IMPLEMENTATION OF AN AUTOMATIC CHOCOLATE VENDING MACHINE BASED ON RFID AND ARDUINO UNO

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ABSTRACT
The paper approaches “an automatic chocolate vending machine”. The machine uses combination of arduino UNO and RFID technology. The machine is useful on places like hospitals, institutions, railway stations, bus stands etc. The machine helps in saving time of a user as the time is a valuable thing and today no one wants to waste it. The machine provides 3 different types of chocolates and also involves 3 types of RFID cards. The work is modification in “coin based vending machine” that only accepts some particular coins as programmed in microcontroller. Here, rather than inserting any coin to buy the product, one has to scan the RFID card to buy the product. After reading the card by the reader some options of products come on the screen in front of the user. Then user has to select one of those options, later some amount from the RFID card will be deducted corresponding to the chosen product and machine provides the selected product at its output.

Keywords: Arduino UNO, RFID, Stepper motor, LCD, Voltage regulator IC.

INTRODUCTION
Vending machines works automatically to vend various kinds of sustenance like packed sandwich, chocolate bars, snacks, canned juice, candy, cold drinks, hot drinks, or other than food items like news-papers while coin is entered in the machine[1], [2]. There are several ways to execute the procedure for example implementation can be done using a microprocessor or micro-controller[3]–[5]. Generally when a person enter the amount corresponding to the product in the machine, it instantly provides that product however there are some products that are needed to be prepared[6]–[8]. The main difficulty which is seen is coin identification by coin detector. For example when cost of the required product is Rs.5 and by unknowingly user enters Rs.10 in the vending machine, and then machine is not able to return the remaining money back. Therefore there is a requirement to implement a machine that overcomes all these type of problems. Here in this work arduino is used along with RFID technology to eliminate this problem [9]–[14]. 1 out of the maximum no. of common types of vending machines is a snack machine, a metal coil is generally used in this. If a person rotates the coil then he/she will get the product at the output of the machine. Usually in marketplace it’s noted that people are able to vend goods according to their desire. The machine helps in distributing the goods according to necessity of people, it’s a simple and easy to adapt device [15].

The present paper is divided into 4 parts wherein 1st part of the paper discusses about existing state of work, 2nd part includes approach which is used to implement the present work, then 3rd part confers result observed from the experimentation, lastly the paper is followed by the conclusion.
RELATED WORK DONE

Previously invented vending machines use currency to provide different goods/products. These machines are generally equipped with microcontroller or microprocessor to provide control over the process. One has to enter a coin or paper currency depending on the different programming of the controllers. For the purpose of sensing the currency a sensor is present. This sensor senses the size and density of the currency which is not sufficient to differentiate the original from fake currency. In these machines products can be taken by inserting a fake currency of same size, shape and density, therefore a thought of combining RFID and arduino had come to solve this problem. This implementation can overcome these problems. This paper proposes a new RFID based methodoly wherein there is no need to insert any currency in the machine. Here 3 RFID tags having different-different numbers are available in the device. When one out of these 3 tags is scanned by a reader then 3 varying products come as options to the user. When user selects the product of his/her choice then machine provides that product to the user.

The accessibility of these vending machine plays foremost role since various persons rely on these machines for retrieving the product appropriately, their normal use is to distribute beverages, foodstuffs, candies and different–different consumable products without having a person to sale these products. The vending machine provides the products according to the necessity of the user. Various dealers use this because supply multiple benefits like time saving, gives choices to select the product at any time of day.

APPROACH

Figure 1 represents the block diagram of automatic vending machine. Here, the arduino is used as a controller and main processor. This machine has arduino UNO [16]–[19] in combination with RFID technology. The controller has various point on it to connect any externals like LCD [20], [21], keypad etc. A voltage regulator IC is used to regulate the supply power to a fixed value of voltage 5 volts. This 5 volts drives the entire circuitry.

![Figure 1 Block Representation](image-url)
In the procedure initially user has to scan RFID card, when this card approaches the locality of the reader then reader checks if the amount is sufficient in the card or not according to the chosen product. There are different options of the product come in front of the user. The controlling over this is provided using arduino UNO. “Motor driver circuits” are interconnected between processor and stepper-motor due to requirement of more current by stepper motor. The current from arduino is not adequate to drive the motor. Chocolates are injected in a coiled spring that is interlinked with stepper motor. If motor starts rotating, the product comes out of vending machine at a stable angle available to the user. Figure 2 shows the process flow of present work.

![Flow Chart of Process](image)

Figure 2 Flow Chart of Process

RESULT

Figure 3 presents the hardware implementation. To implement the work, here 3 different cards are selected for the experimentation. These 3 different cards have different different serial numbers. Firstly user scans the card then after detection of that card by reader, card’s details like user’s name, account balance will be displayed by the liquid crystal display (LCD) screen and following this, picture of 3 different products comes at the display screen and also the corresponding price. After selecting one of those products, the machine will provide that product at its output and corresponding amount of will be deducted from the card.
CONCLUSION

This “automatic chocolate vending machine” deals with various foodstuffs along with multiple options to make payment. Digitalization in every field is increasing day after day because it offers more exactness and practicality. Existing vending machines work after inserting currency which is time consuming process as one need to have that coin which is already programmed in the processor. Therefore in the work the processor is integrated with RFID technology to overcome the above mentioned problem. It is observed that the implemented machine is reasonable, consumes less energy and simply accessible therefore the user is able to use this machine anywhere.

REFERENCES


