Intelligent Lifesaver Dispenser Machine using Raspberry-Pi 3

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May 25, 2020

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Abstract: -Reaching out to basic healthcare is an important keystone of building a healthy nation. An intelligent lifesaver dispenser machine in areas where having a pharmacy is not feasible. It vends the machines in cases of emergency and ensures the drugs are available 24*7. This dispensing machine is a lifesaver in case of accidents on roads or highways, rural areas, and the area where pharmacies are not within the reach. At the least first aid can be easily accessible with the help of this machine. The project is developed with Raspberry-pi 3, Global System for mobile communication (GSM)&RFID tag. GSM notifies the predefined vendors when the medicine needs to be refilled.

Keywords: IoT, Raspberry-pi 3, GSM, RFID card.

I. INTRODUCTION

Every time, landing on an article, we see the increasing ratio number of road accidents and lives lost in an accident. The unavailability of medical stores at any time is the major cause of losing lives in these road accidents. The lives which can be at least saved by providing immediate medication can control this increasing number. A situation where normal headache leads to migration and cough causing TB can be just avoided by taking medicines on time. Avoiding and delaying can just worsen the situations.

With advanced technology like IoT, this scenario can be improved. All-time medicine machine provides the immediate medication handling the emergency and providing the essential drugs on time-saving lives in large number. Situations, in which medical stores are closed at night and distance of the hospitals from accident spots on the highway can be controlled by this proposed system.

The medical device is essential to the practice of modern medicine. Raspberry-pi is mini-board computers providing with slots to connect with the monitor, keyboard, and other peripheral devices. Raspberry-pi 3 has Bluetooth, WI-FI and it has a more powerful CPU/GPU pair. Raspberry-pi has less power consumption than that provided by the Arduino controller providing 230V

power. This system delivers the medicine by swiping the RFID card. The RFID card has the details of the tag and password associated with all users. It allows the user to enter medicine and if available dispenser it.

The GSM is used to detect when the medicine goes below a certain level allowing to re-fill the system by the authorized organization.

II. HARDWARE COMPONENTS

A. RASPBERRY PI 3 MODEL

The Raspberry Pi 3's four built-in USB ports provide enough connectivity for a mouse, keyboard, or anything else that you feel the RPI needs. Keep in mind, it is recommended that you use a powered hub so as not to overtax the on-board voltage regulator. Powering the Raspberry Pi 3 is easy just plug any USB power supply into the micro-USB port. There's no power button so the Pi will begin to boot as soon as power is applied, to turn it off simply remove power. The four built-in USB ports can even output up to 1.2A enabling you to connect more power-hungry USB devices.
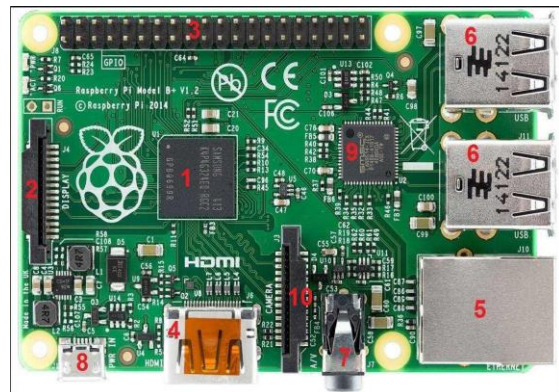
B. LCD

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and seven-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.
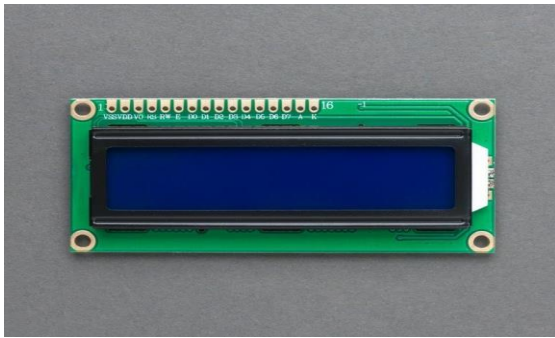
C. NodeMCU

The system is implemented with the NodeMCU module. The NodeMCU module is connected to the Raspberry pi. The VCC pin of NodeMCU is connected to the +5V of Raspberry pi. The ground pin of NodeMCU is connected to the ground pin of Raspberry pi. The TX pin of NodeMCU is connected to the RX pin of Raspberry pi to establish communication. The RX pin of NodeMCU is connected to the TX pin of Raspberry pi to establish communication.


D. RFID

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. FID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, to be read.
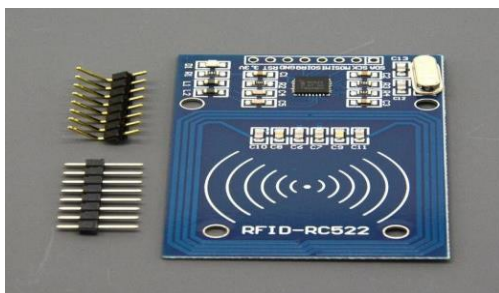
E. WIFI MODULE

