

# Automatic Medicine Teller

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**Abstract:** Nowadays, it is necessary and also mandatory to give care and medication to geriatrics. Automatic Medicine Teller is designed specifically for geriatrics to do their work independently. It prevents them from taking wrong medicine at wrong time. The main components used here are - a raspberry pi interfaced with a buzzer, IR sensor, a speaker and also with a GSM. In this design, three boxes are used, in the beginning the boxes are filled with the medicines for three sessions manually by their care taker. This device will remind the geriatrics to take correct medicine at appropriate time. This will remind the geriatrics to take the medicines correctly. The programming language used here is python. Initially a buzzer sound is intimated at a appropriate time. This sound will remind the geriatrics to take the medicine. The IR sensors are placed in each box, when the user takes the medicine within the prescribed box it does not intimate anything, else a voice message will intimate them from the speaker that they are taking the wrong medicine. When the medicine counts below certain value the message will send to their caretaker to refill the medicine through GSM. The main objective is for illiterate people and geriatrics who is suffering Alzheimer's disease.

**Index Terms:** Raspberry pi, Geriatrics, IR Sensor, Buzzer, Speaker, GSM, Boxes

## 1. INTRODUCTION

IN today's world, the lifestyle of human varies person to person. They are living a lifestyle were human gets affected easily by a lot diseases and the lifetime of human decreases due to their improper lifestyle. When a person grows old he gets affected by lot of disease due to his less immunity and improper diet. Geriatrics fail to take their prescribed medication at proper time. This can lead to decrease their health drastically, causing further increase in their illness. Medical adherence is that the patient and the geriatrics take their correct medicines correctly at appropriate time. It is necessary and mandatory for the patients and geriatrics to take their medicines correctly for the better improvement of their health. Medical issues arises when the patient fails to take their correct medicines because of their poor health condition and sometimes due to poor treatment. To solve these problems, automatic medicine teller is used, this is one such approach to help the geriatrics to help them in their home when they are alone and to function. independently. This will help the geriatrics to take their medicines correctly to improve their health gradually. This device is mainly designed for Alzheimer's patient. It is very simple and easy to use, this is also of low cost and this is mainly designed for geriatrics to use in their home. Because, today people are becoming more busier and they fail to take care of their elders in their home and they feel very difficult in spending time for them. To regret their mistake, this design will be very helpful for them to take care of their own parents and grandparents in their home. This will be very useful for the geriatrics to function independently without any support and they will also feel comfortable in their living.

## 2 LITERATURE REVIEW

KaleSapna Shin et al (2013) proposed, an Android base application is used for the patients. This application will remind the user to take their correct medicines at appropriate time by setting remainder in the mobile which is an automatic manner. These remainders will be spontaneously set by the application as per the prescription. This reminder will remind the patients to take the medicine competently. The young people are benefited more than the illiterate people who don't know about the usage of android mobile phones. The device used in this system is costly and the process of creating the application in android mobile is tedious[1].

Priyadarshini Shin et al(2015) developed novel idea to provide the information automatically to patients to take their right dosage at appropriate time. Nowadays, most of the patients may forget to take their medicines as per the prescription due to mental stress. Hence, it may cause prolong period to recover from the diseases. Sometimes, the aged patients are gulping the tablets and their dosage level incorrectly causing a severe problem. Hence, it is necessary for the patient to take proper medicines at precise quantity and time. To overcome these problems, a novel Automatic Medication Remainder (AMR) system is proposed. This system uses a normal 4x4 matrix keypad. Microcontroller(Master IC & Slave IC),LCD displays and Real Time Clock(RTC) module and an alarm system used to intimate the patients to take proper dosage at right time. The master microcontroller is interfaced with timer, LCD display and 4X4 matrix keypad used to store the details of the prescription of a particular patient. The slave IC is used to engross the instructions from Master IC and it would work as per the instructions. The Portable and economical AMR system would help aged patients especially to the illiterate people[2]. Corey McCall Shin et al (2016) proposed a system to design Arduino mega based medicine reminder which helps the geriatrics to intake their medicine in correct time and quantity. Assistive Technology(AT) improves the functioning of the individual and their independence. It is observed that nowadays people are more concerned about their work than their health. It is a integration of digital and physical remainder that helps the people of any age, but it is especially helpful to aged people who forget of taking their medicine. The major products are Arduino mega 2560, GSM module, speaker, RTC, APR33A3 and LCD[3]. Bhavadharani Shin et al(2016) proposed a system that will help to monitor the geriatrics to do

