

Implementation- Remote Patient Examination System

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ABSTRACT

As in today's date, health has become the most major and talked topic of each and every country. To live a healthy life, with proper medications and that to on time has become very important so to get proper medical assessment in every corner of the world and especially on time, we can build a mobile app that enables doctors to gain real-time access to a patient's vital signs from anywhere in the world. The mobile solution should allow doctors to gauge a patient's condition to determine whether hospitalization is necessary. The solution can also provide general medical assistance and will be especially useful in cases of emergencies.

INTRODUCTION

Automated healthcare system is the need and future of healthcare in India. Due to the rapid growth in population providing the healthcare services is becoming difficult day by day especially in rural areas. The remotely located patients are the patients away from doctor but need doctor's constant monitoring and support. Such as patients in ICU, at home or may be at distant places. Our proposed system presents the implementation of automated healthcare system, especially for this covid-19 situation which will help remotely located patients and guide them according to their medical condition. The system provides notification by means of popup, based on the symptoms of covid-19, which are basically divided in to three different stages and thus accordingly help the patients in their proper medication. The implemented system is successful to provide an interface among patient and the relatives of the patient.

PROBLEM STATEMENT

These days, especially if we consider the pandemic situation, the increase in number of patients has also led to the decrease in the relative number of doctors per patients and especially this is seen in rural areas, which results in vicious cycle where ignored or delayed diagnostics of any ailment makes the patient more dependent on doctor's checkups. Well, though it is advisable to visit the doctor whenever possible, but as discussed above if due to unavailability of doctors due to any reason, our proposed system i.e. Remote Patient Monitoring System offers effective alternative. Thus, there is need of such systems, so that patients can help themselves by taking proper medication on required time.

LITERATURE SURVEY

As time progressed, the advancement of the Remote Patient Examination System has also been ongoing and has been a key research subject for many individuals from different institutes and industries. And several individuals have introduced various principles and models for implementation of an efficient device with the highest accuracy rate in recent years. Below is a study of some of these concepts and ideas based on Remote Patient Examination System.

1) SYSTEMS USING SENSORS

The authors of [1] propose an architecture allowing to quantify the heart and respiratory rhythms according to certain conditions of movement. Patient monitoring with the help of elements used are: computers (PC), webcam, PPG sensors on the finger. Their operation is inside and relative to the sources of lighting. A sensor is placed on a patient's finger and simultaneously measures the heart rate and amplitudes of the PPG signal. All this data is saved at the PC level. The following figure describes the proposed architecture.

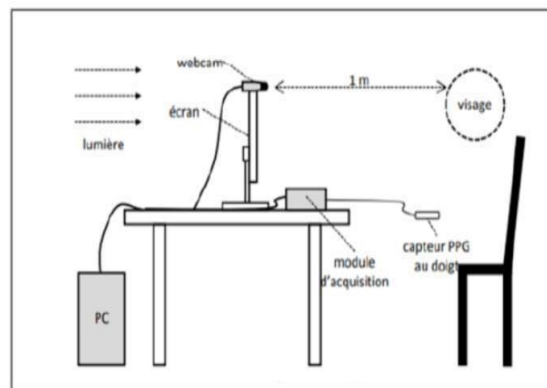


Fig. 1: System Using Sensors

2) PATIENT MONITORING USING MOBILE PHONES

Mobile phone takes important role in patient monitoring to receive, process and transmit patient details. Health net mobile monitoring was proposed in [2]. BSN (Body Sensor Network) embedded in clothes, collect body parameters and communicates with patient's mobile phone. Sensors and central hub were embedded in patient's shirt. The vital signals were collected by the sensors and transmit them to the central hub. Central node then communicates with mobile phone through Bluetooth link. Here confidentiality was achieved by AES128 and authentication was achieved by SHA. A novel Wearable Mobility Monitoring System (WMMS) was introduced in [3]. This model was established based on smart phone approach. This system is easily wearable on patient's belt and it monitors patient's mobility and takes photograph during any change of state. For analysis, these photographs were used.

3) PATIENT EXAMINATION USING BLUETOOTH

Bluetooth enabled device also used for in home patient monitoring. A Bluetooth enabled in-home patient monitoring system was proposed in [4] to detect Alzheimer disease. In the patient's home, patient carries the Bluetooth enabled monitoring device and an access point is placed in each room then all are connected to the local database. When a patient moves from one room to another, the monitoring device selects any one of the access points with strongest signal strength. Once the connection is established the current location and movement of the patient are traced and stored in a local database with the help of Bluetooth communication. The collected location information and the corresponding timestamps are forwarded to the decision engine which is placed in the hospital. This decision engine has movement recognition software, so that the medical practitioner can perform remote diagnosis to determine whether the patient has Alzheimer's disease or not. A survey on data confidentiality in early detection of Alzheimer's disease was proposed.

