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Medbox Plus: Advanced IOT Pill Organizer for Elderly Independence

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ABSTRACT: The aim of this project is to remind individuals who forget to take their medicines on time. This project proposes a smart pillbox with remind and consumption function. Which is used to give alert the user to take pills at a particular time and the pills required to take at that time comes out to the user to avoid confusion among medicines. Smart pill box can reduce elderly family member's responsibility towards giving the correct and timely consumption of medicines. This system Get the details about pills from the user and Send purchase order to medical shop by using GCM communication. Those who're very busy, as this device will now not most effective remind them of their treatments with a voice command will be generated for medicine taken at that time. The patient can store the respective time of the unique medicine by a IR sensors. Based on an RTC (Real Time Clock) interfaced to the microcontroller, the programmed time for medicinal drug is displayed on the LCD in conjunction with a voice sound to alert the patient approximately taking the medicine. The microcontroller used in this challenge is of ATMEGA328 family. RTC used maintains a correct time as it is supported with the assistance of a crystal.

KEYWORDS: Pill box, GCM communication, IR sensors, RTC in microcontroller

I. INTRODUCTION

In modern society, most of the time people remain busy in their daily life schedule. It is true that they give more preference to their work than taking care of their health. Several diseases like diabetes, blood pressure is nowadays very common. Maintaining daily medication become very difficult for old people. Sometimes younger is faced with the same problem. There are many people in our family who need constant help may it be our elderly people, younger or others. But it is not always possible for us to remind them of their medicine's dosages every time. For this purpose, there needs to be some facility for us which monitoring patient and take care. Nowadays we are all used to living technology-based life. We can use this technology in a way that will be beneficial for us. Cell phones aren't best utilized for calling but now maybe used as an ensemble of embedded sensors that together allow new packages including human services, healthcare, social networks, environmental tracking etc. Today in medical services frameworks, the usage of cell phones is turning into an expanding number of values [1]. IoT may be helpful to monitor real-time condition and IoT can be a powerful and effective paradigm to store data collected by sensors devices to the cloud. In our project, the IoT enabled device will control the overall monitoring system. And developed an android application which help patients by reminding medicine in take time and so on.

II. EXISTING SYSTEM

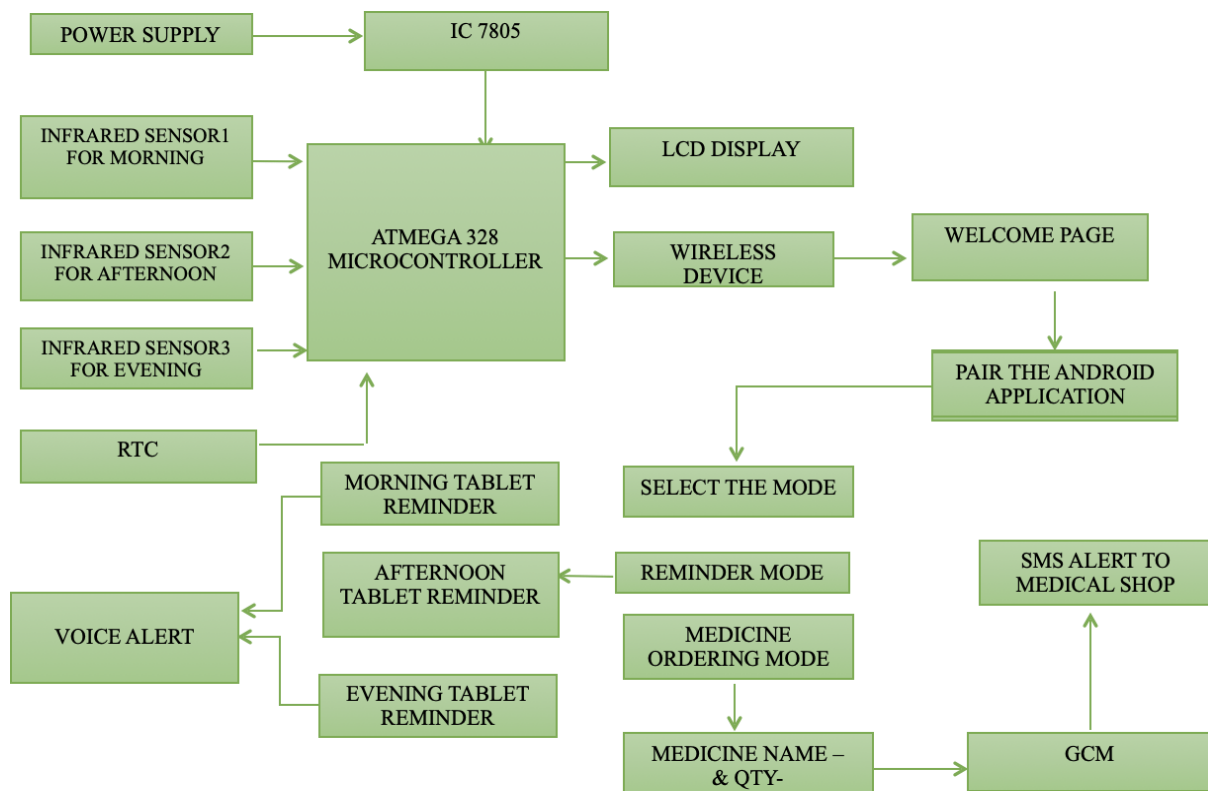
- In daily life, People have trouble remembering the pills they need to take from the bag of medicine.
- Multiple times the problem is the time required to take medicine is not printed on the box of medicine or they couldn't read English. People also have a habit of sometimes forgetting to take pills. Due to this, some medicines expired.

