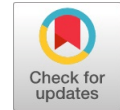# Design and Development of Smart Medicine Information System

Rakesh Kumar Pattanaik, M.Kathirvelu, T.Govinda rao

Abstract: Now a day's people are forgetting to take their medicine due to busy in their work or old age peoples can't remember the medicine timings and dosage of medicine. The healthcare services are using intelligent equipment's for continuous monitoring of in-house patients. To overcome this situation an intelligent home based medicine box system with wireless connectivity along with an android application is proposed to help patients by getting prescribed medicine in time automatically. In the proposed system, manually one can set the medicine to be taken at different timings through the Android app and it will be transferred to microcontroller through Bluetooth of Technology. The proposed system will have medicine tray and in build real time clock which makes an alarm at the set period and controlling mechanism will open the corresponding boxes. The alarm will be switched off automatically once the medicine is taken from the medicine box. The application software will provide the voice message in case of patient is disabling in their eyes. The same information is conveyed to the duty attendees and predefined guardian for necessary action through the Internet of Things.

Keywords: Smart medicine box, MIT aneroid app, HC-05, Rack and pinion, Bluetooth of Technology.

I. INTRODUCTION

Inevitable human administrations have been seen to be the bleeding edge kind of social protection, and coursed, calm driven and independently directed thought is underscored as a choice as opposed to the standard hospitalized, staff-driven and capable managed care [1]. An in-home medication management and healthcare system based administration and social insurance framework dependent on wise and intuitive bundling (I2Pack) and savvy medication box (iMedBox) is introduced in [2]. By utilization of a shrewd pharmaceutical bundling [1] which is fixed by Controlled Delaminating Material (CDM) and constrained by remote correspondence, the preventive prescription administration is controlled. The intelligent medicine box [2-3] works not just as a conventional in-home prescription compartment, yet additionally as a "medicine reviewer", and an "on location inspector" in day by day checking. The main purpose of the Health-IoT [4] system is to track every package of medicine, record the medication activity of every tablet of capsule, and present all prescription information related to the patient.

This system carry the capacities and benefits of IoT with affordable [1] cost and in a natural manner. The upcoming age of bundling is called as I2Pack which [6] can interface with clients by incorporating FID, detecting, vitality collecting, correspondence, show, acting and different capacities and other functions onto traditional packaging. The I2 Pack [6] can be doled out more obligations notwithstanding the containing and ensuring of products. A variety of CDM movies and relating control circuits are included can be have a huge effect contrasting with customary RFID-empowered bundles [7] to the I Package. The change of the data conveyed by the bundling from static to dynamic [8] and the progression of data will change from single-directional (item to-purchaser just) to double directional (both item to-customer and shopper to-item), and the job of bundling will change from "aloof" (just constrained by buyer) to "active"(self-controlled or remotely controlled). By presenting a shrewd prescription gadget (SMD)[9] patients , principally elderly folks individuals can take as much time as necessary without the likelihood of missing pills, and furthermore lessens the danger of over and under dosing mishap . The habit of not taking medicine correctly can have serious consequences such as delay in recovery, illness and even death. This smart device can educate people by providing direct communication between patent and the duty attendees and guardian by notifying if in case patent miss their medicine. A wise locally situated stage the (i-HOME) [10]health – IOT can be actualize to take care of the medical issue and reminding medication to licenses in home as it were. This shrewd framework convey some favorable position, for example, ,an open-stage based astute medication box(iMed-box),an savvy pharmaceutical pressing (imed-pack)with correspondence ability, adaptable and wearable bio-therapeutic sensor device(bio-patch)enable by the best in class infuse printing innovation and framework on chip. Utilizing of advanced mobile phone sensors[11] for sense and transmit significant information identify with patent can accomplish a compressive stage in human services and (m-wellbeing) engineering by proposing another schematic model (e-wellbeing) for patent named as k-social insurance model by utilizing four layer, for example, the sensor layer, the system layer, the Internet layer and the administrations layer. Another administration to incorporate the e-Health and IoT with the assistance of administration science indicated by SSME/IoT/wellbeing. The e-Health administrations can be conveyed through 3phases [12] utilizing various measures and conventions, for example, XML-RPC convention, SIP and XMPP convention, RTP, HTTP, UDP and TCP/SCTP. A wise medication box is proposed in this task, one ought to allocate drugs to specific boxes through aneroid application and can set distinctive clock for endorsed

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prescriptions in an equivalent Bluetooth application. As per the clock the appointed box will open and offer drug ,a buzzer can be actuate after certain deferral until the medication has not being taken and a message will sent to attainder just as the screen. This model valuable in medicinal centre yet also obliging for old people at home.