4) HEALTH MONITORING USING BODY SENSORS

Body sensors were introduced in [6] for health monitoring for acquiring body parameters continuously. The bio sensors continuously acquire the physiological signals and transmit them to the central node. The central node may be PDA, smart phone, micro controller etc. Bio sensors and central node are connected by any one of the wireless transmissions like Bluetooth, Zigbee, etc... or wired transmission like conductive yarns and cables. The amplified signals are received by communication and control signal module and processed by CPU then given to the wireless transmission module.[7] This wireless transmission module transmits the signal to the medical center for analyzing or give alarm signals to an ambulance in case of any emergency.

ECG sensors are fitted on the chest of the patient to monitor heart related information like heart rate, heart activity, etc. The WPPU is connected to the Wireless Access Point Unit (WAPU). The collected signals are sent from WPPU to WAPU then forwarded to the hospital through internet. In hospital, the received signals are stored and analyzed to detect any abnormalities.

5) HEALTH MONITORING USING SMARTPHONES

It collects patient's vital signs and transmits to the mobile phone which is carried by the patient[8]. The mobile phone securely receives, store and forward the data to the trusted medical professionals. Here PC is not used for processing data, but all the processes are done by mobile phones. Using data mining techniques. Communication between patient's mobile and expert's device is done by Bluetooth or WLAN 802.11. In case of any emergency conditions, emergency calls are generated by patient's device and forwarded to the caregiver's device.

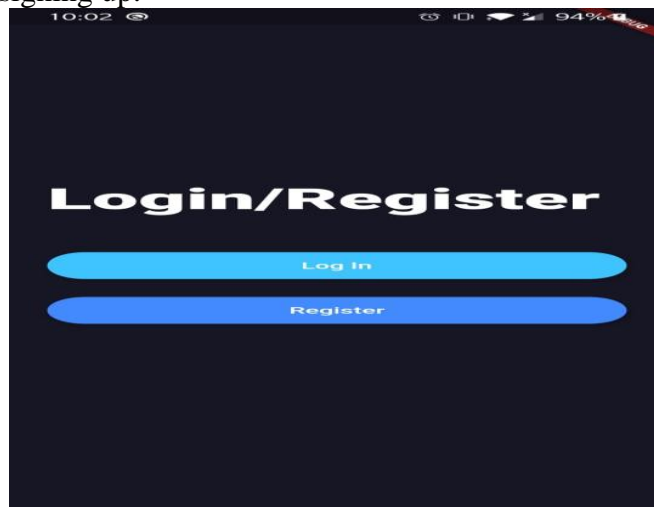
6) HEALTH MONITORING USING SECURITY

Different security and privacy mechanisms were used in health monitoring. In this, the patient's vital parameters were received, stored and transmitted by smart phone. AES-128 encryption is

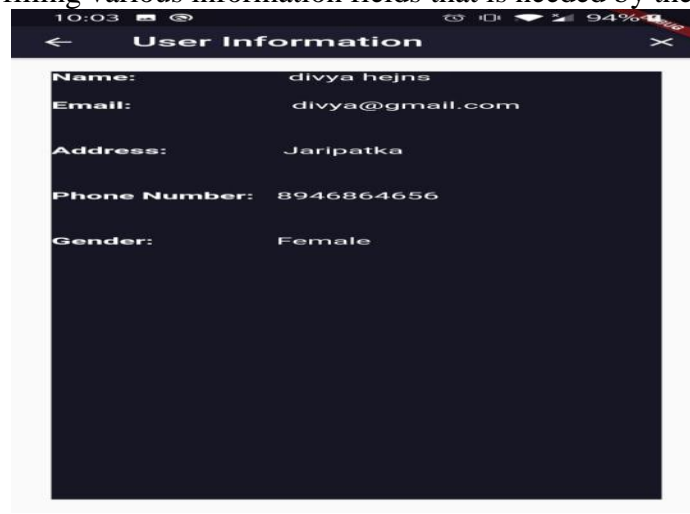
used between sensors to the central hub and Bluetooth encryption is used between hub and patient's mobile phone. Different cryptographic algorithms and key sizes were proposed in [11]. Cipher text Policy Attribute Based Encryption (CP-ABE) with security improvement methods were proposed. The two major problems in CP-ABE are key escrow problem and user revocation. In some cases users may change their attributes frequently or some private keys are compromised. To maintain the system secure, it is necessary to update each attribute frequently. This is known as user revocation.