- Most patients with chronic diseases need to take medications over a prolonged period of time in order to stabilize their conditions. Ensuring that the patients consume the right medication at the appropriate time becomes crucial.

III. PROPOSED SYSTEM

- In this system we have to set the pill time for required medicine by using RTC and IR sensors.
- The real-time clock gives continuous time as an output. Monitor the time continuously using a Real-time clock to identify the pill time. If the system time matches with pill time, the system shows that that it is time to take a pill and generate voice alert to take medicine.
- If the person want to the purchase the medicine by clicking the medicine ordering mode and purchase order medicine details sends automatically to medical shop by using GCM communication.
- The proposed prototype system consists of microcontroller, LCD, IR sensor, RTC system and voice alert system. The brain of the system is microcontroller which controls the function of the system and performs all the tasks. No external peripheral devices and memory devices are required. Initially ATMEGA 328 the based unit interfaces with LCD display.

IV. BLOCK DIAGRAM



V. WORKING PRINCIPLE

There are various medication systems which are in use currently. They depend on various stages and ideas. There is a medicine update framework, My MediHealth which has been created for children. It is made available on mobile

phones such as personnel digital assistance. It is a mobile application that gives Graphical User Interface to design drug schedules and alarm system to remind the patients, about time and other details. Zao et al. have created application - a smartphone application intended to help patients to avoid prescription organization mistakes. Prasad B has proposed an Application, 'Medicine update expert'. This App has a limit of 15 updates. A patient can select these updates while rehashing or Non-rehashing caution designs. Between the two caution designs at a time should be selected. The duration between two caution designs should be at least one hour. A reminder shall be delivered at the schedule time. This reminder could be caution vibration or LED sign

Hamida et al. have recommended a secure and efficient in- Habitation Wearable insomnia monitoring and diagnosing system (2013). The sleeping data of patient at home could be received by Remote clinical background system with the help of recent technology like an experimental estimation of communication and security measures protocols in terms of security and overhead.

According to Ray, (Home Health Hub Internet of Things 2014), health is one of the most important part of the life span. Making life easier is one of the most desired thing that humans want to achieve with the help of recent development of IoT. The novel framework designed by Ray, helps to monitor the health of old people at their residence places through this H3IoT system.

Again, according to Al Majeed et al. (Home Tele Health by IoT, 2013], IoT helps in real time monitoring of health condition. The related devices can sense, transfer data and do analysis in order to perform healthcare process. In this proposed system, they are using cost effective feasible algorithm to minimize the complexity in order to process huge data. These data are being generated by imaging devices, sensing devices and Human interaction.

Huang et al. [2014] proposed an intelligent Pillbox system for elderly people. The purpose of this work is to provide safe and secure medication on time. Moga et al. [2015] recommended an internet based control, monitoring, low cost embedded system for a smart home. This work is using distributed sensing and control system to make this system user friendly and remotely accessible. It provides a very user friendly touchscreen application to perform all events.