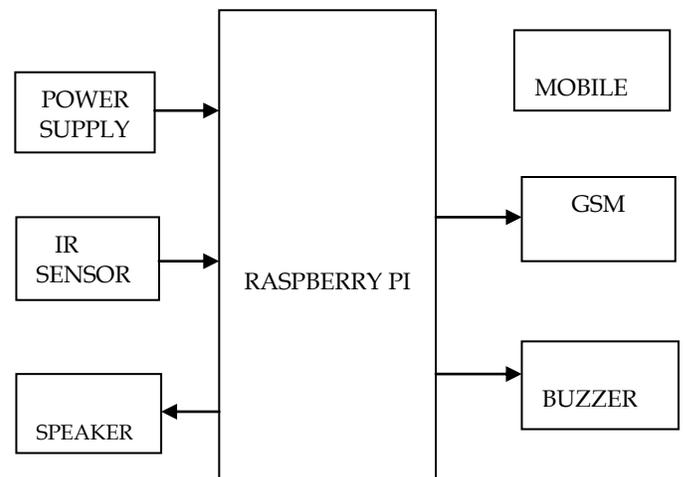
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their work independently. In the proposed system the health of geriatrics is monitored continuously and the obtained result is transmitted to PIC microcontroller. The embedded processor will store the information about the geriatrics in the database. If any change found in geriatrics an alarm sound will be produced[4]. Deepthi Ameta Shin et al(2015) proposed an android based alarm system. Its aim is to create a interaction between patients and doctors. As the user don't take the medicine at an appropriate time it will help the user to take the medicine by setting alarm in the android mobile phone. The alarm can be set for the multiple number of times based on the user convenience. An alert signal is send through E-mail or message. It also helps the patients to know the availability of the doctor's. Based the doctor's availability it will helps the patients to take care of their health [5]. Surender Reddy Shin et al (2017) proposed a system that will reminder the user who don't take the medicine at a appropriate time. This system is suitable for the geriatrics and the people who forget to take their medicine. It reminds the user to take medicine using buzzer and making call at the appropriate time. The LCD is interfaced with the microcontroller which helps the user to take a correct medicine at correct time [6]. Kuperman GJ Shin et al(2007) proposed a method for medication related-decision support. Here, Basic decision support includes drug checking, basic dosing guidance. Advanced decision support includes dosing support for geriatric patients, guidance for medication-related laboratory testing, drug-pregnancy checking. The recommendations for delivering effective medication-related clinical decision support addressed to healthcare organizations, application and knowledge base vendors, policy makers, and researchers[7]. Marike Hettinga Shin et al(2013) proposed a study where, if Real time medicine monitoring with customized SMS reminder had an effect on the adherence level of people with epilepsy. They have found a higher adherence level for people receiving these customized SMS reminders, compared to monitored patients not receiving the reminders. They also feel more adherent and decrease in the severity of their health and experience better health[8]. KeeHyun Park Shin et al(2012) proposed a method where a medication reminder synchronization system that consists of medication reminder agents installed in medication reminders and a medication reminder manager installed in a medication server. The system provides a patient with medications as prescribed by medical staff. The staff can remotely send messages to the system in order to change the medication schedules or device configuration settings embedded in the medication reminder. The proposed system supports the open mobile alliance, data synchronization protocol, which was originally proposed as a DS standard protocol that synchronizes data between mobile devices and a central server. Here, the OMA DS protocol is redefined and extended to transmit the patients medication status data and the device configuration data [9]. Tsai PH Shin et al(2008) proposed a method where two families of algorithms for scheduling medications that interact with each other. All algorithms accept as input medication directions that have been compiled into a machine readable form. One family of algorithms is called One-Medication-at-a-Time, or OMAT. As the name implies, an OMAT algorithm produces a full schedule for each of the user's medication in turn. Algorithms in the other family are called One-Dose-at-a-Time (ODAT) algorithms. An ODAT algorithm schedules one dose at a time without prior knowledge, or with limited knowledge, about future doses. It

