AN EFFICIENT STATIONERY VENDING MACHINE USING RFID CARD

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Abstract— Since their introduction, vending machines became associate degree more and more vital marketing publically and personal sectors .In instructional establishments and offices stationery vending machine is of nice importance. this technique proposes a microcontroller based vending machine that dispatches A4 sheets, pencil ,pen , etc., once the RFID card is scan. The users will choose the desired item once the card is scanned and collect the item within the output unit. The system is split into 3 components, the primary half deals with the scanning of RFID card that provides cashless payment. The second is that the programming unit that is enforced using FreeRTOS. The third half is that the show unit that displays info and delivers the desired item supported the knowledge sent from the microcontroller. an embedded system based vending machine is intended to attain an occasional value , accurate, and transportable machine which will sale the letter paper things mechanically.

Keywords— Radio-frequency Identification(RFID),Real Time Operating System(RTOS).

I. INTRODUCTION

Vending machine could be a coin operated machine for commerce merchandise (Merriam Webster Dictionary). Slot machine provides varied product like snacks, beverages, water, tickets, et al product. Slot machine has several edges like no want human energy, versatile in time, and saving time. Foremost slot machine profit isn't victimization any human energy thereon. The vending machine is managed by operator. Machine makers sell machines to the operator that decides that payment system. The labor work may be saving from having operators that's operated thereon. Secondly, slot machine is versatile in time that will operate in twenty four hours every day, seven days a week; every intense between two,500 to 4,400 kwh each year.The vending machine may be operated anytime though that was vacation or weekend. Thirdly, vending machine will save a time. During a business, associate degree worker doesn't ought to waste time for lunch. With a vending machine within the restaurant, all they need to try and do is place some coins and push some buttons to induce a drink or a snack. As conclusion, the selling sector has seen signific hymenopteron growth over the years and it'll still do thus within the years to come back .The vending machine currently must improve to grant additional contribution and edges to creature[9].

II.THEORY

A. *RFID CARD*

The utilization of RFID, frequency Identification technology has become widespread at intervals several areas of trade. RFID, frequency Identification provides a perfect technology for pursuit assets and characteristic them by employing a straightforward low value antenna hooked up to the item in question. Alongside RFID provides automatic knowledge assortment that there are currently many standards, and this allows RFID technology to be deployed in an efficient and best-known manner. With RFID technology standardized, users are ready to suppose the technology to produce the results they have.

RFID tags may additionally be known as RFID transponders and are usually settled on things that are mobile. They are little and usually low-cost in order that they'll be hooked up to low cost (or high cost) things that require to own info related to them. They are additionally usually thought of as being disposable. The RFID tag contains knowledge that's relayed to the reader, and in some systems it's going to even be potential to update the information at intervals the tag to point that the tag and therefore the item has undergone a selected stage during a method, etc.

The reader write is employed to speak with the tags which will pass at intervals vary. The RFID reader can ordinarily be settled in a fastened position and can be accustomed interrogate an RFID tag. Dependent upon the applying and also the format of the system and also the RFID reader / author, knowledge may additionally be written to the RFID tag Radio-frequency identification (RFID) is that the wireless use of magnetic force fields to transfer knowledge, for the needs of mechanically characteristic and pursuit tags

hooked up to things. The tags contain electronically hold on info. Some tags are hopped-up by magnetic force induction from magnetic fields created close to the reader. Some sorts collect energy from the interrogating radio waves and act as a passive electrical device. Different sorts have a neighborhood power supply like A battery and will operate at many meters from the reader. Not like a barcode, the tag doesn't essentially ought to be at intervals line of sight of the reader, and will be embedded within the half-track object**.**

B. *KEYPAD*

The input device 4x4 is employed for loading numerics into the microcontroller. It consists of sixteen buttons organized in a type of an array containing four lines and 4 columns. It's connected to the event system by regular IDC ten feminine instrumentality blocked in some development system's port. Four microcontroller's pins ought to be outlined as outputs, and different four pins ought to be outlined as inputs. So as the input device to figure properly, pull-down resistors ought to be placed on the microcontroller's input pins, therefore shaping logic state once no button is ironed. Then, the output pins are set to logic one (1) and input pins' logic state is scan. By pressing any button, a logic one (1) can seem on some input pin. By combining zeros and ones on the output pins, it's determined that button is ironed.

