language that offers applications a distinct structure and enables code reuse, reducing development expenses. Java is used for web applications, games, web servers, desktop applications, mobile applications, and database connections.

D. *SQL*

SQL (structured query language) is a language used to describe how databases are organised (collections of records). Because SQL makes it possible to query a database for data that fits into a specific relation, databases organised with SQL are referred to as relational databases. It is an oracle database management system. It includes elements like conditions and loops. It is going to be used for the backend of application.

V. METHODOLOGY

The Process started by gathering information through secondary resources. The project will be developed using agile methodology. It follows an incremental process. The project would be divided into smaller parts that would be created one by one in sprints. In this method the next screen is designed when everything with previous screen goes well.

The estimated working of proposed system is as follows:-

- Foremost the user will provide the information about the injury, pain or uneasiness he is facing.

- The provided information can be in the form of picture or text. Also, text is compulsory so as to proceed further.

- The injury get diagnosed using AI.

- The system will check for the keywords from the given information by the user.

- Further, the image or keywords get compared with the available dataset in the database.

- Then system will provide the required prescription according to the problem he is facing.

- If the user is not able to do any of these steps, then there would be a SOS button available which will send alert to the helpline centers.

How does a user going to use the application:-

- When the user got injured and not able to go to hospital then is going to use this application.

- He will input the details that how he got injured and other details, like if he is patient of sugar or BP or having any allergy.

- Then the input will get matched with the database and then he will be provided the prescription for required medication.
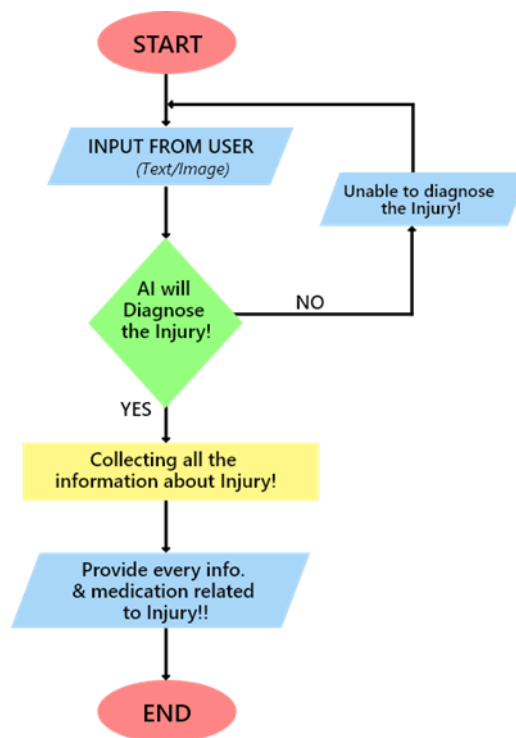

Figure 5.1 Flow diagram for proposed system

VI. RESULTS AND DISCUSSIONS

In this way, a summary of smart pharmaceutical approaches is investigated in the literature, and the results are assessed. There have been limited studies that theoretically provide basis for user interface formation in disease diagnostics. The study, however, is concentrated on the textual medicine data utilised to build useful features for disease diagnosis. For instance, Mishra et al[8]. arranged a database with 4,700 photos of nine prevalent dermatological conditions, such as erythema, wheal, or acne, and utilised deep learning for accurate categorization. Another illustration is pregnant women's transvaginal ultrasounds that are recorded in order to find ectopic pregnancies[9]. A small sample of study combines methods to get better outcomes.

The general public uses smartphones frequently as a tool with a diverse variety of personal and

professional purposes. But while developing apps, data safety has been a top priority. Proposed system would be independent of commercial interests and funding would be done by non-profit way. It will allow users to get diagnosis cost-free and without sharing personal information in case of common injury.
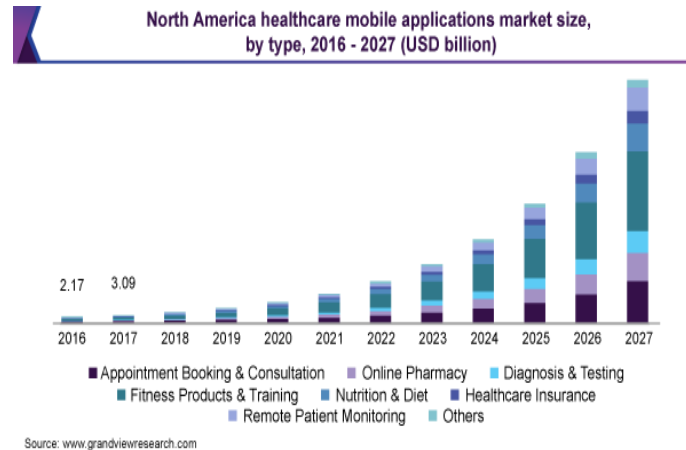

Figure 6.1 Graph showing use of mobile application in

health care [13]

VII. CONCLUSIONS

On a variety of platforms, many medicine applications have been created. A lot of these systems also need hardware devices to ensure patient adherence, dispenser, diagnosis or prescription. Proposed system is focused on fast and cost- effective treatment of patient injury. The user will login to save his information for further adherence. It will provide easy interface to users which will save time. The two main functionalities are receiving a diagnosis after uploading photograph or text and; upload details of other disease if there is any, for the user account, only if user want to create and share data.

The updated features would be reminders and adherence for reminding users of taking care of their health regularly.

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