

An IoT based Medicine Box using ESP8266

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Abstract— Presently the population of world is rising rapidly, providing proper healthcare to the elderly and ill people becomes an important and serious issue and it draws high attention from medical, academic and industrial fields of the society. The Internet of Things (IoT) drives the evolution of the Internet, and is regarded as a great potential to improve quality of life for the surging number of elderly people, significantly. As Android operating system gains huge popularity nowadays, it is a trend to make use of it for the wider access of IoT utility. This project presents a health monitoring system prototype based on IoT, with the increasing use of sensors by medical devices, remote and continuous monitoring of a patient's health. This network of sensors and other mobile communication devices, referred to as the Internet of Things for Medical Devices (IoT-MD), is poised to revolutionize the functioning of the healthcare industry. Untimed medicine administration can always show adverse effects on the health of the patients. The proposed system is designed to help such patients to take the required medicine in the right proportion at the right time. The basic ideology is integrating the principle of IoT with weight-based slot sensing on a normal medicine box. To make it more simpler, it is inbuilt with a Wi-Fi module for alerting the patient and also the chemist at the needed instant using IoT002E.

Key words: Intelligent Medicine Box, Internet-of-Things (IoT), Health-IoT

I. INTRODUCTION

Presently, a promising challenge in healthcare is to move routine medical checkups and other health care services from hospital to the home surroundings. This leads to help patients to get health care more simpler manner especially in some emergency cases. The main moto of our proposed system is to monitor that the patient consumes right medicines at right time. Also, it reduces the expenditure of the fees charged during every visit to hospital.

The existing system provides the medical box which is assistive device for people suffering from memory loss. The model contains Arduino Uno to which Wi-Fi shield is connected by using long wire headers, it is extended through the shield. At the time if intake of medicine the buzzer gets started. The system is embedded with the temperature sensor, if the temperature crosses the limit the SMS alert is sent to particular person. All the details are saved at server side and can be accessed by hospital server to keep track of patient health.

For development of our project we are using the concept of IOT and Android. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, internet create opportunities to more direct integration of the physical world into computer-based

systems, and resulting in improved efficiency, accuracy and economic benefit.

An android application is used along with medicine box to make the System more user-friendly. Our system includes a medicine box which is connected to the hospital administration. The medicine box generates alert by glowing LED if the quantity of medicine gets decremented and notifies to pharmacist also Hospital administration monitors the routine details through a webpage which is managed at the hospital side. An android application is installed on the patient's smartphone as well as in pharmacist smartphone. Through this application patients could view their prescribed medicines by doctor as per the symptoms send by them for seasonal illness and pharmacist gets the status of medicine box regarding the quantity of medicine available in the box for those patients who continuously have to take intake of medicines.

II. LITERATURE SURVEY

A. Enhancing Healthcare using m-Care Box (Monitoring non-compliance of Medication) [1]

The proposed model here is a smart medical box which lies on a single board computer based for those people who suffer with short term memory loss problem. The model monitors non-compliance of medication which provides a single platform and connection between patient, doctor and pharmacies. Related patient can send status of his/her health condition through a wireless communication network. So, it is an alarm-based device that helps in reminding patient about their medicine intake.

B. A Modern Health Care System Using IOT and Android [2]

In this paper, an intelligent home-based medicine box with wireless connectivity along with an android application is implemented that helps the patient and doctor to be in a closed communication. The box is wirelessly connected to the internet to make timely updates about medicines which will be notified in the android application within patient's smart phone. The system automatically generates the alarm so that the patient consumes medicine at right time.

C. Smart Pill Box [3]

The proposed system is designed to help these patients to take the required medicine in the right proportion at the right time. The basic ideology is integrating the principle of Alarm clock with Light based slot sensing on a normal pill box. An alternate to the light-based sensing method using capacitive fields is also employed. To make it more state-of-the-art, it is inbuilt with a GSM module for alerting the patient and also the chemist at the needed instant.

D. A Secure IoT based Modern Health Care System using BSN [4]

By using the BSN technology patient can be monitored using a collection of tiny powered and lightweight wireless sensor nodes. It becomes possible for doctor to handle patient from anywhere without bothering about range or territories. Here the web page is made along with their needs so that they can control the network from PC or from phone, via internet connection. It makes all patients those who are registered to communicate easily and provides more efficient consulting.

E. A Health Care Monitoring System using Wi-Fi Module [5]

The goal of this system is to provide health care services using sensors. The system leads the patient as he/she would no longer restricted to stay on hospital bed. Any assistant doctor or nurse will not be required as the sensors are wearable. This provides early warning of physiological deterioration that leads to preventative clinical action that improves patient's outcome. Advantage of using different kinds of sensors is that it serves patients at a wide range i.e. people living in rural or isolated area.

F. A Hospital Health Care Monitoring System using Wireless Sensor Network [6]

Body Sensor Network help people providing Medicare services such as medical monitoring medical data access communication with healthcare provider such as SMS or GPRS, continuous monitoring service, etc. In this system, a coordinator node has attached to patient's body to collect signals from wireless sensors and sends them back to the base station also the patient's physiological signals are gained by the sensors attached on the patient's body, and then transmitted to remote station. With this system multiple patient can be diagnosed.

III. PROPOSED SYSTEM

Online consulting is another new approach in our system where patients can consult to doctor online and can be treated by doctor by prescribing medicines. The only precaution we have to take is that patient can consult online for regular seasonal illnesses and not for serious diseases. In this approach patients register on the app and the data is stored at online database. After registration one can login to app and can consult to doctor through app by simply sending symptoms of illness. when doctor is online can view the symptoms instantly and can reply with probable cause or disease along with medicines preferable. If the doctor is available at instant then system checks if the previous suggestions available for same problem if it is then system automatically reply with same suggestion and if not, available it replies that "waiting for doctor to respond". In the same app patient can monitor his/her medicine box for available quantity of regular medicines.