C. *LIMIT SWITCH*

Limit switches are a sort of detector that sight presence and absence. Specifically, mechanical limit switches are switches that are automatically activated, that means that they need some form of arm, lever, knob, plunger, etc., that is physically—or mechanically—activated by creating contact with another object. Because the object makes contact with the mechanism of the switch, it eventually moves the mechanism to its "limit" wherever the contacts turn. Different kinds of sensors/switches exist, as well as proximity sensors, lightweight sensors, electrical switches, among others. In its simplest kind, a limit switch could be a "switch" which will be mounted into remote locations in order that it's motivated by associate degree object apart from a personality's operator. Mechanical limit switch operators are on the market in several shapes and sizes supported their practicality and application. Momentary, or "spring come back" switches return to their traditional state as before long because the mechanism is released from the article it's sensing. Maintained switches can stay within the motivated position even once the mechanism has been discharged.

Fig.1.LIMIT SWITCH

D. *MOTOR*

Motors take electricity and turn out energy. Electrical motors are accustomed power many devices have a tendency to use in way of life. Motors are available varied sizes. Immense motors which will take many 1000's of power unit are usually employed in the trade. Some samples of massive motor applications embrace elevators, electrical trains, hoists, and significant metal rolling mills. Samples of little motor applications embrace motors employed in vehicles, robots, hand power tools and food blenders. Micro-machines are electrical machines with components the scale of red blood cells, and notice several applications in drugs.

DC motors carries with it one set of coils, known as coil winding, within another set of coils or a collection of permanent magnets, known as the mechanical device. Applying a voltage to the coils produces a torsion within the coil, leading to motion. The mechanical device is that the stationary outside a part of a motor.

The mechanical device of a static magnet dc motor consists of 2 or additional static magnet pole items. The field of force will alternatively be created by an magnet. During this case, a DC coil (field winding) is wound around a magnetic material that forms a part of the mechanical device. The rotor is that the inner half that rotates. The rotor consists of windings (called coil windings) that are connected to the external circuit through a mechanical electrical switch. Each mechanical device and rotor are manufactured from magnetism materials. They 2 are separated by air-gap. A winding is formed from series or parallel affiliation of coils. Coil winding - The winding through that the voltage is applied or iatrogenic. Field coil - The winding through that a current is passed to supply flux (for the electromagnet) Windings are typically manufactured from copper.Motors take electrical energy and produce mechanical energy.

E. *LCD*

Alphanumeric displays are employed in a good vary of applications, as well as palmtop computers, word processors, photocopiers, purpose of sale terminals, medical instruments, cellular phones, etc. The sixteen x two intelligent alphanumerical matrix show is capable of displaying 224 totally different characters and symbols. On the market as associate degree ex gratia additional is that the Serial liquid crystal display computer code, that permits serial management of the show. This selection provides abundant easier affiliation and use of the liquid crystal display module. The computer code permits microcontrollers (and microcontroller based mostly systems like the PICAXE) to visually output user directions or readings onto associate degree liquid crystal display module. All liquid crystal display commands are transmitted serially via one microcontroller pin. The computer code may also be connected to the port of a laptop.

F.*MICROCONTROLLER*

The NXP microcontroller series LPC215x uses a high performance. 32-bit ARM7 core that operates at up to 60 mhz. Every device has 512 computer memory unit of on-chip Flash and up to forty computer memory unit of on-chip SRAM memory. A 128-bit-wide memory interface and a proprietary memory accelerator change 32-bit code execution from Flash with zero wait-states. The liquid crystal display driver provides thirty two segments and supports up to four backplanes. It delivers low-power operation and minimizes

Display overhead by mistreatment AN on-chip show RAM with auto-increment addressing. It's factory-made in a very Si gate CMOS method, needs no external elements, and is compatible with TTL/CMOS elements and chip-on-glass technology.

G.FreeRTOS

Freertos may be a category of RTOS that's designed to be sufficiently little to run on a microcontroller - though its use isn't restricted to microcontroller applications. A microcontroller may be a little and resource affected processor that comes with, on one chip, the processor itself, browse solely memory (ROM or Flash) to carry the program to be dead, and also the random access memory (RAM) required by the programs it executes. Generally the program is dead directly from the browse solely memory. Microcontrollers area unit utilized in deeply embedded applications (those applications wherever you ne'er really see the processors themselves, or the software package they're running) that ordinarily have a really specific and dedicated job to try to the dimensions constraints, and dedicated finish application nature, seldom warrant the utilization of a full RTOS implementation - or so build the utilization of a full RTOS implementation attainable. Freertos so provides the core real time planning practicality, inter-task communication, temporal order and synchronisation primitives solely. This implies it's additional accurately delineate as a true time kernel, or real time government. Further practicality, like a command console interface, or networking stacks, is then be enclosed with add-on elements.