may fail to make good scheduling decisions compared with OMAT algorithms but can better accommodate dynamic variations in user behavior. Data presented here on performance of the scheduling algorithms in terms of success rate and schedule quality can help builders of smart medication dispensers and scheduling tools choose among algorithms and tradeoff merits along different dimensions[10].

### 3 PROPOSED SYSTEM

The proposed methodology is done with Raspberry pi module, where the hardware model involves filling of medicines in the appropriate box for all session like morning, afternoon, night. An IR sensor is fixed in each container. When a power supply is given, the buzzer will gets ON at a particular time and the patient can take the medicine. Once the patient takes the medicine from the box the buzzer gets stopped. If the patient takes the medicine before the specified time, the buzzer will not make any sound. When the patient takes the wrong medicine in the nearby container, there will be a voice intimation that the patient is taking the wrong medicine. When the tablet count reaches a certain value that is, when the tablet count goes down an SMS will be send to the mobile phone of the caretaker of the patient through GSM as 'Refill the medicine' in the box.



**Figure 3.1** Block Diagram of Proposed System

The Figure 3.1 shows the block diagram of the proposed system. This system is used to remind the patient to take the medicine correctly. This system is made use of Raspberry pi module, in this system when the specified time is arrived a buzzer is indicated to remind the patient to take the medicine. Its hardware setup involves filling of tablets in appropriate boxes for all the sessions like before and after breakfast, lunch and dinner. If the patient does not take the medicine at a particular time, the buzzer will intimate the patient to take the medicine. Once the patient have taken the medicine the buzzer will stop its buzzer sound. If the patient takes the wrong medicine in the nearby tray, a voice will intimate the patient that they are the taking the wrong medicine. If the sensor is detected every time count value of the tablets gets decremented. Once the tablet count reaches a certain value a message will be send to the caretaker of the patient through GSM to refill the medicine.

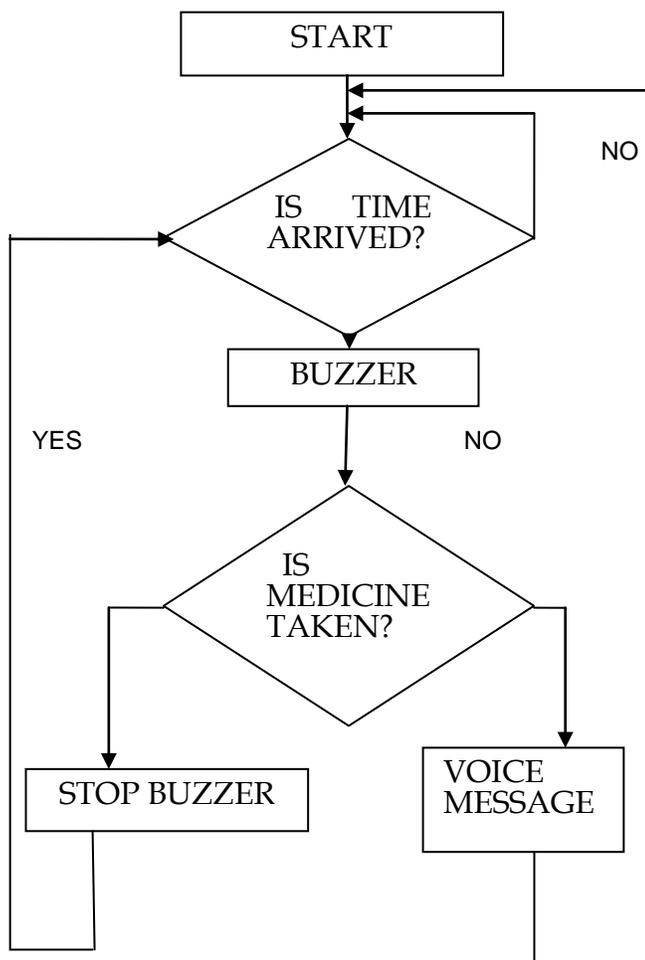
**ALGORITHM OF THE PROPOSED SYSTEM:**

STEP 1: Power supply is given and the device gets ON. Usual time run continuously until the appropriate time reaches.

