IoT based smart medicine kit

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ABSTRACT

This paper presents an optimal solution, the smart medicine kit for regular patients using an IoT based sensors which provides diagnostic feature. The intake of medicine by the patients are prepared as a data and stored in drive or cloud. The medication kit acts as a remainder to take medicines with timer circuit. The heart rate of humans, glucose level in blood can also be monitored with the kit, with IR temperature check and mini CPR patch sensors. Health based IoT ease the medical diagnosis.

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1. Introduction

In the busy world, there is no time for everyone, mainly elders, to take care of their health by it is not always possible for us to remind them of their medicine's dosages every time. Shifting health care monitoring system to home can help many people to save their life. In order to track the health condition of the elderly people, the proposed model will be helpful.

2. Literature survey

The IoT technology for home control and monitoring system for accessing and controlling devices and appliances remotely using Android based Smart phone app [1].An integrated networked ECG monitoring system that uses mobile computing devices and webpages as control interfaces [3].A health monitoring system consists of several sensors connected to a patient and they communicate the data through the processing unit [2]. In the project, Raspberry Pi is used as a data aggregator as well as a processor. The patient and doctor smartphone/computer are used as a monitoring system [4].

3. Proposed system

In this proposal, continuous monitoring of healthcare of is possible with the help of biosensors. A data regarding healthcare of patient is stored in cloud or drive, which could be later referred by Doctors for giving appropriate medicines. We have focus on those patients who having difficulty to take medication on time, we tried to design and to aid patients with managing their medical prescriptions, through a reminder feature with an alarm in the pill-box reminder. They will use to manage their medications.

An emergency button is also provided for informing the condition of critics to concerned person with the GSM module and IoT technology. The structure of proposed system is shown in Fig. 1 with its necessary components.

4. Required components

4.1. Arduino

Arduino board designs use different types of microprocessors, controllers. These boards contains serial communications interfaces, such as Universal Serial Bus (USB) on some models, which is used for loading programs from the computers. The microcontrollers present in the boards can be programmed using the C and C++ programming languages, using a standard API, known as "Arduino Language". It is flexible, reliable over task, since it is an open source electronics platform for both software and hardware.

4.2. Internet of things

IoT technology is most synonymous with products related to the concept of the "smart home", including home appliances and devices. IoT can also be used in the health care systems. IoT here, interconnects and interfaces various things for providing access

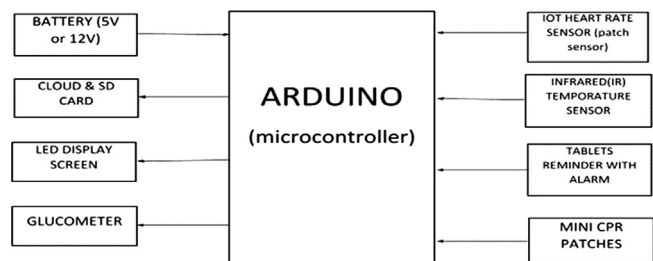M. Nalini, V. Abirami, G. Aishwarya Lakshmi et al.

Fig. 1. Block diagram of the proposed system.

at a single point. Using this patient's health status SMS alert system also added to their care takers. Whenever the patient takes any measurement from this kit the information is send to care takers as well as patient.

4.3. Pulse rate measurement

The heartbeat sensor is used to track the heartbeat. The transmission of data to Arduino and then to required devices through IoT provides diagnostic features of heart beat. Your pulse changes from minute to minute. After observing and receiving data, it will displayed in the LED screen.

The first measure of corona precaution is monitoring the oxygen level in blood so this pulse rate measurement is most important for ensuring the persons health.

4.4. Glucometer

The device is used for measurement of approximate concentration of glucose level in blood. Simple working can be demonstrated by strip of glucose paper which can be sprayed with drop of blood to demonstrate glucose level. The glucometer's recorded data will be stored collectively in the memory.

Continuous monitoring of glucose may avoid the risk of hypoglycemia and hyperglycemia so that patient's health is assured by their family members also. This meter consists of no of testing strips which is made up of a material porous fabric sometimes this may change based on the manufacturer. The alternate material used for this is polyamide, polysulfone, cellulose and polyolefin.

4.5. Temperature sensor

It monitors the temperature of patient through IR biosensor and provides the data to Arduino; automatically saved in the memory with time and date. If any abnormality shown, the data is conveyed directly to the concerned person of the respective patient.

4.6. Pillbox reminder

A smart medicine reminder system based on IoT, which provides an alarm when it is time for taking medicine. The pill box can be taken outside for refilling. The alarm lasts for about 2 min till the user switch offs after taking the medicine.

4.7. Mini CPR

CPR is an important technique (Cardiopulmonary resuscitation) for saving life during emergencies for heart related issues. The kit contains mini CPR patch sensors for the emergency purposes which is made up of PVC material, with optimum quality PVC
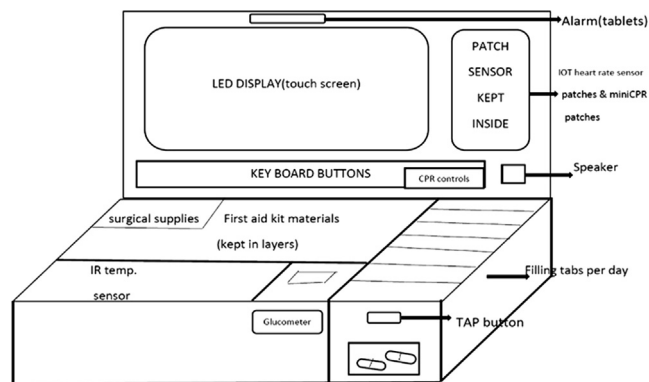

Fig. 2. Typical view of a kit.

material. This is used to recover one's heart rate and to recover breathing. This can be used for first aid purpose only.

5. Implementation

Bio sensors which is used for health monitoring is interfaced with Arduino to detect health condition of patient. The system is useful to monitor the patients. The medicine box, IoT sensors like heart rate sensors once initiated, gives alarm at required interval to denote time of taking medicine. And ease the work of doctors to handle more patients. The continuous tracking of health condition makes the patients lead a healthy life. After implementation the kit will show as Fig. 2. Which has all the facilities state above.

6. Conclusion

This paper presents an IoT based Smart Medicine Kit which provides diagnostic feature, stores the respective data of the patient in the cloud for the later reference of the doctor. It is used for the continuous and consistent monitoring of healthcare of the patient with the help of bio sensors. Those Bio sensors is interfaced with Arduino to detect health condition. The pillbox reminder help patients in managing their medical prescriptions through a reminder feature and an alarm.

As the data of the patients are monitored, emergency feature is also provided for informing the conditions of the respective patient to the concerned person through a GSM module and IoT technology. With the help of IoT and the Arduino, pule rate sensor, glucometer, temperature sensor, mini patch sensors (of CPR), the continuous follow up of the health conditions ease the medical life of the patients and ease the work of doctors to handle more patients.

CRediT authorship contribution statement

M. Nalini: Conceptualization, Methodology. **V. Abirami:** Data curation. **D. Harini:** Visualization. **G. Aishwarya Lakshmi:** Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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