III.EXISTING SYSTEM

A.*BLOCK DIAGRAM*

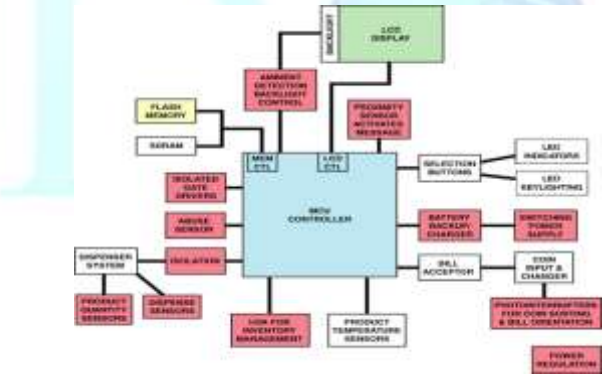


Fig.2.EXISTING SYSTEM

A coin primarily based coin machine that delivers the things like newspaper, Cool drink, Coffee, etc., were designed. A product as a full is delivered.

A. *COIN UNIT*

Coin unit contains receptacle, lever, spring and coin slider. Coin slider and spring holds coin till the lever is force. Once lever is force then coin falls down in a very receptacle. Coin unit is built in such some way that once coin is entered in a very coin slider, it blocks the sunshine that comes from source of illumination so icon diode become high resistance. Once lever is force, lightweight falls on icon diode that cause the ohmic resistance of icon diode decreases to low resistance.

B. *MICROCONTROLLER*

The digital signal and switches area unit understood by the program burn in microcontroller and is regenerate to the shape understood by liquid crystal display. The program is written in supported C-compiler.

C. *LCD (LIQUID CRYSTAL DISPLAY)*

LCD consists of 3 management lines, electrical device choose (RS), read/write (R/W) and change (E). once RS is low, liquid crystal display is in command mode otherwise in information mode. Similarly, once the R/W is high to low transition, liquid crystal display is in write mode otherwise in browse mode. The management bit change (E) is ready high to show the info. Here, RS (pin4), R/W(pin5) and E(9pin6) area unit connected to identification number ten,11, and twelve of port three of the microcontroller severally.

D. *POWER SUPPLY*

Since microcontroller (ARM 7), liquid crystal display treat 5v dc offer,7805 regulator and zero.01 microfarad capacitance that generate constant output voltage +5 volts, output current capability of 100ma is used. Equally motor driver needed higher voltage, that is equipped by 12v dc offer, for the aim 7812 regulator is used. The regulator is provided with eight to eighteen volts from a dc supply.

IV. PROPOSED SYSTEM

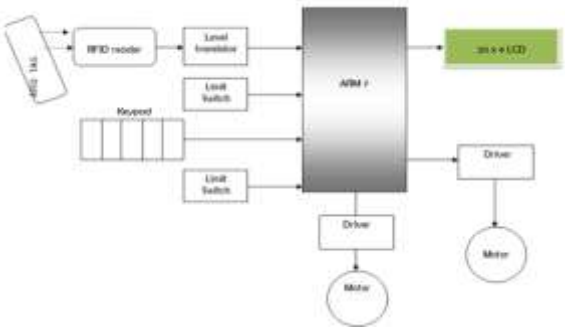
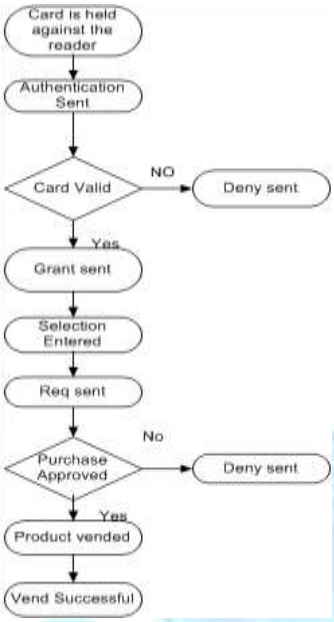


Fig.3.PROPOSED SYSTEM

- An embedded system based vending machine is designed.
- The programming module is implemented using FreeRTOS.
- The RFID card is used to provide cashless payment .
- The A4 sheets are counted and delivered based on the requirement of the user.
- The other stationery items like pen, pencil are also delivered.