STEP 2: Time segment is that the time runs continuously until the specified time reaches. When the specific time reaches the buzzer gets ON indicate the patient to take medicine.

STEP 3: If the desired medicine is taken by the user, the buzzer stops and its goes to the next Segment.

STEP 4: Otherwise, a voice message will intimate them to take the medicine and then the time loop goes to the next segment which contains the medicines of next session. The figure 3.2 shows the flowchart of the automatic medicine teller, which shows the process involved in the working of the model.

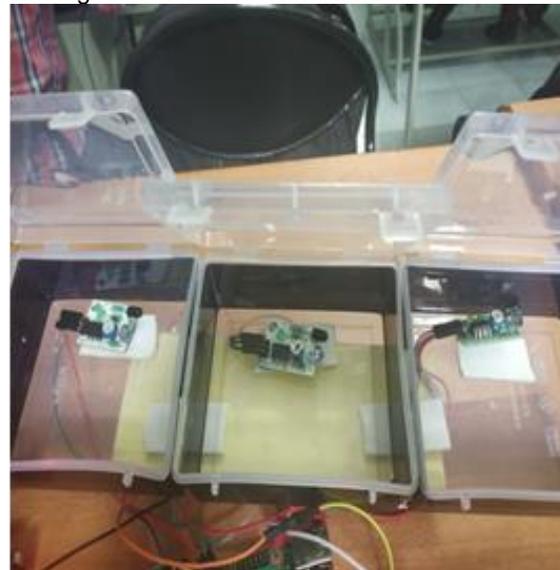
**Flowchart of the Automatic Medicine Teller:**

**FIGURE 3.2 FLOWCHART OF AUTOMATIC MEDICINE TELLER**



**Figure 3.3 GSM interfaced with Raspberry Pi**

Figure 3.3 shows GSM is interfaced with Raspberry pi. The GSM is interfaced with Raspberry pi, where the receiver and transmitter of GSM is connected with transmitter and receiver of raspberry pi respectively. It will send a message to the caretaker of the patient to refill the medicine when the tablet count goes below a certain value.



**Figure 3.4 Final Hardware**

Figure 3.4 shows the complete hardware setup of the Automatic Medicine Teller. In this medicine teller IR sensor and GSM are interfaced with raspberry pi. Each sensor is placed in each box and also a buzzer is interfaced with it. When a specified time comes the buzzer gets ON and the person takes the medicine from the box, when the person takes the wrong medicine from the box a voice message will intimate them that they are taking the wrong medicine and when the medicine count goes down a message will be sent to the care taker of the patient that they have to refill the medicine in the box.

**4 CONCLUSION**

Many medicine reminder systems have been developed on different platforms. Many of these systems require special hardware devices to remind the patients about the taking

medicine in correct timings. So in the proposed work an attempt has been made to implement a system which is economical, easily accessible and improves medicine adherence. There are so many systems designed to serve for the same purpose. But they are difficult to use, immobile, high cost and tedious process. This system overcomes these problems. Hence, it is easy to use, affordable and better accuracy. This system is useful for the every age group society. This will reduce the problems caused due to taking wrong medicine and also remind the caretaker's to refill the medicine. In future due to manual work, the available system become more time consuming. So in the give future, an attempt can be made to implement fully automatic medicine reminder based on handwritten character recognition. This achieved with the help of artificial neural network. The proposed system will only set the reminders to take the medicine. This reminders reminds the user about their medicine in-take schedule. It will also tell the user of the end of medicines.

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