

## **Robot Handling Medicine Dispenser**

**Prof.P.P.Belgali, SanikaSankpal, Prathmesh Kadam and Sairaj Khebudkar**

**Department of Electronic & Telecommunication Engineering**

**Dr. J.J.Magdum College of Engineering, Jaysingpur, India**

**Abstract:** Most often people regardless of whether they are old or young tend to forget their medicines. Timely medication is very necessary for the cure of any disease. An automatic medicine dispenser with the ability to distribute multiple medicines for a certain patient or a private individual can allow more attention to be given to patients and elderly to remember when and what dosage of their medication to be taken. The robotics designed to store, sort, and dispense various types of medications based on prescription data. It features an advanced sensor system for verifying medication types and quantities, and incorporates machine learning algorithms to adapt to different medication regimens and patient needs. This project also includes a user-friendly interface for health care providers to input and monitor prescription details. By automating the dispensing process, the system seeks to reduce the work load on healthcare staff, ensure precise medication delivery, and ultimately contribute to better patient outcomes. The Robot Handling Medicine Dispenser project aims to enhance the efficiency and accuracy of medication administration in health care settings. This system integrates robotics and automation to manage the dispensing of medications, minimizing human error and improving patient safety. The heart of our project is the medicine dispenser which is the model of a circular drive which has four compartments to place the medicine during four times a day. Our project uses PIC16F877A as our main microcontroller. The dispenser also has a LCD display to display the medication system and medication time is alerted by the alarm. The whole medicine dispenser can be movable which is controlled by a remote control. As future work we plan to control robot through voice control and reminder system for refilling the medicines.

**Keywords:** PIC16F877A, Motor Driver, DC Motor

## **I. INTRODUCTION**

The robotic medicine dispenser is based on the principle of automatically reminding patient to take their medicines on time using a timer algorithm. The main feature of this project is that it can dispense medicines to multiple patients. This is made possible by controlling the motion of the robot using a remote control. The remote works with the help of an X-Bee module which is a transceiver that communicates through radio frequency. We used PIC16f877A as our main microcontroller a sit very reliable, low cost and can be easily interfaced with multiple peripherals. For a automatic medicine dispenser a mechanical model that efficiently provide the medicine at the required time. The medicine provider model should be properly synchronized with the timer module. For achieving this we made cylinder of glass which is divided into four compartments. This cylinder is attached to the stepper motor which controlled by microcontroller through a micro stepper driver that provide precise micro step rotation of stepper motor. So as stepper motor rotates the cylindrical rotates simultaneously. A real time is the most important part of our project that gives the exact time of medicine dispenser rotation. A rover is also present that is controlled by a remote through radio frequencies which makes our medicine dispenser movable.

## **II. EASE OF USE**

### **1. Necessity**

It is necessary to provide medication to the people who's admitted in hospital to take medicine on the time. So automatic medication dispenser is designed specifically for users who take medications without close professional supervision.

### **2. Need of Project**

The project initially planned to provide medicines to a number of patients who had been admitted into hospital. It necessary to take the medicine on the given time, so our system help to give medicine automatically on the user define time.

### **III. LITERATURE SURVEY**

#### **1. Robotic Medicine Dispenser**

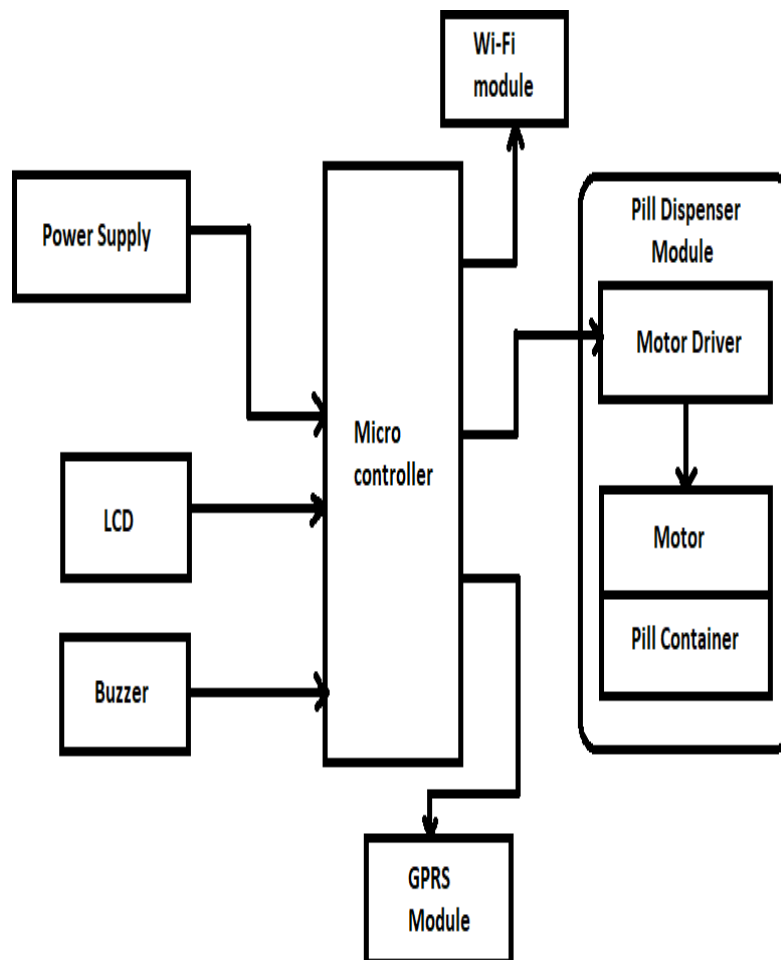
In today's world, people are suffering from several diseases and due to this the need for medication has increased exponentially. An average person takes 2-3 tablets a days and there is a chance for the person to let slip from the memory. In order to avoid such mistakes an automated system for dispensing medicines is required. In the paper, we present a robotic medicine dispenser that automatically dispenses medicines to the patients in the hospital. Most often people regardless of whether they are old or young tend to forget their medicines. Timely medication is very necessary for the cure of any disease.

