Automatic Vending Machine using RFID

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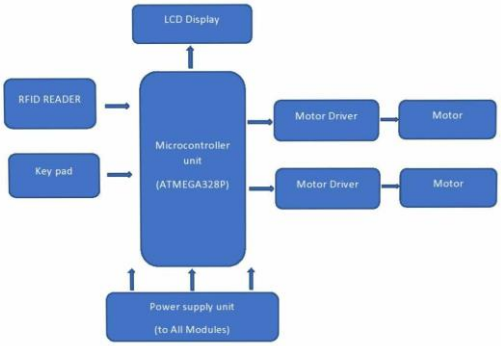
***Abstract*:- The automatic vending machine can be used to serve the essential needs to the people in the commercial areas. The vending machine is based on 'EMBEDDED SYSTEM', the usage of this machine is inevitable and its demand is increasing rapidly. In today's busy world people forget to carry their own essential needs with them, they opt to get the things from where they are, and so the vending machines can solve their urge. But nowadays people prefer to use digital payment options instead of cash to avoid the cashless associated with carrying cash. So to mitigate the demand for modern payment modes, we implement digital payment system that uses RFID tag. This system gives the access only through RFID which avoids the misuse of machine. Here, we have designed a vending machine for the educational institutions which can be used by the students to vend the essential needs like first aid medicines, masks, sanitary napkins, etc. The RFID tag can be accessed and the particular product can be selected, then the machine will dispense the product while the corresponding amount will be deduced in t The tag. A single RFID tag is given to the particular class in common which can be used by all, the RFID tag can be recharged using a master card by the person in-charge. The remaining amount and the balance number of the products can be displayed in the LCD display.**

II.INTRODUCTION

Vending machine are an automatic machine which dispense a products like coffee, cold drinks, snacks, tickets etc., Implementing an automatic machine in real-time are going to be of use for people. the normal slot machine payment includes cash payment (including folding money and coin) and smartcard payment. The slot machine has been growing significantly in recent years and is accepted gradually by more and more consumers, the slot machine brings convenience for consumers, but its scattered distribution also brings inconvenience in controlling, management and maintenance for consumers. This paper presents the system which operates not on coin or note, because The storage of coins may be a limiting factor, because the storage become full the coin handling becomes a problem .so it operates on RFID system. RFID technology has introduced the novel cashless payment system, and replaced the normal cash based methods in vending machines. Additional features added to RFID VMs are security and reduction of man power. this technique gives the access through only RFID which avoid the misuse of machine. RFID may be a secure and price effective electronic identification wireless technology supported capacitive-inductive resonant system. This technology incorporates frequency (RF) electromagnetic fields. Passive RFID battery-less package includes the RFID card and RFID reader with 13.56 MHz operational frequency. A little RFID reader is fitted on the machine. The card which contains RFID tag is given to every department. the time. At the time ,who have the id card, that member easily get the things ., by showing the ID tag to the reader is that the only thanks to get the specified product (napkin and medicine) and therefore the master card only recharge and reset the quantity.

III.PROPOSED SYSTEM

The Arduino act as main processor. The vending machine has Arduino Uno that acts as a master controller along with RFID tag and reader. The external devices such as keypad, display are often Connected through the varied pins on the Arduino Uno. First, RFID card is scanned and reads the tag, after user can select the merchandise for his or her own needs. this will be operated by using Arduino software. In between the Arduino and gear motor , the motor circuit is placed. The controller current isn't Sufficient for the gear motor because they have more current. The gear motor is connected to the spiral ring ,those product are inserted within the ring. Finally the merchandise are often selected and then the motor rotates to deliver the merchandise.

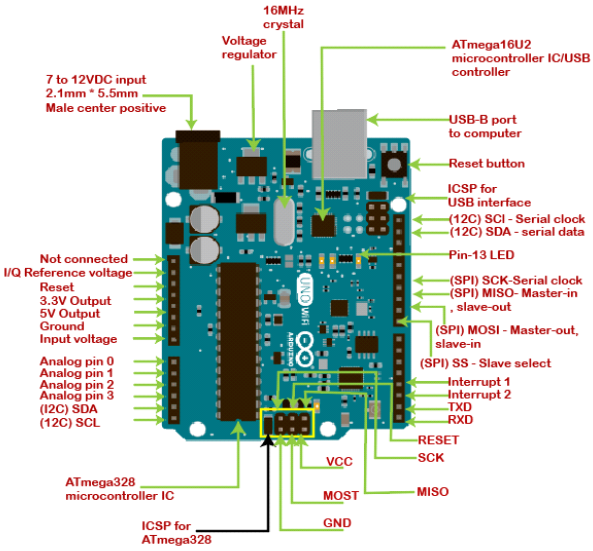


IV.EXISTING SYSTEM

In the preceding medicine slot machine either the microcontroller or processor is employed for the entire process and their coding is additionally complex.This may also used to sense the inserting of coin through the currency inlet and also senses what proportion product to be delivered exactly by the electrical motor. Once the fake coin with same density and same size inserted to the coin inlet the coin are often accepted and the products are often delivered without sensing the coins,this may be considered because the major drawback of this existing machine.