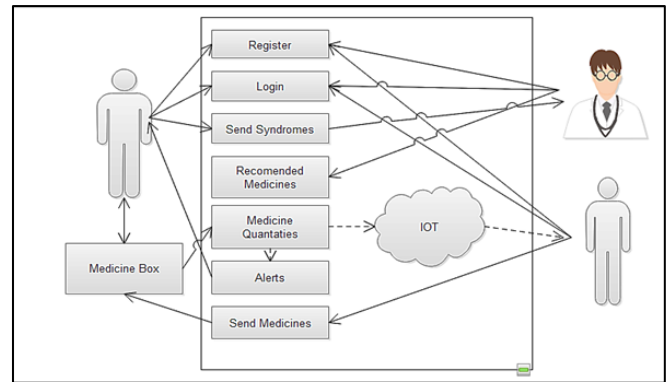


Fig. 1: Architecture Diagram

A. Medicare Box

The smart Medicare box mainly focuses to regulate and optimize the accessibility of medicine and to provide prescription in user friendly and simpler way. The smart Medicare box is an innovative approach for detection of available medicine quantity. Medicine box has a compartment and LED is attached to that compartment. Whenever the particular time slot is scheduled for medicine intake the LED will glow. The Medicare box is integrated with load cell sensor it calculates the result of the stock availability in box and notify the pharmacist about the stock availability.

The components used in the Medicare box are ESP-8266, load cell sensor, LED and a plastic box.

- 1) ESP 8266: It is a low-cost Wi-Fi module with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. It is capable of either hosting in application or offloading all Wi-Fi networking functions from another application processor.
- 2) Load Cell Sensor: It is a transducer which is used to create an electrical signal its magnitude is directly proportional to the force being measured.
- 3) LED: LED act as an output of our system giving alerts by glowing.

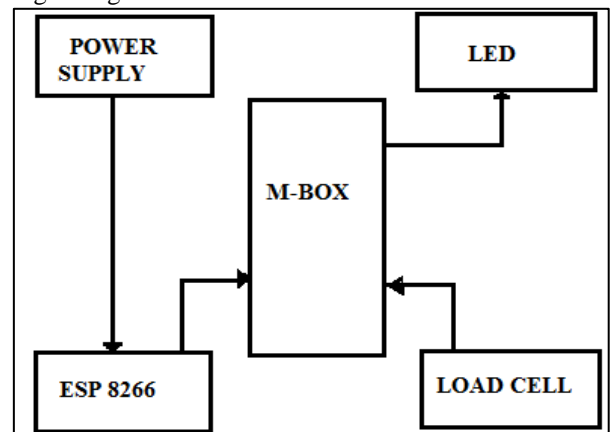


Fig. 2: Block diagram of Hardware

B. Website & Android Application

An Android Application of Medicare is developed and installed on patients and pharmacist Smartphone. Patient can easily access and monitor his own medicine stock. Website provides reliability to doctors and pharmacist keeping track of patients and it also provides ability to add, modify or delete the prescribed medicines.

IV. WORKING & DEMONSTRATION

The main functionalities include:

A. Hospital Server

Patient registers themselves by providing required details. They are saved in the server. Doctors will be registered to the hospital site. Doctor can view the Id and particular symptoms of the registered patient and recommends the dosage of medicine. All these get notified in the server and notification's get updated. In android app of a patient. Pharmacist have to register through the site and can also login through application.



Fig. 3: Hospital Server

B. Android application and alert

Android application should be first installed by patient and pharmacist. Login details are provided at the time of registration. Whenever there is change in dosage of medicine it will get update in application. These details are automatically updated in server. The stock availability of medicine status is updated every time and notified to pharmacist.



Fig. 4: Android Application

C. Hardware Unit

Hardware unit consist of a compartment with an LED to indicate that medicines are in low quantity. The hardware unit will notify the pharmacist about the stock availability of medicine.

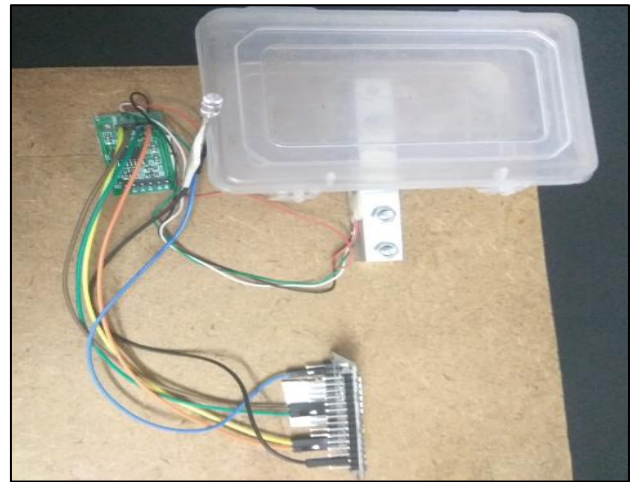


Fig. 5: Hardware Unit

V. CONCLUSION

This system will change the face of healthcare monitoring and treatment outcomes. By providing personalized and optimized services, it will promote a better standard of living. With the wide use of internet this work is focused to implement the internet technology to establish a system which would communicate through internet for better health. Internet of things is expected to rule the world in various fields but more benefit would be in the field of healthcare.

Hence present work is done to design an IOT based smart healthcare system using a processor. Nations across the world are struggling to improve patient care and it provides a timely and cost-effective response to this critical imperative. Moreover, recent developments in sensor, internet, cloud, mobility and big data technologies have led to affordable medical devices and connected health programs, vastly increasing the potential of IoT to influence further changes.

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