

Automated Medicine Dispenser using IoT Technology

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Abstract - A Dispenser is a machine that dispenses items such as snacks, beverages, consumer products to customers automatically, after the customer chooses the specific product and required quantity of their choice. There are various kinds of dispenser and vending machine, so during the pandemic period, we have planned to design a medicine dispenser for corona patients keeping social distancing in mind. Dispenser machines can dispense different items or quantities of something much more conveniently. It is similar to an automated machine without man power which we normally see in metropolitan cities. Our aim is to construct an automated medicine dispenser prototype model, which can be installed in hospitals and pharmacies to dispense medicines to elderly patients, blind people, corona patients and many more.

Key Words: STM32 Blue Pill board, RFID, Medicine dispenser, Scheduler, IR sensor, ESP8266.

1. INTRODUCTION

Automation defines a wide range of technologies that reduce human interaction in the process. Automation plays a vital role in the global economy and in daily experience. It reduces the human efforts and consumes more time. The main objective of this project is to design and implement a flexible automated medicine dispenser machine for patients, especially corona patients without touching the dispenser considering the safety of doctors and nurses.

1.1 OBJECTION

The main objective of this project is to design and implement a flexible automated medicine dispenser machine. One of the purposes of this dispenser is to control the spread of corona virus from an infected person to others. Even elder people, blind person can be benefitted from this dispenser. The Successful implementation of this project will be useful for doctors and nurses, so that the corona patients can themselves take medication prescribed by the doctor without any human interference. And the implementation of this system in hospitals (medical centers) in this type of pandemic situation will be very useful and safe.

2. PROBLEM STATEMENT

To eliminate the threats and to ensure the safety of the doctors and health workers from avoiding contact with the

corona patients, we are proposing an "AUTOMATED MEDICINE DISPENSER". The purpose of this dispenser is for the in-patients to take tablets without the nurses reminding them to take the tablet every time. Another main purpose of this dispenser is to control the spread of corona virus from an infected person to others. The Successful implementation of this project will be useful for doctors and nurses, so that the corona patients can themselves take medication prescribed by the doctor without any human interference. And the implementation of this system in hospitals (medical center) in this type of pandemic situation will be very useful and safe

3. PROPOSED SYSTEM

The concept behind this model is dispensing medicine by avoiding contact between the machine and the patient. Here we have a sample of container whose inside is coated or made up of thermoformed plastic which is used in the packaging of tablets. Below the container, a disc mounted with motor and shaft is present. The disc consists of a hollow region having the same dimensions as of the medicine. When the hollow region of the disc comes in contact with the opening of the container, the pill dispenses and the disc rotates so that the pill falls down into the up placed down. In this method, the data of prescription of tablets to every patient is feed to the microcontroller's memory. By using the concept of line follower robot, the dispenser moves in the line put across the patient's bed, it stops at each cot. When the patient scans their tag in the RFID reader, the pills prescribed for the patients fall into the holder. Many dry pharmaceuticals are sensitive to moisture. Tablets may become unstable and they tend to degrade. High barrier packaging is necessary but, by itself, is often not enough. Shelf life of a drug can be extended by means of desiccants. Several types of desiccants are available; the type and quantity need to be matched to the drug and package. One common method is to include a small packet of desiccant in a bottle.

4. TECHNICAL BACKGROUND

4.1 HARDWARE DESCRIPTION

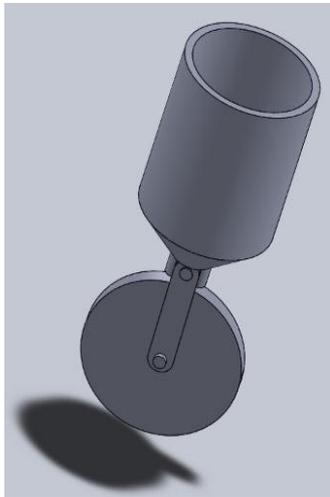


Fig 1 - 3D design



Fig 2 - Hardware extraction

When the power supply is switched ON, after 3 seconds there will be a buzzer sound. This buzzer acts as a scheduler to remind the patients to take their tablet 3 times a day either before or after intake of food. After the buzzer, the patient has to scan their rfid tag. Now, the vibration motor turns ON, so that the tablet gets placed in the hollow space at the mouth of the container. An IR sensor is placed at the mouth of the funnel so that it detects if the tablet is in correct position or not. If it is in the correct position, the motor in the disc turns ON and it rotates for 180deg. If the tablet is not in correct position, the vibration motor is turned on again. When the mouth of the funnel and the hollow space in the disc comes in contact, the tablet falls into the hollow space present in the disc. An IR sensor checks if the tablet is

present in the hollow space or not. After one complete rotation, the tablet falls in the hands placed by the patient. After dispensing the required medicine, a message is displayed in the patient's mobile using IoT technology.