IMPLEMENTATION

1. User can simply login by entering the email id and password which they have entered while creating their account/signing up.

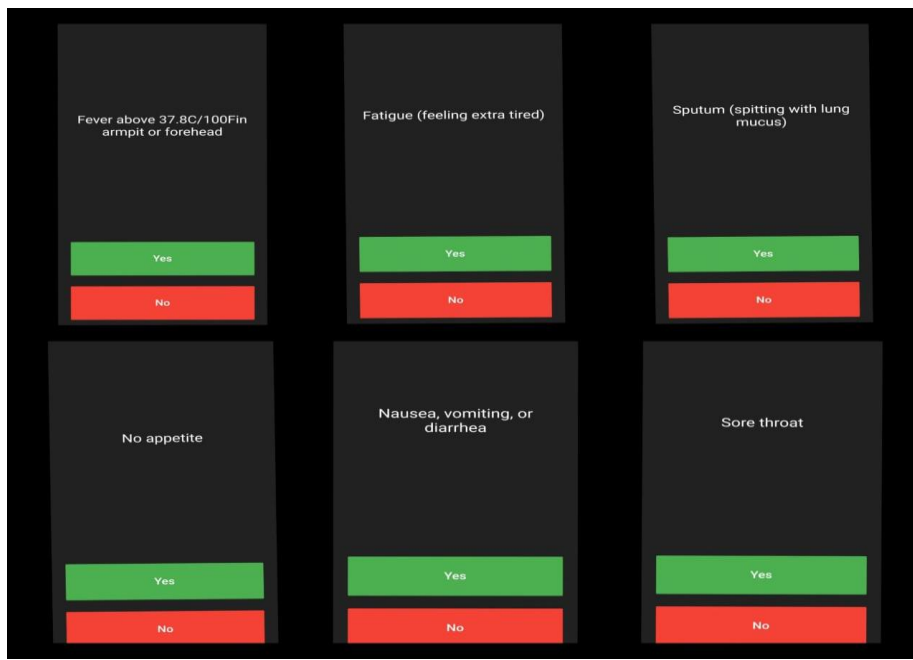


2. If the user wants to create an account he/she needs to register in the application by filling various information fields that is needed by the system.



3. After the user has logged in the application, he/she will be directed to a new window which will contain an option to start your screening for covid-19, which would contain a set of

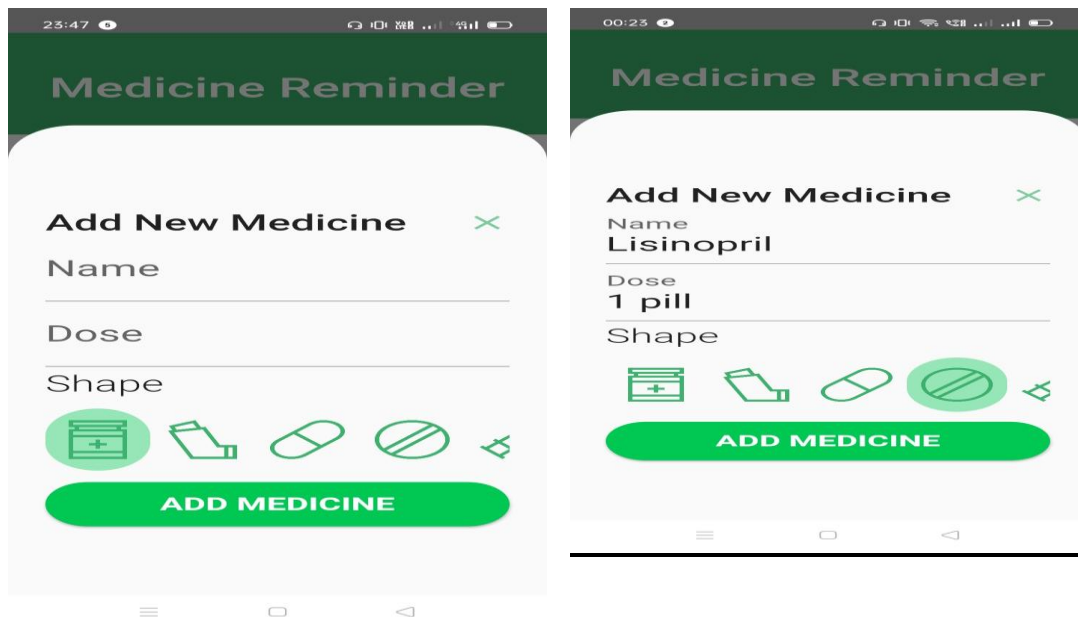
questions that a particular Has to answer.