II. SYSTEM ARCHITECTURE

The architecture of proposed system is shown in figure1. The focused area of this is project is on Bluetooth of things for wireless connectivity. Bluetooth Communication is a 2.4GHz frequency based RF Communication with a range of approximately 10 meters. It is one of the most popular and most frequently used low range communication for data transfer, audio systems, hands free, computer peripherals etc. MIT App Inventor for Android is an open-source web application originally provided by Google. A rack is a rectangular bar which on one side is provided with teeth, such as a gear; basically a gear with an infinite radius. The pinion, a small gear wheel, which is in contact with the teeth roll over the rack and linear movement is madeA relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays.
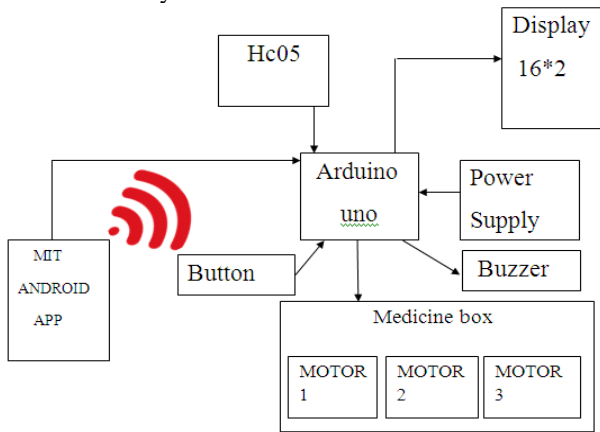

Fig.1: Block Diagram of Smart Medi- Box
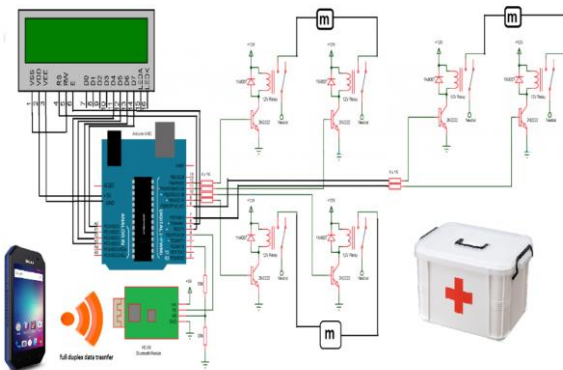
III. EXPERIMENTAL SETUP OF SMART MEDI-BOX

Fig.2. Circuit Diagram of Smart Medi-Box

The circuit diagram of smart Medi-box is shown in figure 2. The Arduino board controls the whole process by taking input from Bluetooth. In this project an android mobile is used as a wireless communication device to microcontroller. The android mobile starts transmitting the signals according to the time interval as real time clock which is designed in the

android application software. That mediator transfers the data through a full duplex communication process. According to the Bluetooth's performance the transmitting and receiving of data ,the microcontroller receives the command signal as" 1" or "2"or" 3" . "1 "is the command to perform relay to make the motor to rotate in the clockwise direction and vice-versa. Whenever it receives the two signals it rotates as counter clockwise direction. When the android mobile generates a mobile signal according to the android application software settings of date and time, then it starts automatically transmitting signal as "1" or "2" or "3" this signal will directly receive by the Bluetooth and Bluetooth starts transmitting signal to the microcontroller. When a reset switch is pressed, the motor automatically comes back or rotates counter clockwise direction. In this project there are three motor and six directions are used. For six directions there are six relay are used. The direction clockwise and counter clockwise will start the locomotion of the power supply.

IV. PROCESS DIAGRAM OF SMART MEDI-BOX

The process starts with identifying, how transmission takes place between aneroid mobile and a microcontroller wirelessly. The transmission medium used in this process is called as a wireless communication. In this project an android app is developed for a clock timer. The timer is designed by "android studio" and the process of designing is called as companion. Additionally speech to text conversion will helpful for blind people. The front end screen of mobile android app is shown in figure 3 and back end process is shown in figure 4. The process flow diagram of signal transmission of android app to the Bluetooth is depicted in figure 5.
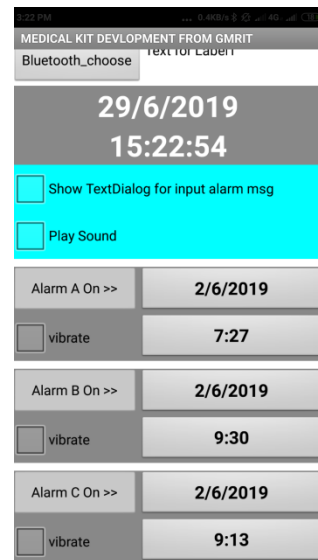

