# MEDSMART-A BETTER HEALTH WITH MEDBOX

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***Abstract*- A Survey indicates that about 65% of Adults are suffering from chronic diseases and due to their hectic lifestyles, it has made both the elders and youngsters forget to intake their medicines on time, which is very much needed for their recovery from the diseases. Medsmart offers a quick fix to this affliction. It is an intelligent medicine box based on Embedded system that gives its patient a friendly reminder to take their prescribed medications on time. The Zigbee protocol transfers all the messages to be displayed. In addition to this, it also has few features attached to it.**

***Keywords- Medsmart, Embedded C, Pillbox, Zigbee, Arduino.***

## I. INTRODUCTION

Nowadays, people who are constantly in need of help can be a family member, physically disabled, visually aided, etc. Most of the elders are affected by taking incorrect pills. In addition to this, many patients suffer from blindness or short-term memory loss and forget to take their prescribed drugs at the specific time, which may affect their health physically. Excess usage of drugs and improper following of medical instructions are the situations which come across in common. People take incorrect pills and it leads to unwanted side effects both physically and mentally at times. The greatest damage is that it can harm the body parts or can even cause fatal consequences. The above problems and perceptions needs a quick fix. Medsmart is a helpful solution that makes it easier for patients to take their medications.

*1)* ***Amnesia:***

Amnesia is the most widely recognized problem with elders. It is a general term for unusual forgetfulness. One may not be able to recall upcoming events. This problem is more than enough to interfere in the daily life. It shows that 62% of the population have amnesia and is a normal part of aging. The dominant parts of individuals with amnesia are of age 60 and above. In many cases, amnesia isn't only an aging illness. According to recent survey 14% young adults, 22% middle aged adults and 26% older adults are dealing with Amnesia.

*2)* ***Missed Dose of Antibiotics:***

A doctor will not prescribe any antibiotics until and unless it is need. People tend to take antibiotics three to five times per day. But in case if they miss a dose due to the above mentioned distress or due to their busy lifestyle then it may result in improper cure of the illness. In addition to this, already missed pills or drugs should not be taken along with the next upcoming drug. This results in double dosage which can affect blood streams and may also lead to other side effects. Looking the other way round, skipping the missed dosage throughout the medication just because they missed it once is not a solution either. Sticking on to the regimen will help a person to recover from their disease or problems as soon as possible.

## II. EXISTING METHODS

[1] The existing system uses matrix bar code and RFID (Radio Frequency Identification) tags. These are disadvantageous as the patient needs to scan these tags when taking their medicines each time. This can be difficult and time consuming. The cameras used to scan the tags are expensive.

[2] In another system named Smart Pill Box (SPB), it is integrated with a Webduino Module which uses wireless fidelity routers and signals to connect to the internet and is demonstrated to be more expensive.

[3] Another method demonstrates that the detection of pill consumption is based on opening of the pill box. Thus if the patient opens the box and does not consume the pill it leads to a wrong prediction that the pill has been consumed.

[4] The Smart Pill Box is used to check and make sure whether the patient has taken the right amount of antibiotics at the right time. This paper hasn't proposed a method to notify the patient's remote relatives about the missed dosage of the patients.

Med Smart takes into account these shortcomings and tries to overcome them.

## III. PROPOSED SYSTEM

In this proposed system, the BUZZER sounds an Alarm to remind and aid both able-bodied and blind or visually impaired patients. It also alerts partially deaf patients i.e. people who use hearing aids. VOICE PLAYBACK module helps in reminding the patients especially the visually impaired people about the dosage details. LCD displays the pillbox details.