The personal activities and independence can be well managed and improved by AT(Assistive Technology) to do better. But very few people know and access assistive Technology, because it is costly and there is lack of training, availability, and awareness. As per a survey, 2 billion people will require at least 1 assistive product by 2050. In the same time, the older people may need 2 or more assistive products. Jaun et al. have proposed "The Intelligent Pill Box". They explain how to design and implement Assistive Technology devices using open source technologies. This provides a new way to manage medication dosages. They used Arduino Mega 2560 as main controller. This assistive technology provides more option for taking the medicine. It is based on an automatic alarm system, that uses interacted interface and notice system via GSM network. A pillbox based on an MCS-51

micro-controller can send out medicine using a stepper motor at a scheduled time, but there was no provision to record the time when the patient took the medicine. Sawand et al. has proposed a architectural frame work to handle life cycle and important service components of e- healthcare. They used the new technologies likes IoT, WBSN (Wireless Body Sensor Network) and cloud computing to collect data, to transmit and to analyze and finally store to the cloud center for further use. Ahmad et al. proposed a solution where the fog and edge computing has been used in 5g and IoT system. Self-addictiveness and resilience in cyber-physical systems is the key concern in their research Abdallah and Fayyoubi have developed a mobile application to assist dumb and deaf person in daily life activities They are using Arabic language as medium of interaction. They used the concepts that the people with special needs communicate with normal people by choosing the sign images. Al-Haider et al. have recently proposed a "Smart Medicine Planner for Visually Impaired People"[15]. Their proposal may helpful specially for blind and elderly person to manage the daily medicine dosage. Dispensing and Alarming are two main parts of their whole system. Google Cloud is being used to store the recorded voice and recognizing in the application. Raspberry Pi3 with Bluetooth connections are being used to communicate between their Smart medicine planner and voice box.

Finally, we studied extensively the existing problems in the current methods and proposed systems. We have tried to solve them and developed our novel Pill reminder and monitoring system

VI. SYSTEM SPECIFICATION

Software Specification

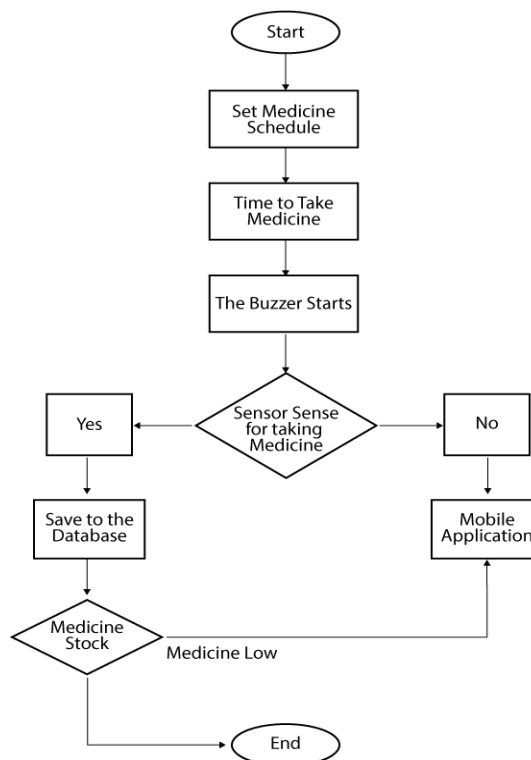
ANDROID APP

- Front end : XML frame
- Back end : JAVA code
- Software : android studio

Hardware Specification

- Atmega 328 microcontroller
- Power source
- IR sensor
- LCD display
- Real time clock
- Bluetooth device

VII. FLOW CHART



VIII. CONCLUSION

To improve medication safety and to avoid confusion in taking tablet among the elderly, this project proposed a smart pillbox with remind and confirm functions. The proposed pill box can reduce family member's responsibility towards ensuring the correct and timely consumption of medicines.

Because the proposed pillbox containing an voice alert sound to the user for a particular time and real-time clock gives continuous time as an output. The objective of creating a device that allows the organization of several medication schedules, automatic opening system and an effective notification system, is reached. We have demonstrated a mobile application that generates alarm signals to remind a patient to take medication. We focus on helps patients and improving the monitoring system. The application Medicare is easily accessible. Combination of a sensing system with android application helps us to measure how well a patient can take their daily medication in real-time. The availability of sensors and other medicinal services gadgets (IoT) work better in consideration of patients. It allows real-time monitoring. Better compliance in terms of the taking of medicine can be acquired with the use of our proposed framework. This framework assures the security of the patient, prevent wrong dosages, support medication adherence. As a future work, we are wanting to improve our drug update framework by presenting extra highlights utilizing portable application and incorporate other medical

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