Fig.3: Front End Screen Of Android App
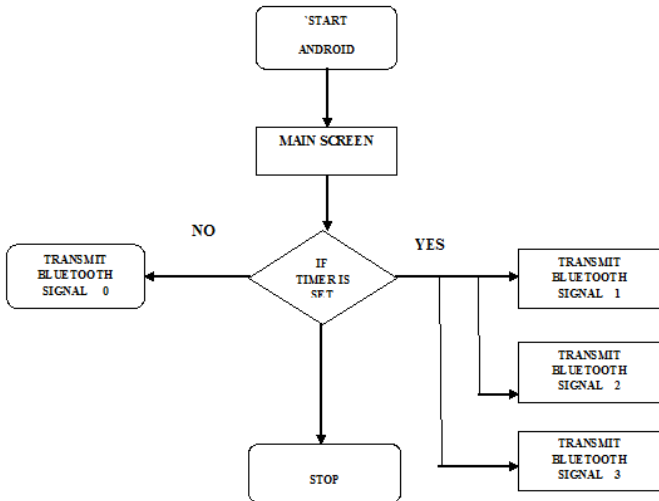
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Fig.4: Back End Process of Android App

Fig.5: Process Diagram for Signal Transmission from Android App to Bluetooth

Different medicine boxes are assigned with different alarms to indicate the medicine to be taken at different intervals. The Arduino controller will activate the corresponding motors to open the medicine boxes in forward and reverse directions.

V. RESULT AND DISCUSSION

The designed system was implemented with prototype hardware and tested with different medicines assigned to the box. The demonstration of working of the project is given in figure 7 to figure 14. The LCD in the system will display the "Box No", "Assigned Medicine Name", "Dose According to Age Group. The Android app in the system is useful to set the desired amount of medicine to be taken at different intervals. The screen shot of front page of App and display of medicine LCD is shown in figure 7 & 8.
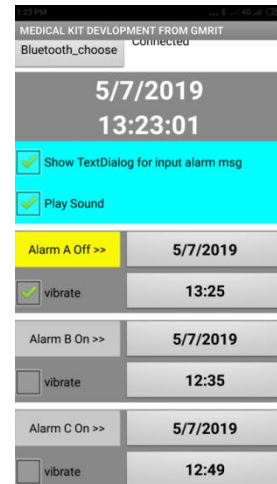

Fig.7: Android App Screen For Setting of Date, Time and alarm.

Fig.8: Display of medicine in LCD

The medicine box open at set time and alarm also start beef to indicate the patients to take the medicine. The screen shot of opened medicine box is shown in figure 8a and 8b.

(a)

(b)

Fig.8 (a): Opening of "Box A"
(b):Medicine in box A-Digene Tablet

Similarly, medicine for box B and C will set through android app and it was opened at correct time is shown in figure 9 to 10.
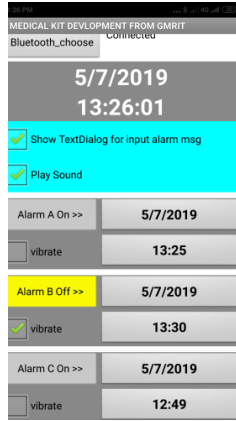
Fig.9: Android Screen for Setting of Date, Time, "ALARM-B".

Fig.10: Opening of box B and its medicines

The clock wise rotation of the DC motor makes the rack and pinion to open the box and its anti clock wise rotation makes the box to close it. The direction and delay time for opening the boxes is shown in figure 11 & 12
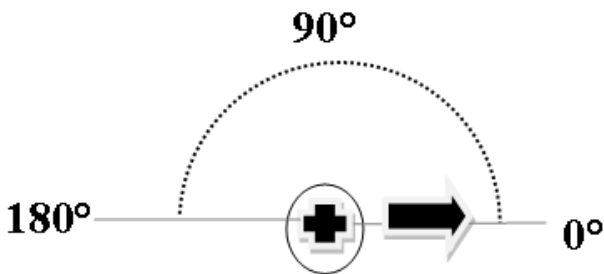

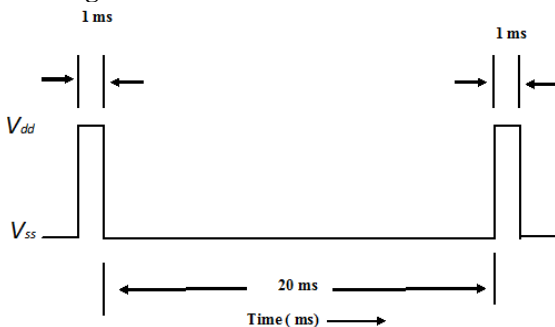**Fig.11: Clock Wise Direction of DC Motor**

Fig.12: Delay Times for Opening of Boxes

The time taken for opening of boxes with delay of 20ms is shown in figure 12. After the timer completes its counts then the rack and pinion makes the boxes to move forward direction. The Anti-clock wise direction of dc motor makes the rack and pinion in backward direction to close the boxes. After the reset button pressed by user will make the boxes to move backward direction.

VI. CONCLUSION & FUTURE WORK

In this paper, an interactive and intelligent medicine information system is presented. The proposed system is much useful to the old age peoples to remind the amount of medicine to be taken at different timings. The system was controlled through mobile app and microcontroller. The Bluetooth of things" is main fuscous area of this project as it is a communication path between android mobile and midi-kit. To design suitable application software for android mobile MIT app inventor is used. In future, it can be extended to internet based system for controlling the system from anywhere in the world.

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