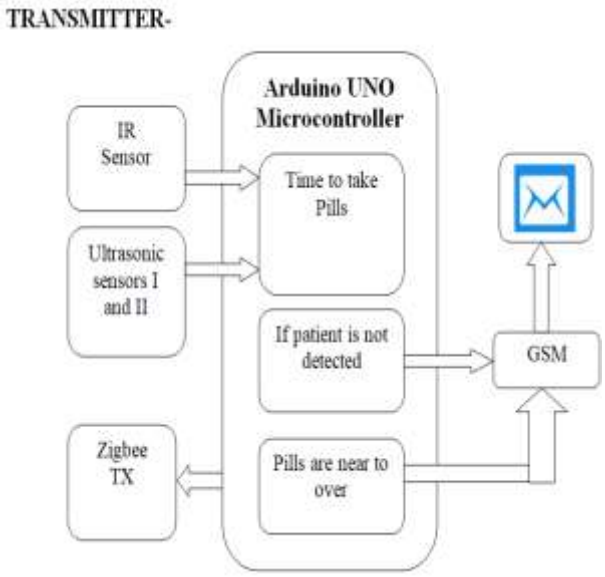


Fig.1. Hardware architecture of Medsmart (Transmitter)

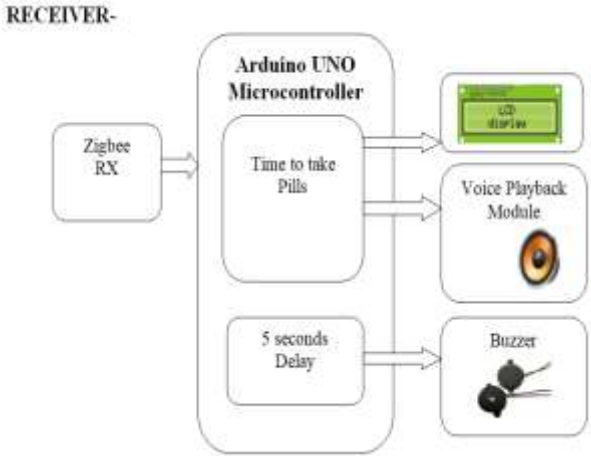


Fig.2. Hardware architecture of Medsmart (Receiver)

The system uses ULTRASONIC SENSORS and IR SENSOR which is the main advantage. The infrared sensor indicates whether the medicine is taken or not and the ultrasonic sensors by measuring the distance between the pills and the box senses and sends refill notifications to the mentioned pharmacist. Initially, the patients have to open the box as per the instructions given by the voice playback and LCD displays the pill box details. The buzzer sounds at the time scheduled for the patient. In case of missed dosage it sends SMS to neighbours and distant relatives. As mentioned before, the pharmacist is notified automatically about the refilling part through SMS when the box becomes empty.

