

Smart Medicine Box for Old Age People

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Abstract

Health care services based on Internet of Things have great potential in medical field. Proper Medication is necessary to become a healthy but failure of that can create big trouble for a patient. This is extremely problematic for the elderly patient who had problem in keeping track of their medicine. So to overcome this we made this Smart Medicine Box which keep tracks of the dosage and duration between each consumption. Poor eyesight as one of the contributors for medicine consumption errors such as misdosage since the elderly finds it troublesome to read the instruction on the medicine case and identifying the right dosage of the medicine along with that memory loss is common in old age due to that decrease in speed of information being retrieved. Hence, this Smart Medicine Box will track their medication and inform patient to take right dosage of right medicine at the right time.

Keyword : *Internet-of-Things, Health-IoT, Bio-Patch, Intelligent Packaging, Intelligent Medicine Box.*

Introduction

In hospital healthcare and services can drastically reduce the total expenditure on medical care or treatment. Therefore it is urgent in near future for the healthcare industry to develop advanced and practical

Health related technologies and services. In this project, an intelligent home based platform the iHome health IoT is design and implemented and also present an IoT-based intelligent home-centric healthcare platform (iHome system), which seamlessly connects smart sensors attached to human body for physiological monitoring and intelligent pharmaceutical packaging for daily medication management.

An intelligent medicine box (iMedBox) serves as a home healthcare gateway. IoT devices (e.g., wearable sensors, iMedBox via a heterogeneous network which is compatible with intelligent medicine packaging (iMedPack), etc.) are seamlessly connected to the multiple existing wireless standards. The body-worn Bio-Patch can detect and transmit the users bio-signals to the iMedBox in real time. The iMedPack is connected with the iMedBox via a RFID link to assist the users with their prescribed medication. All the collected information is interpreted, stored and displayed locally on the iMedBox. In recent years, RFID technology has become more and more popular in the applications of ed medicine at the proper time. However, non-compliance with medication is becoming more prevalent.

Literature Survey

As people become older, they suffer from various age-related illnesses and require treatment and medication. Usually doctors suggest medicines to old age people which is daily they need to take. But as per the survey did by S. D. Neupert et al., it has been higher chances that old age people forgot to take their medicines. To address this issue Andrew Y.J. et al. proposes the first electronics device called as MedMinder which makes the announcement about how to take a medicine in a day.

To identify the objects in the Ubiquitous Computing Christian Floerkemeier et al. and Kay Romer et al. proposes a scheme for smart box. Tools kept in the box can be found with the RFID system. Jos M. Reyes Iamo et al., proposes a complete system which is called as MISS: Medicine Information Support System in the Smart Home Environment. MISS is composed of three subsystems: The Doctor Subsystem, the Pharmacy Subsystem and the Smart Home Subsystem. From doctor's visit system will start, after the visit doctor will upload the prescription into the system. Pharmacist access the data through RFID-enabled prescription. Pharmacist after confirming dispatches the medicine in RFID-enabled containers. At Smart Home system, checks for conflicting medicines, health condition and food items and if no conflict is found then update the data into the system which sets the remainder and other subsystems.

Block Diagram

Keypad is used for the user or nurse to enter the information of time when the smart box would send "remainder" (displaying numbers and playing synthesized voice).

The LCD screen is used to display the instruction information, the number of pills need to be taken, and the current time and date. The speaker is used to play the synthesized sound to remind the user to take pill.

