Design and Implementation of Paper Dispensing Machine

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ABSTRACT: Time is the precious thing that one does not want to waste in any way. In colleges, it is quite difficult to give a stationery papers to each student during the submission period and also the counting of the paper depending on the requirement would cause further time delay and there is a chance for the error in the manual counting of paper. To avoid this problem, this project "Paper Dispensing Machine" using PIC Microcontroller, Coin sensor and RFID based on the mechatronics principle is proposed. It will help us to save more time and manual work will benullified. Also on a large scale, a dispensing machine can manage more customers as compared to a shop. It occupies less space. Also, they are cheaper than shops. And no substantial human labour is needed to operate it. Thus more dispensing machines can be set up than shops, in many more placesinaccessible to shops. This can increase last mile connectivity substantially. Dispensing machines can create better jobs. Manufacturing them can pay more than running a small shop. It will provide employment in a better-paying industry. By increasing consumer consumption more money can be circulated, thus improving the economy.

KEYWORDS: PIC16f877a, Coin Acceptor, RFID module, Wi-Fi module, Motor Driver.

I. INTRODUCTION

When the world is running hastily with advancement, time is the undisputedly the most valuable resource of all. It becomes inevitable to save time by all possible means. In places such as shopping malls, wholesale and retail outlets, automation is incorporated for the automatic delivery of the products to the customers. A dispensing machine is a machine that dispenses items such as snacks, beverages, lottery tickets, cologne, consumer products, and even gold and gems to customers automatically after the customer inserts currency or credit into the machine. These machines are increasingly taking place of the shops nowadays, which reduces the time and also reduces the human effort required to recognize, search, count and deliver the product along with cash handling. The dispensing machines helps to reduce human errors in the counting of items and transactions. The Automated Teller Machine (ATM) is the best example of all, for the application of engineering principles to reduce time and human effort. These kinds of dispensing machines operate based on the application of electronics engineering, mechanical engineering and electrical engineering, which are collectively termed as the Mechatronics. Thus, it is proposed in this project to design and fabricate an automatic paper dispensing machine, with the application of mechatronics principles, to reduce the time taken and the human effort taken to deliver the paper to the customer in required quantity and size, and also meet the higher demand for paper at the peak time, such as examination seasons near educational institutions and almost everlasting demand near the government offices.

II. LITERATURE SURVEY

The dispensing machine can be microcontroller-based which dispenses all stationery items like A4 sheets, pencil, pen, etc., once the RFID card is read. It can also be a FPGA based vending machine that supports four products and two coins. It accepts coins as input in any sequence and dispenses products when the required amount is deposited. A dispensing machine can be used for tickets in the modern transport system. Thus manpower can be minimized in buses and ticket counters and a safe journey is assured without any disturbance. Importantly, dispensing machines can be used in the medical field for different medical facilities like First Aid facility, ambulance facility, and direct calling facility via GSM, dynamic GPS, smart card facility and restocking medicine alert.