#### **2. Automatic Medicine Dispenser Robot**

The robot uses line follower method to deliver the medicines to the patient's . The project is based on medications are the key instruments for preventing and effectively managing chronic illness however, despite their significance and well-known benefits. People frequently fail to take their medications as prescribed, resulting in poor clinical outcomes, higher healthcare costs, and negative effects for workforce productivity and public health. As a solution to this we design robot handling medicine dispenser. It is perfect solution for patients who forget to take medicine on time. Need of medicine dispenser is most important for patients that takes in multiple medicines get easily distracted due to phone calls, knock on door etc. These distractions confuse the patient on which medicines have been taken in or which medicine not taken. Medicine dispenser is less time consuming as it reduces time on reading labels which are often difficult to read and often written in small letters. In recent years assistive robot has emerged as increasing field of research and development. The robotic platform is used to test several ideas like intelligent reminding system, companion, social interaction etc. for physically impaired and elderly people in the society. Robotic medicine dispenser is an intelligent reminder system that reminds medicine time by alarm system and provides required medicines at required dosage.

## IV. DESIGN APPROACH

### 1. Block Diagram



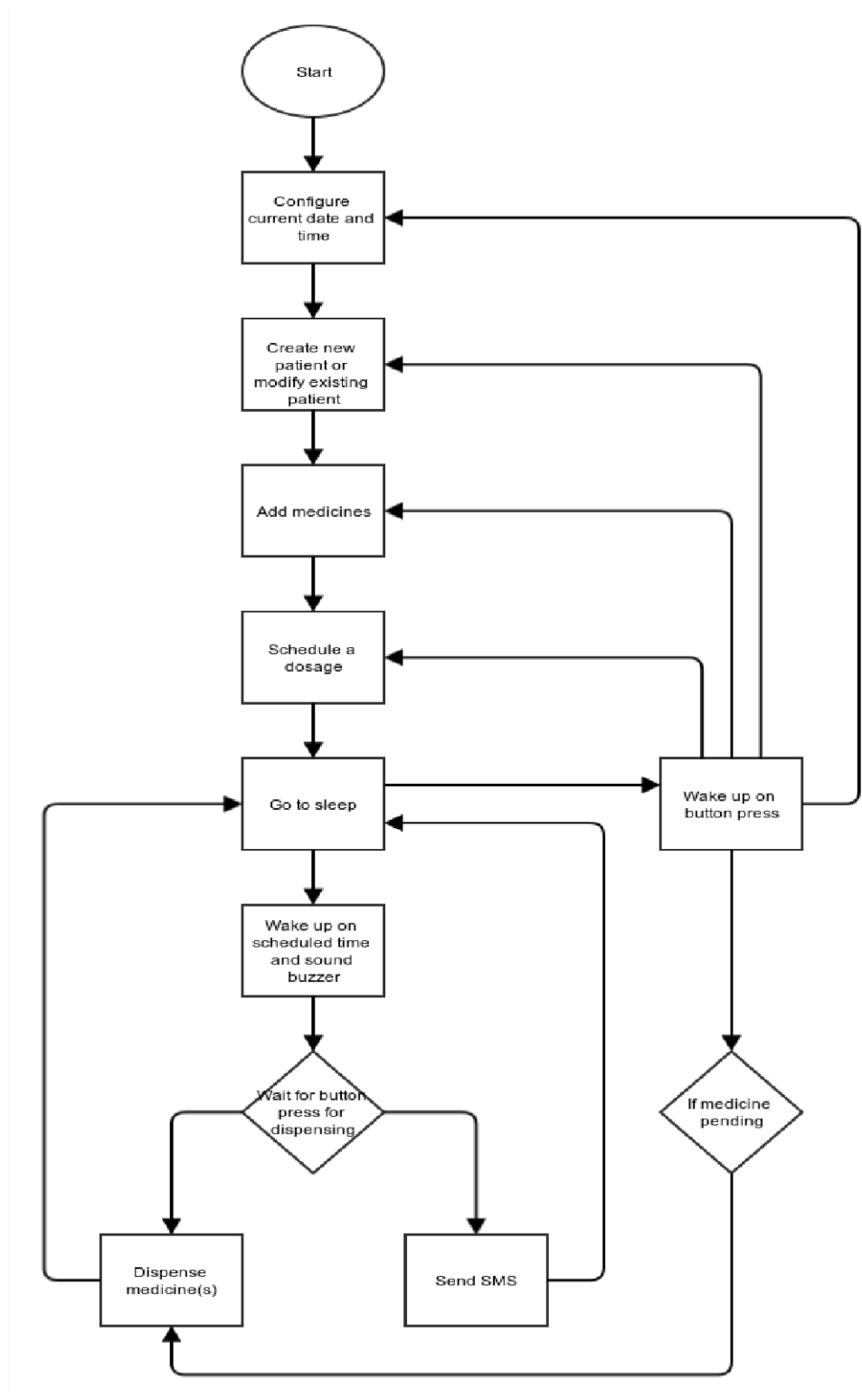
### 2. Working

The robot is placed in its home position. The robot checks if it's time to deliver medicine based on the entered data. The robot selects the path to the patient's room and uses the line follower method to travel there. The robot reaches the patient's room and announces the patient's name or ID. The patient or their caretaker authenticates their identity with a fingerprint scanner. The medicine box opens, and the robot displays the medicine name and quantity. The patient or caregiver takes the medicine and presses a button. The robot closes the medicine box and returns to its home position.

### 3. Result



## Flowchart



## **V. HARDWARE DESIGN**

### **1. PIC16F877A**

The PIC microcontroller PIC16F877A is one of the most renowned microcontrollers in the industry. It has a total number of 40 pins and there are 33 pins for input and output. It consists of two 8 bit and one 16 bit timer. It can operate up to 20MHz frequency. It consist of 256 bytes of E-EPROM data memory.