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give Raspberry pi microcontroller access to your Wi-Fi network. ESP8266 is Wi-Fi enabled system on chip (SoC) module developed by Espress if system. It is mostly used for development of IoT (Internet of Things) embedded applications. It employs a 32-bit RISC CPU based on the Tensilica Xtensa L106 running at 80 MHz (or overclocked to 160 MHz). It has a 64 KB boot ROM, 64 KB instruction RAM and 96 KB data RAM. External flash memory can be accessed through SPI. ESP8266 module is low cost standalone wireless transceiver that can be used for endpoint IoT developments. To communicate with the ESP8266 module, microcontroller needs to use set of AT commands. Microcontroller communicates with ESP8266-01 module using UART having specified Baud rate.
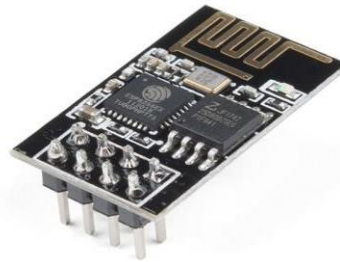
F. DC MOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

G. PEFBOARD

Perfboard is material for prototyping electronic circuits (also called DOT PCB). It is a thin, rigid sheet with holes pre-drilled at standard intervals across a grid, usually a square grid of 0.1 inches (2.54 mm) spacing. These holes are ringed by round or square copper pads, though bare boards are also available. Inexpensive perfboard may have pads on only one side of the board, while better quality

perfboard can have pads on both sides (plated through holes). Since each pad is electrically isolated, the builder makes all connections with either wire wrap or miniature point to point wiring techniques. Discrete components are soldered to the prototype aboard such as resistors, capacitors, and integrated circuits. The substrate is typically made of paper laminated with phenolic resin (such as FR-2) or a fiberglass-reinforced epoxy laminate.

III. Software Requirements

A. Python3

It is an interpreted high-level, general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed, and garbage collected. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

B. OpenCV3.2

(Open Source Computer Vision Library) is an open-source computer vision and machine learning software library. The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. Open CV - Python is a library of Python bindings designed to solve computer vision problems. Python is a general-purpose programming language started by Guido van Rossum that became very popular very quickly, mainly because of its simplicity and code readability.

IV. METHODOLOGY

The system has raspberry pi which is an 8-bit RISK microcontroller board that controls the functionality of all the components. The system relates to hardware components like RFID module, keypad module, LCD module, GSM module, Wi-Fi module, and dispenser. At first, the RFID card reader needs to be scanned ,and then it asks the user to enter the password and if the user is authorized then the system will display the prescription of that user i.e. list of medicine.

The user can enter the number of medicines required. If the medicine is greater than the mentioned in prescription than the system will ask the user to consult the doctor if not then it will check for available balance for the required medicine , if the balance is available then the payment will be deducted from the card and it will dispense the medicine, if the balance is not there then, in that case ,it will dispense only first aid box which is available free of cost and it will display insufficient balance and the database will be updated every time.
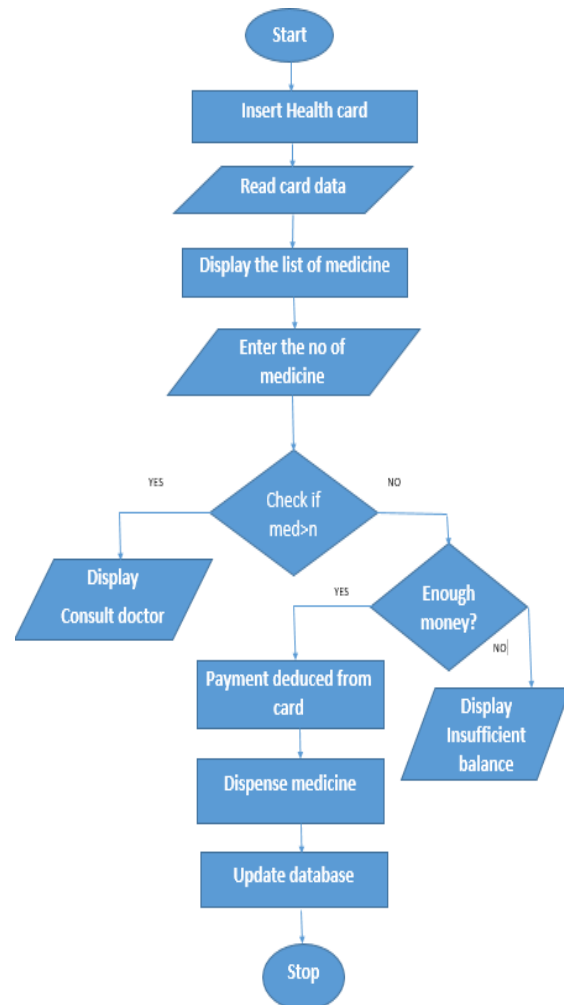
V.   CONCLUSION

The healthcare field is one of the most delicate and important fields to be continuously enhanced. The Intelligent lifesaver dispensing machine is simple, flexible and efficient. It provides world-class medical facilities even in remote areas with no hospitals and minimum investment in infrastructure and maintenance. It maintains patient health information with the associated tag and password in the RFID card. If the number of medicine decreases below a certain level, then it sends the SMS to the authorized organization to refill the medicine using GSM.

VI.   FUTURE WORK

In future cash accepting module will be implemented which will use concept of image processing from reorganization of the coin. Currently we are implementing the system RFID card and we could use NFC card instead. Delivery of etc medicine infested along with prescribed medication. In current system only prescribe medicines are dispensed but in future user can dispense medicine which does not require prescription like medicines that relief aches, pains and itches and first aid.

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