V.ARDUINO

Arduino Uno is a 8-digit microcontroller board dependent on the ATMega328P. It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6 simple sources of info, a 16 MHz quartz gem, a USB association, a force jack, an ICSP (In Circuit Serial Programmer) header and a reset button. In this framework, Arduino microcontroller circuit fills in as an information processor that controls the engine associated with twisting spring.



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DSIBINO_V1 is the clone Arduino board. Which means it's all the features of Arduino is included with some special feature like

1. It can be operated from AC or DC 12v power supply.
2. It's come with 2 in-built led for various debugging and testing.
3. Price is lesser because USB programming replaced by FTDI232 PGM facility.

VI.RFID READER

A RFID per user is a gadget that is utilized to examine a RFID tag. The per user has a reception apparatus that emanates radio waves; the tag reacts by sending back its information. Various components can influence the distance at which a tag can be perused (the read range). The recurrence utilized for recognizable proof, the reception apparatus acquire, the direction and polarization of the per user receiving wire and the transponder radio wire, just as the arrangement of the tag on the item to be distinguished will all affect the RFID framework's understood reach.

VII.GUIDELINE OF OPERATION

The per user creates an attractive field through its coordinated radio wire at 125 kHz. Latent RFID transponders likewise have an incorporated reception apparatus that is tuned to a similar recurrence. At the point when they are inside scope of the per user unit they can draw adequate force from the electromagnetic field to control their own inner gadgets.

When fueled they can regulate the episode attractive field which is distinguished by the per user. In this manner the Transponders can send their information to the per user.

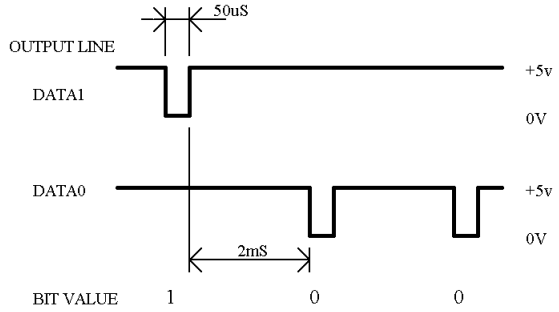
There are a wide range of sorts of transponders intended to work at different frequencies, and their capacities and the measure of data they convey can likewise change. Overall activity the peruser will ceaselessly check for any transponders that go inside go and communicate their information to the peruser. As EM4100 viable transponders don't have crash evasion calculations just one card can be examined inside the scope of the peruser at any one time. At the point when a transponder is perused the peruser will unravel and send the got information by means of ASCII

coded sequential yield, or standard Weigand yield for the Weigand variant of the peruser unit.

VIII.WEIGAND OUTPUT FORMAT DEPICTION

When utilizing the Weigand yield form the peruser will check for a substantial transponder. At the point when a read happens the unit will communicate 40 pieces of client information contained in the transponder in standard Weigand convention.

The yield lines for the Weigand yield are the DATA0, and DATA1 lines as portrayed in Table 1, 4 line interface. Weigand convention gives 2 lines to information move. A beat progress on the DATA1 line shows rationale 1 bit, while a beat change on the DATA0 line demonstrates a rationale 0 digit. In their inactive state the two lines are held high. During information move the fitting rationale line will beat low for 50uS followed by a time of 2ms where the two lines are held high. In this design each piece is communicated in grouping until every one of the 40 pieces are sent. The finish of the transmission is motioned by the two lines being held high for more than 50mS. Figure shows an illustration of the circumstance succession for Weigand convention. Figure



IX.RFID TAG

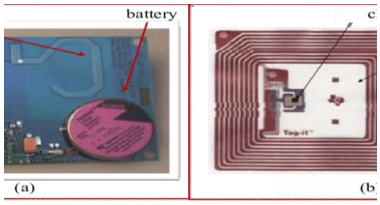
A RFID tag is a central processor joined with a receiving wire in a conservative bundle; the bundling is organized to permit the RFID tag to be connected to an item to be followed. "RFID" stands for Radio Frequency Identification. The label's reception apparatus gets signals from a RFID peruser or scanner and afterward returns the sign, as a rule with some extra information (like a remarkable chronic number or other redid data).RFID labels can be minuscule - the size of a huge rice grain. Others might be the size of a little soft cover book.