### **2. LCD DISPLAY**

An LCD(Liquid Crystal Display) screen is an electronic display module and has a wide range of applications. A LCD display is very basic module and is very commonly used in various devices and circuits. This LCD has two registers, namely, Command and Data.

### **3. RTC Module**

Real time clocks (RTC), as the name recommends are clock modules. The DS1307 real time clock (RTC) IC is an 8 pin device using an I2C interface. The DS1307 is a low-power clock/calendar with 56 bytes of battery backup SRAM. The clock/calendar provides seconds, minutes, hours, day, date, month and year qualified data.

### **4. Servo motor**

A servo motor is a rotary actuator or a motor that allows for a precise control in terms of the angular position, acceleration, and velocity. Basically it has certain capabilities that a regular motor does not have. Consequently it makes use of a regular motor and pairs it with a sensor for position feedback.

### **5. L293D**

The L293D motor driver is available for providing User with ease and user friendly interfacing for embedded application. L293D motor driver is mounted on a good quality, single sided PCB. The pins of L293D motor driver IC are connected to connectors for easy access to the driver IC s pin functions.

### **Diagram Description**

**Microcontroller:** This is main block of project to control the whole process and do the main tasks sequence.

**LCD Display:** This block is used to display all the process and current time to the observer.

**Motor Driver:** In this project we use L293D motor driver to drive the robot.

**Buzzer :** To indicate the patient has time to take medicine.

**Servo Motor:** This motor is used to dispense the medicine to the patients with respective with time.

## VI. CONCLUSION

The smart medicine dispenser can be used to improve medicine adherence. Our project is based on creating a robotic medicine dispenser. We proposed this project as it is very important to take medication on time. Most often people regardless of whether they are old or young tend to forget their medicines. Timely medication is very necessary for the cure of any disease. With the help of our project we aim to tackle the problem of timely medication. An automatic medicine dispenser with the ability to distribute multiple medicines for a certain patient or private individual can allow more attention to be given to patients and elderly to remember when and what dosage of their medication to be taken.

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