IoT Based Medicine Dispenser

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***Abstract*— The Medicine Dispenser is a machine which dispenses the medicine based on the authentication of the user by using the user name and the password given to the user by the administrator of the machine. This machine will dispense medicine according to the user prescription provided by the user's doctor and also the number of medicine is also determined by the user's choice.**

In this medicine dispenser the money is handled through the digital points stored in the user's card which is given by the administrator and also user can restore the points by taking to the administrator of the card and use his identification to add the digital points to the card.

The main goal of the dispensing machine is to provide the medicine to the users 27/7 so it can help the village people Who are for away from the hospital or the clinic to buy the medicine and also it can be installed like a ATM machine so it is easy to use by the people even though if they cannot read and write.

The medicine can be replaced by the admistrater of the machine by time to time based on the expiration date or is it is empty the machine will alarm the administrator to refill the machine through SMS or telecom messenger.

Keywords—: Internet of Things (IoT), RFID (Radio frequency identification), Arduino Mega, Nodemcu.

I. INTRODUCTION

The medicine dispensing machine is using the care card which is used to store the data of the users like there user name, password, prescription of the user etc. So here we are using RFID tag which is used for the identification of the user and this RFID tag uses radio frequency identification devices for identification and tracking of the user records like login and the amount and the medicine taken by the user to store it as a reference in the future. The RFID tag system includes the tag itself, a read/write device, and a host system application for data collection, processing, and transmission.

The medicine dispenses uses Arduino mega as a main system controller to attach all the module to perform their respective function and also for the machine we require more pins so the controller we selected is Arduino mega . To this controller mainly there are 4 module connected to it there are keypad, nodemcu, LCD display, repeaters.

The medicine plays an important role in everyday life so the Medicine dispenser also help in the rural village where there is no hospital or clinic there we can install these medicine dispenser so it can help the people and since it is simple to use there will be no problem in teaching to the people who are
illiterate and also there are security measure so that the user can not obtain more than the medicine needed to then that of prescribed by the doctor so there will be no harm to the user the LCD module will let the user to see all the prescription that has given to the user these numbers can be entered with the keypad located in the system .

II. RELATED WORK

Some related work for this medicine is dispenser is that it can be easy to install in a place such as there is no medical facility to provide the people with a medicine. The security and the money for the medicine is done through the care card received by the authorization of the machine so only the given person can collect the medicine. The amount given to the people is updated as the digital money and the balance is sent to the user mobile to keep the money in track.

The process for the dispenser is controlled by the Arduino mega controller and this device is given a powder convert to convert the current to 5.5v for the controller. Due to the physical and financial limitations in establishing a medical store at remote areas is very important, this machine hasbeen designed to be a standalone unit, requiring minimum supervision to operate for long periods of time.

III. PROBLEM STATEMENT

To design and develop a dispensing machine which uses RFID tag as an authorization card and display the user data with prescription. The system that will send notification to the administrator if the medicine is needed to be refilled.

IV. PROPOSED SOLUTION:

RFID tag system with a Arduino mega board that uses LCD, nodemcu, RFID and Wi-Fi Module. Embedded system which will provide all the function needed to fulfill the goal to creating the medicine dispenser.

V. DESIGN ANDMETHODOLOGY

The users will first insert the health care card in this case the RFID tag into the system. The system will scan the card using RFID reader through radio identification and displays user name and ask for the password for the further continue. Then the system will read the card data and display the prescription and will ask for user's input. The users has to select the prescribed medicine from the medicine displayed on the LCD and also has to select the number of medicine required. Once the input has been taken the system will check the number of tablet is present or not. If it does, system will check the users balance and will dispense the medicine and if the user does not have required amount it will display a message stating insufficient balance and ask the user to recharge the card.

- *User Authentication*:In this process the user authentication is done by scanning the RFID tag with the RFID reader of the system and entering the password given to the user if the password is correct then the authentication is complete if not the machine will tell user to check the password.
- *Medicine Dispensing:* If the authentication is complete then the user may select the medicine required and also the number of medicine required for the machine to dispense.
- *Database Updating:* After the pill has been dispensed the database of the users digital points and the number of pill stock in the database will be updated.
- *Inventory Control:* Controlling the number of pills present is critical to functioning of machine. If the medicine gets over, the system will send notification to refill it.

A flowchart is a type of diagram that represents an algorithm, workflow or process. Flowchart can also be defined as a diagrammatic representation of an algorithm (step by step approach to solve a task). At first the health care which is RFID card needs to be scanned. Then the system will ask the user to enter the password. If the user is authenticated, then the system will display the prescription of that user i.e. the list of medicines. The use has to select the medicine fron the list of medicine displayed and has to select the number of medicine required for the user then the medicine is dispensed if the medicine is less than the message is showed to the user the medicine is not available and the message is sent to the administrator. After that the database of the user digital points is updated and the balance message is sent to theuser.

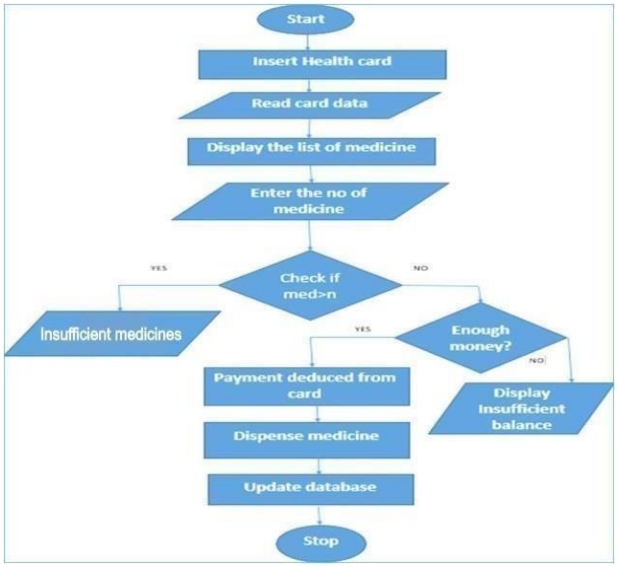

Figure 1. Flowchart of the ATM system

VI. SOFTWARE COMPONENTS

- *Embedded C*

- *Arduino Software* - The Arduino integrated development environment (IDE) (figure 4.4.1) is a cross-platform application for Windows, macOS, Linux that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The Arduino IDE supports the languages C and C++ using special rules of code structuring.