X.DYNAMIC TAG (ACTIVE RFID TAG)

A RFID tag is a functioning label when it is outfitted with a battery that can be utilized as a halfway or complete wellspring of force for the label's hardware and receiving wire. Some dynamic labels contain replaceable batteries for quite a long time of utilization; others are fixed units. (Note that It is additionally conceivable to associate the tag to an outside power source.)

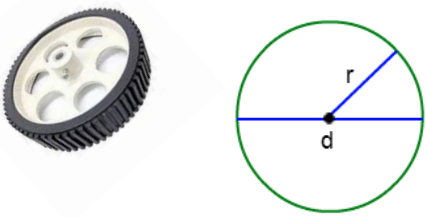
XI.INACTIVE RFID TAG (OR PASSIVE TAG)

An inactive tag is a RFID label that doesn't contain a battery; the force is provided by the peruser. At the point when radio waves from the peruser are experienced by a detached rfid tag, the looped receiving wire inside the label frames an attractive field. The label draws power from it, stimulating the circuits in the tag. The label at that point sends the data encoded in the label's memory.



A-active tag b- passive tag

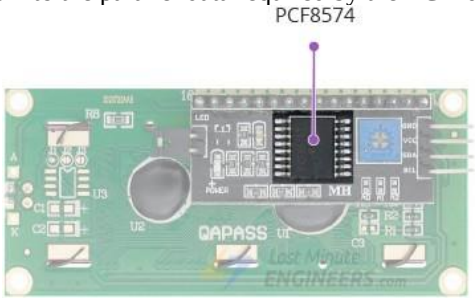
XII.DC MOTOR



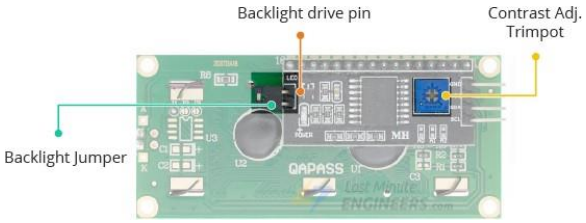
A DC motor is any of a category of electrical machines that converts DC electric power into mechanical power. The foremost common types believe the forces produced by magnetic fields. Nearly all kinds of DC motors have some internal mechanism, either electro mechanical or electronic to periodically change the direction of current flow partially of the motor. during this system, the DC Motor of operational voltage and Most types produce rotary motion; a linear motor directly produces force and motion during a line . Current: - 12V 5A is used. The speed is 500rpm.

XIII.I2C

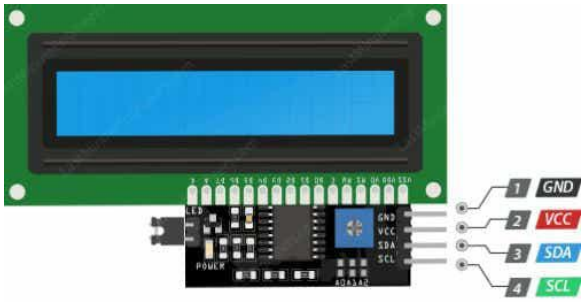
At the heart of the adapter is an 8-Bit I/O Expander chip – PCF8574. This chip converts the I2C data from an Arduino into the parallel data required by the LCD display.



The board also comes with a small trim pot to make fine adjustments to the contrast of the display.



In addition, there is a jumper on the board that supplies power to the backlight. To control the intensity of the backlight, you can remove the jumper and apply an externa voltage to the header pin that is marked as 'LED'.

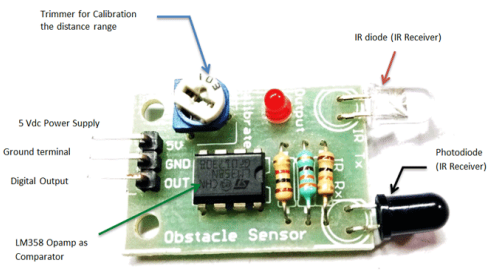


XIV.LCD MONITOR (16*2)

Liquid Display (LCD) screen is an electronic display module and finds a good range of applications.16x2 LCD display is extremely basic module and is extremely commonly used in various devices and circuits. These modules are preferred over other seven segments and other multi segment LEDs. The rationale being LCDs are economical, easily programmable, haven't any limitation of displaying special and even custom characters(unlike7segments),animation the n on.