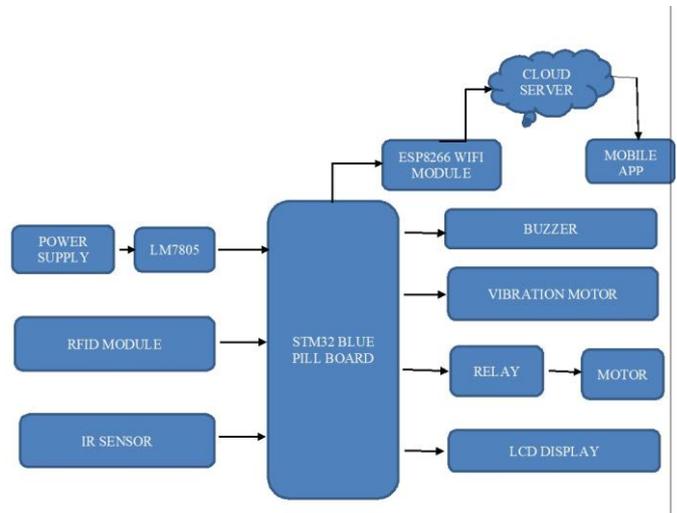
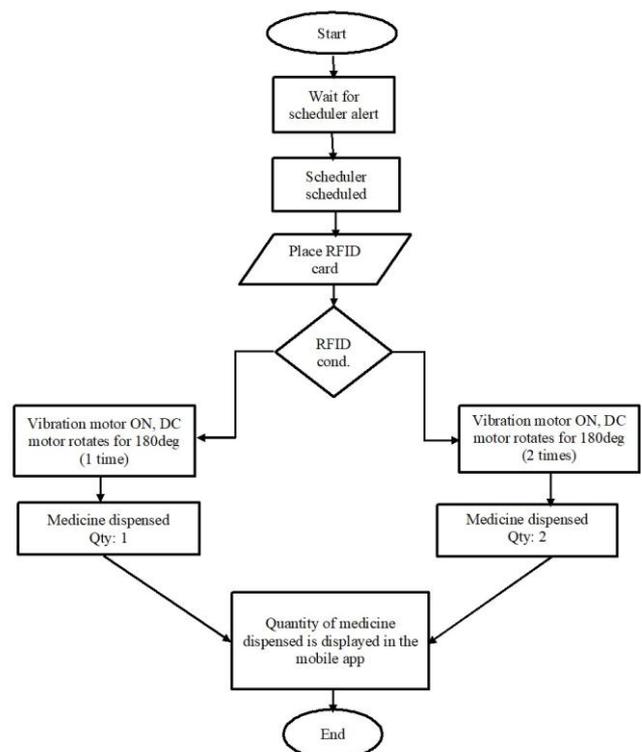


Fig 3 - Block diagram

4.2 FLOW OF CONTROL



4.3 SOFTWARE DESCRIPTION

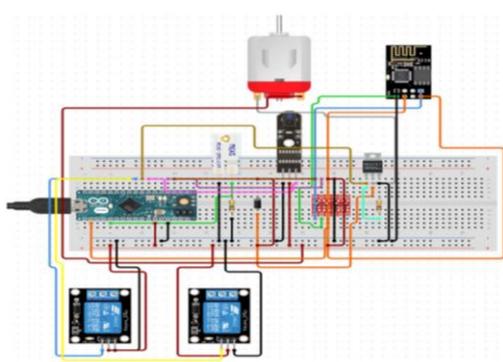


Fig 4 – Circuit diagram

This system is designed using Arduino software which is an open-source platform used for building electronic projects. Here, many sensors can be found and can also be installed from sensor libraries. These sensors are connected to a microcontroller and can also be simulated. Arduino can interact with buttons, LEDs, sensors, motors, speakers, cameras, the internet. Arduino provides a factor that breaks out the functions of the micro-controller into an easier and more accessible package.

4.4 EXPERIMENTAL RESULTS

When the power supply is switched ON, wait for the buzzer which acts as a scheduler. Then scan the rfid tag in the reader. Vibration motor turns on. If a tablet lands in the mouth of the tunnel, then the IR sensor detects it. The disc starts to rotate for 180 deg for the tablet to dispense. Number of rotations depends on the number of tablets assigned to each patient. After dispensing, 'Dispensing container' will be shown in the LCD display.



Fig 5 – LCD display

5. CONCLUSIONS

This project is attempted to develop and design a complete automatic medicine dispenser system. The overall operation facilities the user by just scanning the tag and getting the prescribed tablet without any contact between the patients and the doctors/nurses. The time required to give tablets manually is more when compared to the automated medicine dispense. This medicine dispenser will be very helpful for blind people, elderly people and especially for corona patients. Considering the pandemic, we came up with the idea so that there will be no contact between the doctors or nurses with any patients.

6. FUTURE SCOPE

This automated system for patients is developed so that it reduces the time and work of doctors and nurses. In this work, an attempt is made to develop an automated medicine dispenser using microcontroller and rfid technology which will definitely help patients like blind people, elderly people and especially corona patients.

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