A. MECHANISM



V.SIMULATION RESULTS

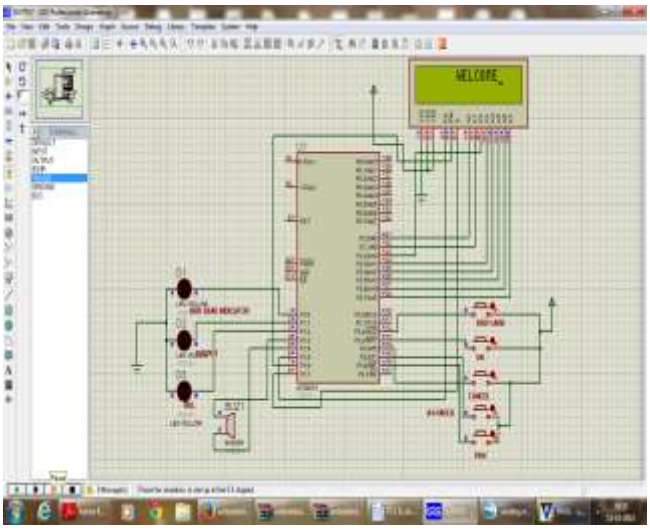


Fig 4.RFID card is read

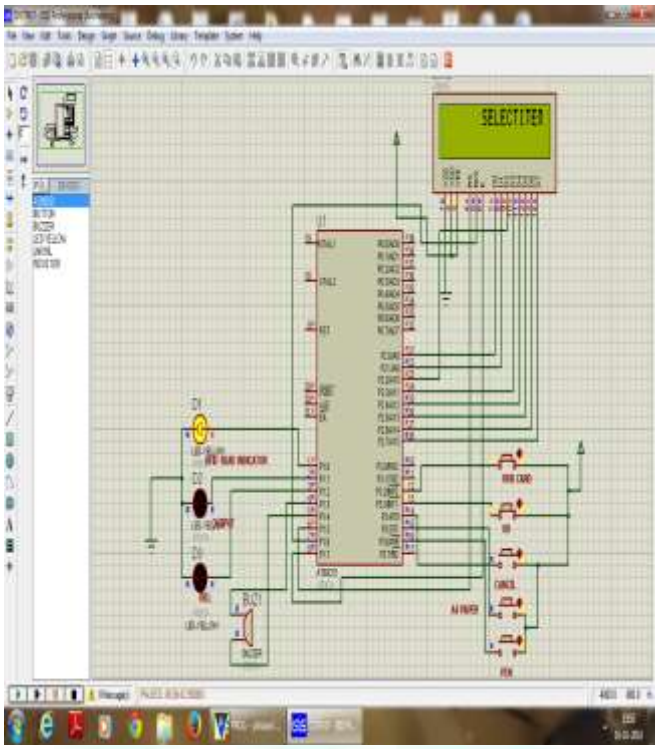


Fig 5.Selecting the required item

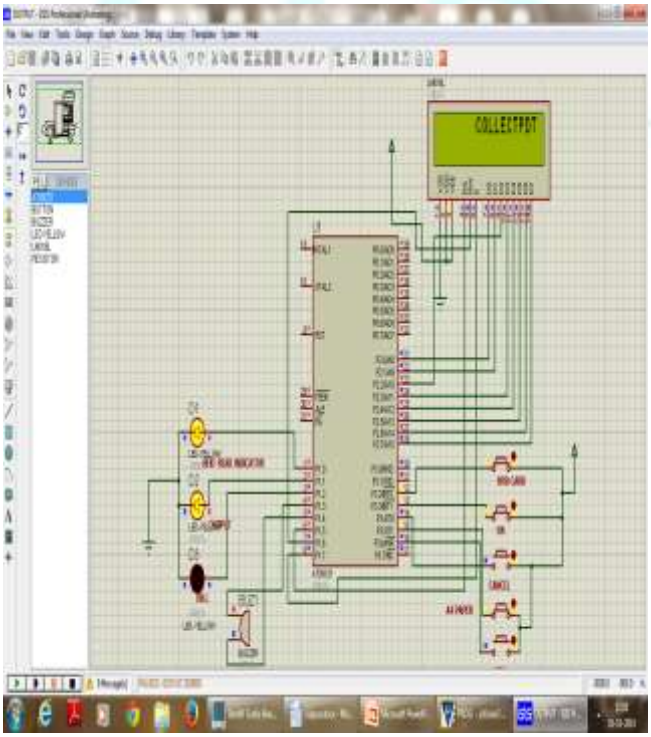


Fig 6.Collect the required product

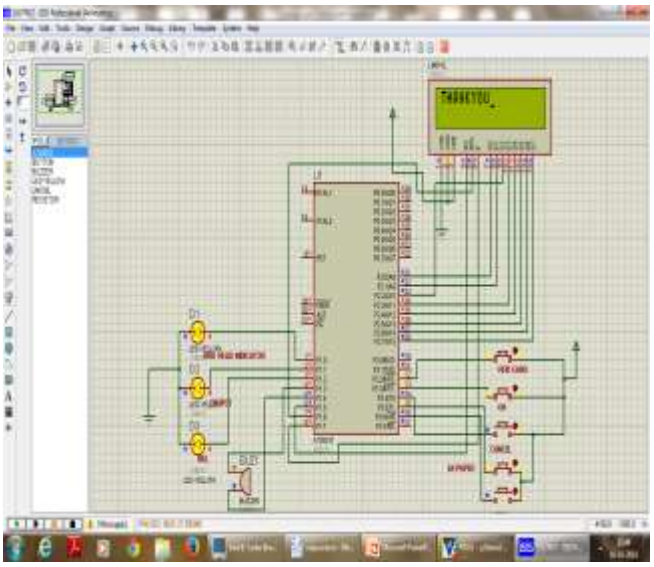


Fig 7.Process is completed

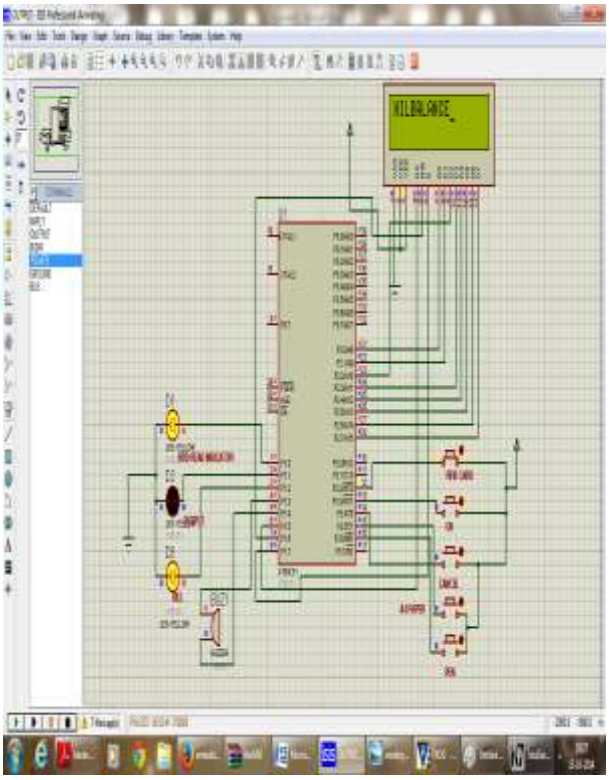


Fig 8. There is no amount in the card when the card is read

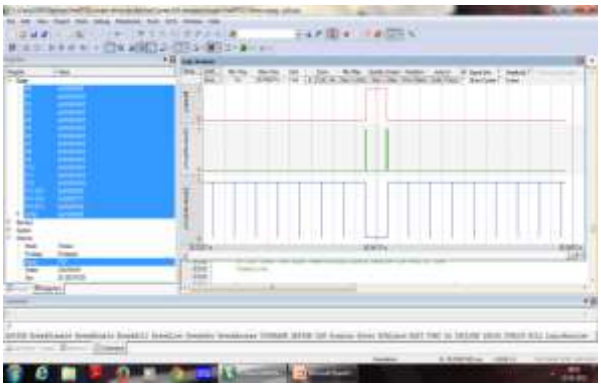


Fig.9.Task creation

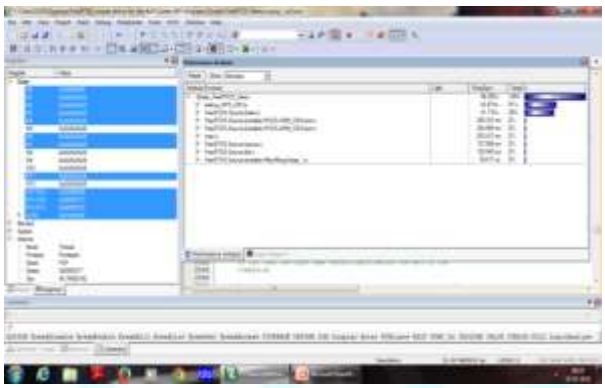


Fig.10.Performance Analysis

V.CONCLUSION

In the recent time use of digital is increasing day by day as a result of their accuracy and practicability. Since the system operation principally depends on high level programming, we are able to extend the system as our interest and needs. this method is time saving, portable, affordable, consumes less power might be created simply accessible in order that the user can use this method whenever and where.

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