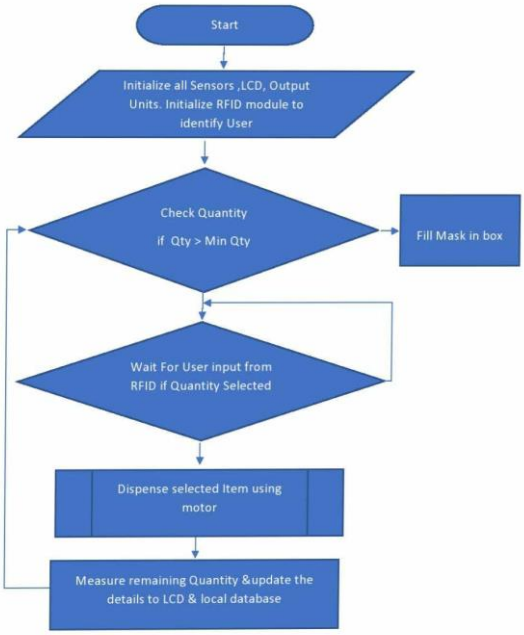
XV.IR SENSOR

An infrared (IR) sensor a proximity sensor, or a 'nearness' sensor that senses whether there is an object near it or not. The IR stands for Infrared sensor. Infrared is the light out of our visible spectrum.



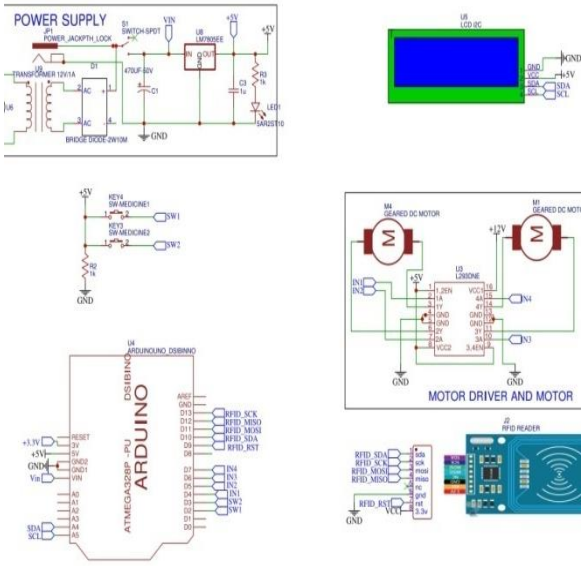
XVI.WINDING MECHANISM

This is perhaps the main parts on medicine machine, conveying component. In this framework, winding component is utilized, with aluminum wire physically molded into twisting with the assistance of PVC Pipe. Medicine machine has two chambers for apportioning the things. Each chamber has one DC Motor appended behind it, when somebody and presses the catch, at that point relating engine turns and apportion one thing. Dispensaries curl has been joined to engine to apportion the thing on turn of engine, these loops are made by material holder wires.



XVII.FRAMEWORK DESIGN

In this paper, a model of medicine machine that sells two unique sorts of product is planned and built. There was two catches to pick the sort of tidbit. In the wake of picking the necessary bite type, place RFID card to the RFID peruser. At that point the peruser recognizes the card ID and showcases the measure of cash on LCD. Microcontroller drives the engine driver to put out the picked nibble and the leftover equilibrium is shown on LCD. The general circuit outline is appeared in Figure 3.The MDRC522 RFID was picked as the card scanner. This 3.3V board was associated with Arduino in the framework through a level shifter circuit, permitting it to be worked securely by the 5V Arduino. RFID Vcc and ground are associated with Arduino supply and ground pins. MIS0 and MOS1pin are associated with Arduino microcontroller pin 11 and 12. SCK, RST and SDK pins are associated with Arduino microcontroller pin 13, 9 and 10 separately.