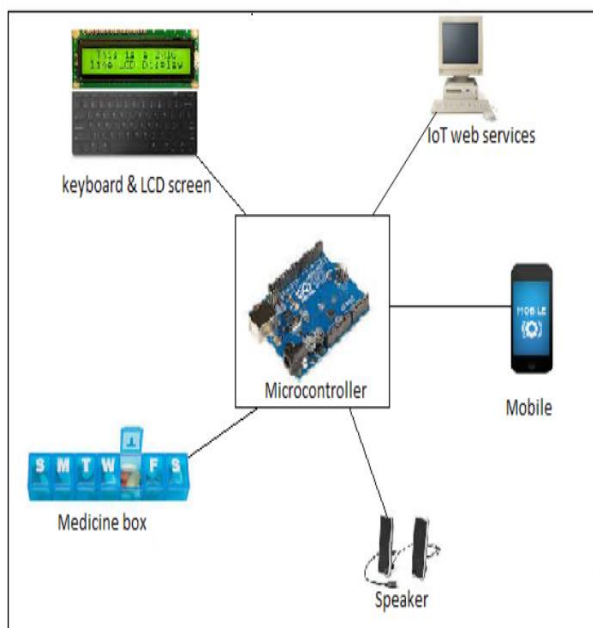


Figure 1: Block Diagram

System Architecture

People often forget to take their medicines at the right time in this busy world especially elderly people. Medicine box has three compartments. An LED is attached with each compartment. When it's time to take medicine LED from the right compartment glows. A wifi shield is attached to the arduino board which automatically updates these details to the IOT webpage. The system could be integrated with sensors. IR sensor is integrated here with the box. It checks whether the compartment is empty or not, and if empty it will update the information on IOT.

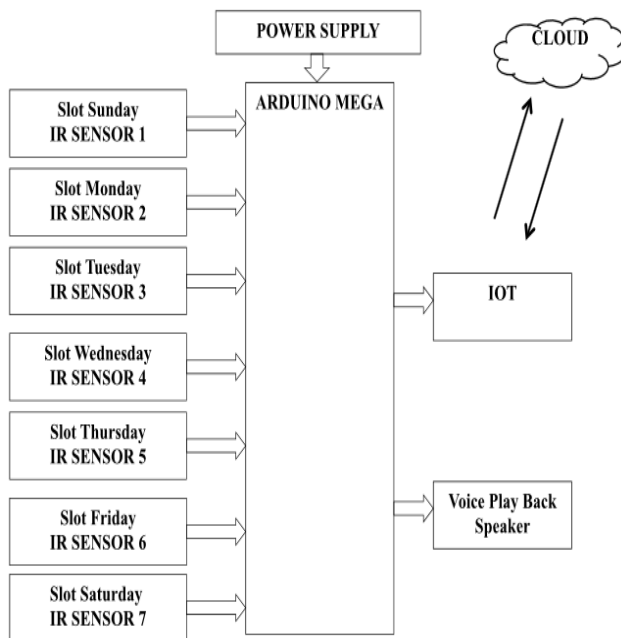


Figure 2: System Architecture

Different components used in the box are:

- **Microchip Arduino Mega :** The Mega is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins, 16 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.
- **WiFi shield :** The Arduino WiFi Shield allows an Arduino board to connect to the internet using the 802.11 wireless specification (Wifi). It is based on the HDG204 Wireless LAN 802.11b/g

System in-Package. An AT32UC3 provides a network (IP) stack capable of both TCP and UDP. Use the WiFi library to write sketches which connect to the internet using the shield. The WiFi shield connects to an Arduino board using long wire-wrap headers which extend through the shield. This keeps the pin layout intact and allows another shield to be stacked on top. The WiFi Shield can connect to wireless networks which operate according to the 802.11b and 802.11g specification.

- **LED :** LED need a pin each on the Arduino board. They act as the output of our system giving alerts.
- **IR Sensor :** An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion.

Modules of the Project

1. Patient Module
2. Microcontroller
3. Alert Module

Patient Module

In this module we develop a small kit placed at patient side. User can insert the details in the system like start of the taking medicines, internal in a day, in a week, name of tablets, etc. User need to insert all those data with the help of the 3x4 keyboard with 2x16 LCD screen.

Microcontroller

Microcontroller is the mail heart of our project. The data entered by the user in first module are stored in the memory of microcontroller. Microcontroller is responsible of controlling our system. It will get the data from user and continuously check the input data with current day and time. If match is found then it provide notification to alert system.

Alert Module

Work of this module is to provide an alert message to patient as well as nurse/care taker. We provide a beep at patient side with displaying which medicine to take on LCD screen, whereas we had planned to have a speaker module at nurse/care taker side. Speaker will provide an announcement about which medicine will be scheduled to take.

Application

The smart medicine box has many applications namely

1. Old age People who take regular medicines
2. Alzheimer Patients
3. Complex medication schedule
4. Daily task reminder
5. Patients who take multiple medicines

Conclusion

An attempt has been made to make Smart Medicine Box with very high efficiency and low cost. The designed smart medicine box would significantly release nurses or users burden, by reminding about the medicines to be taken at appropriate times. It is also helpful to old age people who take medicines regularly and vitamin supplements.

Future Work

The smart medicine box can be connected to a real time clock, so that day and date will be taken real time. Multiple tablets for each day will be kept in sub compartments and announcement includes tablets name or color, so its easy to select which tablet patient needs to take.

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