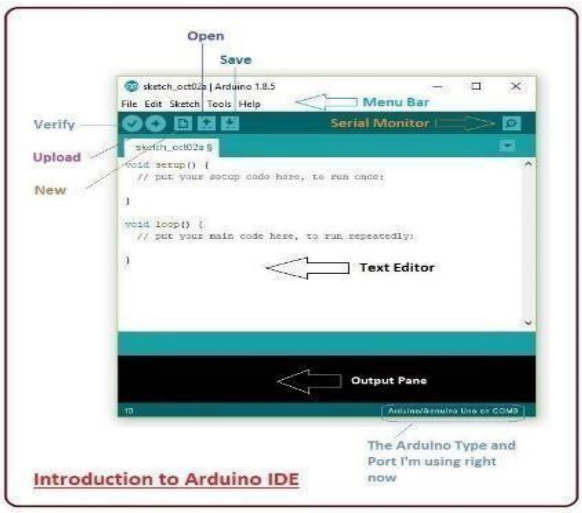

Figure.2. Block diagram of the Arduino software.

VII. IMPLEMETATION

The steps involved in assembling all the devices and implementing the project:

Step 1: Configuring the Programmable Devices

The module we are using are the Arduino mega as the main controller module and this is connected by LCD display for the user interaction, keypad for entering the user requirements relay which is used for depending the medicine the message is sent by using Nodemcu module by using telegram to the authority of the system RFID reader is to read the care card to give the authentication to the user.

Step 2: Setting up code in Arduino Mega:

The RFID module code should be dumped to the Arduino Mega board which is installed in the patient section.

Step 3: Integrating the hardware modules

Arduino Mega should be connected to all the module like RFID reader, Wi-Fi module, LCD and relay.

Step 4: Connecting the NodeMcu module

The message is sent through using the Nodemcu module which is connected to the mega module.

Step 5: Powering up all the devices

In this system it is connected to the power supply and also voltage converter which convert the voltage to 5v-2.5v power supply. By using this power supply the system can work without any problem.

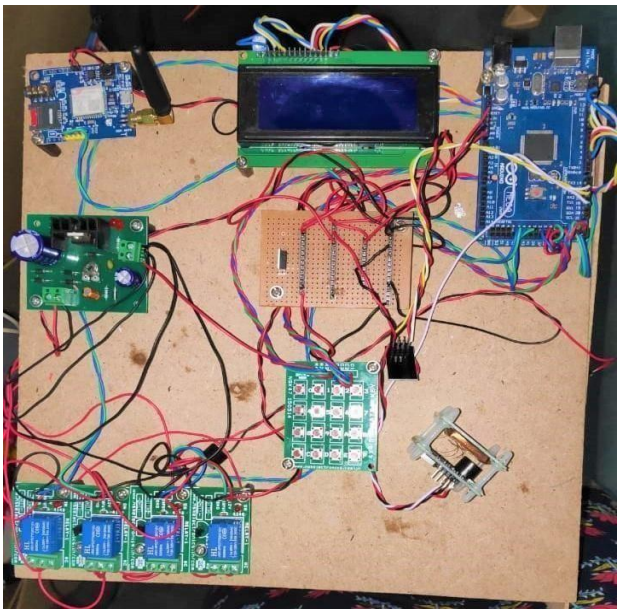

Figure34 Assembly of all components

PSEUDO CODE:

1. Start
2. Initialization of LCD, Wi-Fi module, Nodemcu, Relay, RFID Reader
3. Define CARD, PHONE_NUMBER, TABLET, BALANCE
4. Store Prescription
5. Initial Display

VIII. SYSTEM ARCHITECTURE

Figure.4. Block diagram of the model

1. The system has microcontroller Arduino mega which is an 8-bit RISK microcontroller board which controls the functionality of all the component in the system. The system relates to the hardware components like RFID module, Keypad module, LCD module, Nodemcu module, Wi-Fi module and Dispense system which is used to dispense the medicine.

2. As we can see in the figure 5 the block diagram shows all the modules connected to the main controller by which we can see the overall view of the system this conceptual model is used as a base to construct the main system.

VII. ADVANTAGES

- It is very much portable that it can be installed in very less area.
- No Individual person needed for maintenance.
- Easy to use and Provides 24/7 medicine facility.
- Since online transaction involved no fear of robbery.
- The dispenser will dispense the medicine automatically for that disease.
- The message system is automatic so the refill of the system message is directly sent to the care taker of the system.

VIII. DISADVANTAGES

- This system will not work without the power supply since some rural areas has less time of electricity.
- Intelligent medical dispenser will only deliver tablets but no sirup or liquid medicines.
- The system cannot dispense more than one medicine at the given time.

IX. CONCLUSION

The medical dispenser offers a flexible and simple solution for extending basic healthcare to all places including remote places, at a very less cost. The machine will dispense prescribed medicine. The machine adds an intelligent medicine unit, which sends a refill notification message to the authorization the system given to the person to refill the medicine pills. The medical dispenser is technically feasible to all the peoples. The system also provides the required user authentication for the user by using RFID tag and the RFID reader.

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