XVIII.TEST AND RESULTS

In the proposed candy machine, an Arduino Uno is an expert regulator alongside RFID tag and peruser. In this framework there are two chambers for administering the things. Each chamber has one ceaseless turn DC Motor appended behind it, when somebody embeds a RFID card on candy machine and presses the catch, at that point relating DC engine pivots and apportion one thing. Dispensaries curl has been connected to DC engine to apportion the Item on revolution of DC engine, these loops are made by material holder wires. In the event that engine pivot fixed point the items are accessible to client at yield of candy machine. Show data on LCD show, for example, addition of RFID card, choice of item and Account balance. Each shopper holds an inactive RFID card with an operational recurrence of 13.56 megahertz. At the point when purchaser brings his RFID card in the scope of RFID peruser, as of now put away UID interesting distinguishing proof number in that specific card is perused by the RFID peruser. Arduino programming utilizes that UID number to make an information base against each RFID shopper, in which subtleties like buyer personality, current equilibrium, and after exchange balance against his card are put away. LCD shows current equilibrium. On the off chance that the client select one of the item by squeezing the switch, metal spring are turned. And afterward the item will be accessible to client at the yield of candy machine and furthermore remaining equilibrium is shown on the LCD screen. In this framework, the client need to embed a RFID card and press a catch of client decision and the candy machine will apportion the relating thing for client. This RFID based Vending Machine is significantly utilizing four equipment types which are: Arduino Uno, two consistent turn DC engines, LCD, RFID card and 12V force supply. Two catches are for choosing the things in the two chambers. LCD shows the messages and directions to work the Machine. This framework is versatile, moderate, burns-through less power and can be made effectively accessible with the goal that the client can utilize this framework at whatever point and whatever.

XXI.CONCLUSION

In this framework, the client need to embed a RFID card and press a catch of client decision and the medicine machine will administer the comparing thing for client. This RFID based Vending Machine is significantly utilizing four durable goods which are: Arduino Uno, two constant pivot DC engines, LCD, RFID card and 12V force supply. Two catches are for choosing the things in the two chambers. LCD shows the messages and guidelines to work the Machine. This framework is versatile, reasonable, burns-through less power and can be made effectively accessible with the goal that the client can utilize this framework at whatever point and whatever.

REFERENCE

[1] Sarika Oundhakar, *Automatic Medicine Vending Machine*, India International Journal of Engineering Technology Science and Research IJETSR ISSN 2394 – 3386 Volume 4, Issue 12 December 2017 .

[2] M Sangeetha, T V Janardhanarao, Ch S Rama Gowri,*AUTOMATIC MEDICINE VENDING SYSTEM-MEDICAL ATM* ISSN: 2455-2631© October 2016 IJSDR | Volume 1, Issue 10 IJSDR1610031 International Journal of Scientific Development and Research (IJSDR) .

[3] Malashree.G, Ubaidulla, Shilpa R S, Divya U, *ATM (All Time Medicine) Counter For Medicine Self-Dispensing*,International Journal of Latest Technology in Engineering, Management & Applied Science (IJLTEMAS) 1st Special Issue on Engineering and Technology | Volume VI, Issue VS, May 2017 | ISSN 2278-2540 .

[4] Srividya C N, Munisahana M, Navyashree N S, Nikhil Gowda T K, "*Autonomous All Time Medicine Counter for Medicine Self Dispensing*", May-2019, www.ijraset.com, (IJRASET).

[5] Vishal Tank, Sushmita Warrier, Nishant Jakhiya, "*Medicine Dispensing Machine Using Raspberry Pi and Arduino Controller*", IEEE Conference on Emerging Devices and Smart Systems, March-2017.

[6] M Sangeetha, T V Janardhana Rao, Ch Rama Gowri, "*Automatic Medicine Vending System-Medical ATM*", IJSDR, October-2016, www.ijsdr.org .

[7] Jayesh Patil, Sameer Khairmode, Rishikesh Lokhande, Omkar Shinde, "*The Autonomous Pill Dispenser with Alarm and Mobile Notifications*", ISSN: 2321-9653, IJRASET, www.ijraset.com, April-2019.

[8] Shashank Shinde, Tejas Kadaskar, Pushpak Patil, Rohit Barathe, "*A Smart Pill Box with Remind and Consumption Using IoT*", www.irjet.net, December2017.

[9] Mahaveer Penna, Dankan V Gowda, Jijesh J J, Shivashankar, "*Design and Implementation of Automatic Medicine Dispensing machine*", IEEE International Conference (RTEICT), May-2017.

[10] Naga Swetha R, Mahendra, Roopsingh, Chinna, "*Smart Pill Box Using IoT*", ISSN: 2393-8374, 2018.

[11] Toshifumi Watanabe, Muzuki Murase, Katsuhiro Naito, "*Prototype Implementation of RFID based health management system with low-power ARM microcontroller*", IEEE Annual Consumer Communications & Networking Conference,2018.

[12] Suhail, Beg, "*Implementation of FSM Based Automatic Dispense Machine with Expiry Date Feature Using VHDL*," International Journal of Modern Engineering Research (IJMER), vol. 4, p.p. 1-5, April 2014.

[13] Singh, "*Touch Screen Based Automated Medical Vending Machine*," International Journal for Innovative Research in Science & Technology (IJIRST), vol. 1, p.p. 1-4, April 2015.