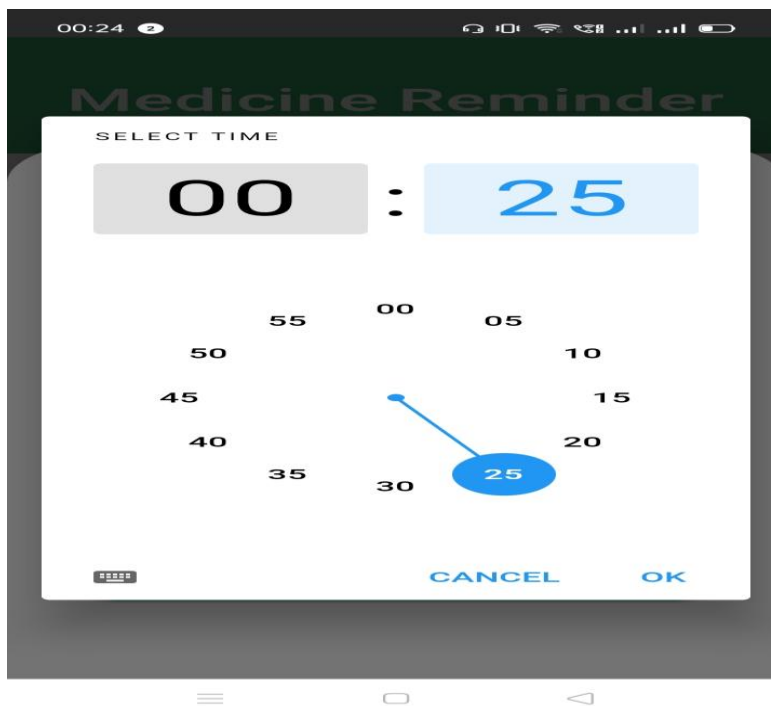
4. The application also displays the worldwide status about covid-19. This information includes the overall data about number of confirmed patients, number of active cases, number of recovered and deceased patients and the total of number of tests performed.



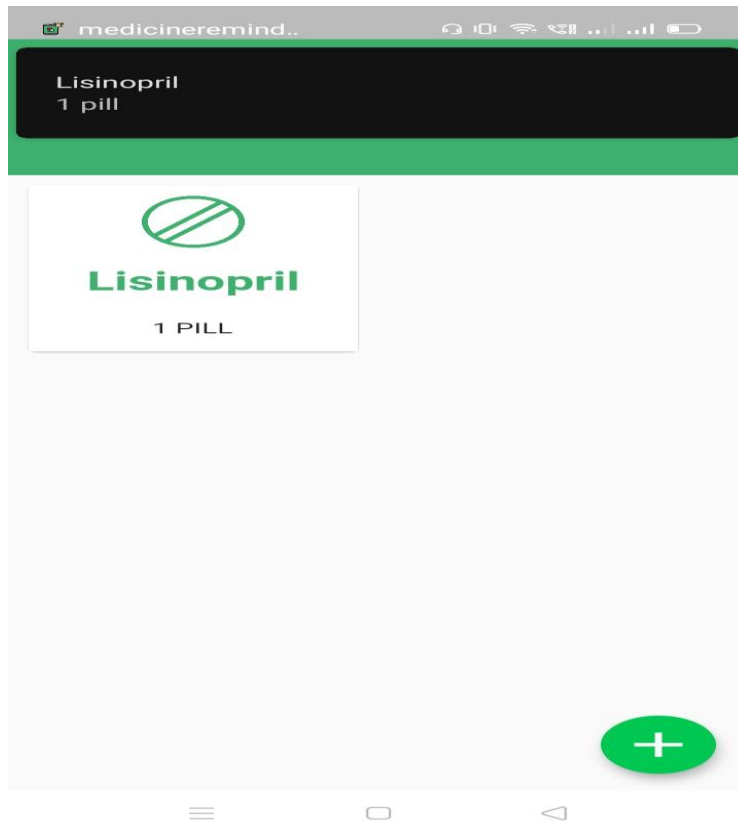
5. Our next module that is medicine Reminder, this will help a person to set a reminder based on the Prescribed medicine and its dose so that a particular person can always be alert about the medications to be taken. .



6. This is how with the help of timer one can set a reminder.



7. As soon as the reminder is set, The set reminder will be shown via notifications for particular time, for particular medicine as inserted by the user.



CONCLUSION

Thus a mobile app has been developed that enables doctors to gain real-time access to a patient's vital signs from anywhere in the world. The mobile solution should allow doctors to gauge a patient's condition to determine whether hospitalization is necessary.

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