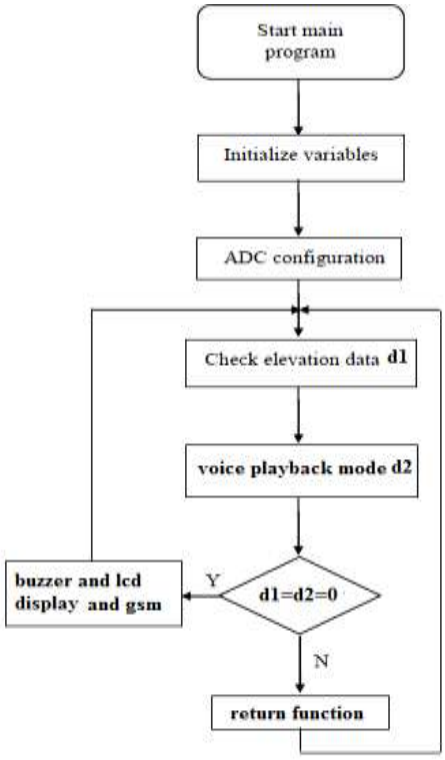


Fig.3. Flowchart

### *A. System Design*

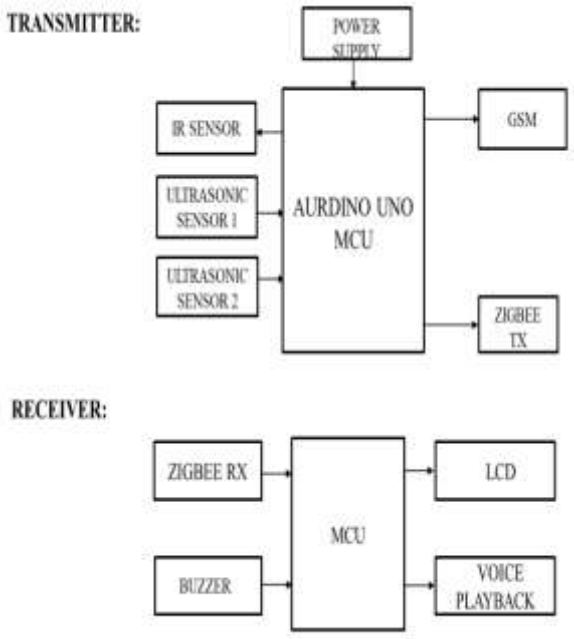


Fig.4. Block Diagram

### *B. Block Diagram Description*

**Power Supply-** The Arduino is powered by a 9-12 V power supply. Here regulated power supply which is a combination of transformer, rectifier and filter.

**Arduino Uno-**It is a microcontroller unit of type ATmega328 microchip. The operating voltage is 5V and the input voltage is 7-12V.

**Ultrasonic Sensors-** HC-SR04 ultrasonic sensor using sound waves determine the distance of each boxes thus helps in refilling process.

**IR Sensor-** It checks whether the patient have consumed the pills or not by sensing and notifying the remote relatives and neighbors through messages.

**Zigbee-** It acts as a wireless transmitter/receiver. The message which is to be given to the voice playback and LCD display is transmitted through this module. The cost is less and it uses less power which is the main advantage. Its maximum range is 100m and has a data rate of 250kbps.

**LCD display-** The liquid crystal display (LCD) is used to display the name and number of pills to be taken at that time.

**Voice Playback (**APR33a3)- It has same data fed into LCD. User can record and playback up to 8 voice messages. It is integrated mainly to help the visually aided.

## IV. RESULT

The system is less complex and is easy to use, thus even illiterates are able to use this system efficiently. Pill consumption is detected in a proper manner. This system can also be used by visually impaired and partially deaf people.

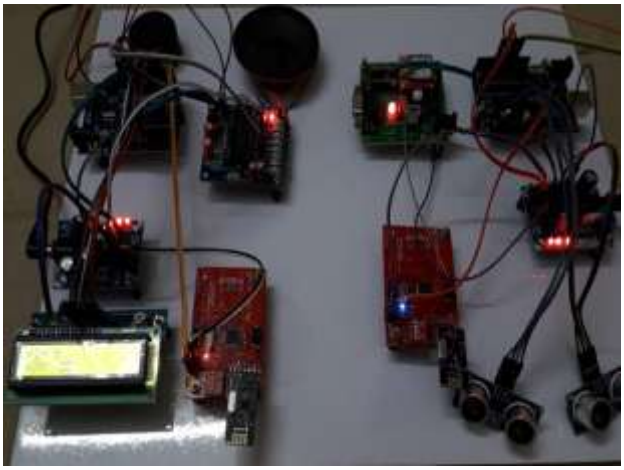

Fig.5. Medsmart

## V. CONCLUSION

This paper provides a solution to overcome the medical crisis faced by people. Medsmart contains separate compartments for each pill. It helps the patient in pill consumption by specifying the correct amount of pill and time to take it each day. Medsmart has been developed mainly to support patients who have different categories of chronic diseases. It uses a microcontroller platform and has been justified to work adequately. The major advantage of this box is that it has less complexity so that even illiterates can use it easily. Thus, this implementation is a very useful step in the field of medicine which in turn reduces the death rate ultimately.

## VI. FUTURE SCOPE

- The system can also be implemented using IOT technology.
- Instead of using ultrasonic sensors, weighing sensors can be used for more accurate results.
- Automatic emergency notification system can be implemented**.**

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