III. PROPOSED METHODOLOGY
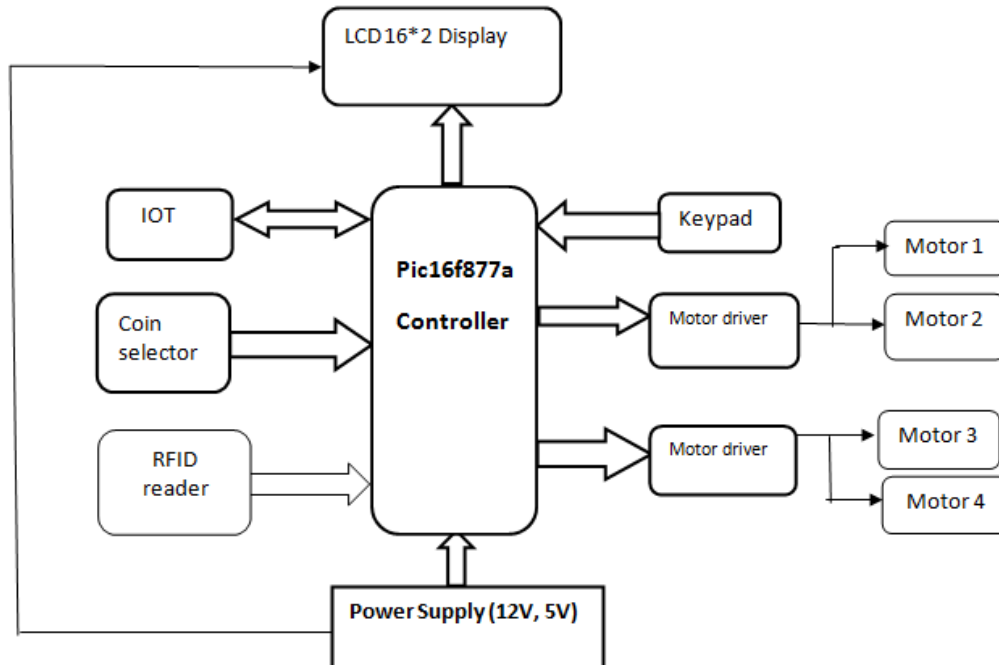
A. BLOCK DIAGRAM

Fig. 1. Block Diagram of the Project

This block diagram shows the Paper Dispensing Machine. We will be using the PIC16f877a controller which will take all decisions related to the sensor and peripherals. Motor driver (L293N) is used which will control the motor. When we insert a coin in coin acceptor then automatically stationery papers will dispense from its respective tray. Another advantage of this project is this, we are using a smart card (RFID cards). Every student will be having one smart card. In this smart card, some balance will be deposited by the user through admin mode. When we will scan the card and input the number of pages using the keypad, papers will dispensed from its respective tray. We are using IoT for keeping the record of RFID card users and their transactions.

B. ALGORITHM FOR DISPENSING MACHINE

1) Place the machine in a suitable environment and connect it to 220V/50Hz mains supply.

2) Select the desired type of pages to be dispensed using the keypad situated on the front panel.

3) Through LCD verify your selection.

4) Using keypad select the number of pages to be dispensed.

5) Select your mode of payment through two predefined modes i.e. RFID cards or through coins.

6) To pay through RFID simply swipe your card through the reader. If the user wishes to pay through coins put the coins in the coin acceptor module situated on the front panel.

7) Once the payment is verified, motors will be activated to begin the paper dispensing process.

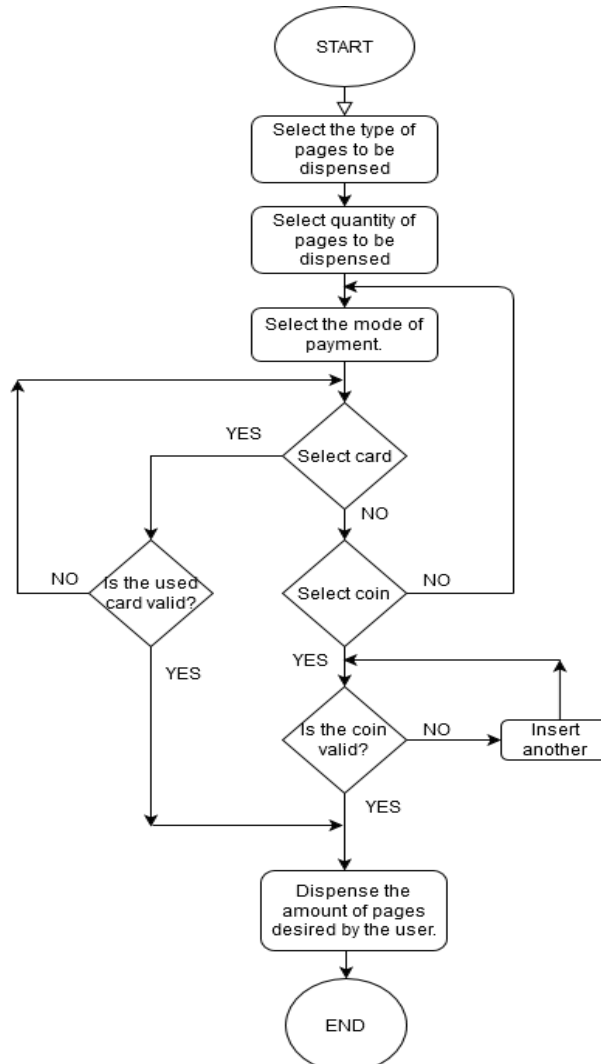8) Collect the dispensed papers through the outlet tray.

C. FLOWCHART

Fig.2: Flowchart

IV. RESULTS

A. FRONT PANEL

Fig.3: Front Panel

Fig.4: Selection of type of pages
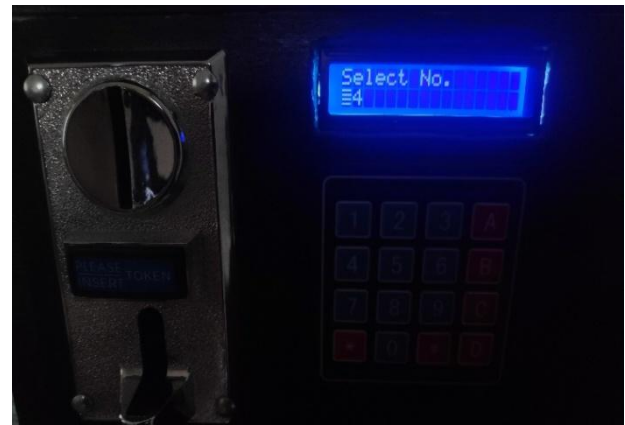

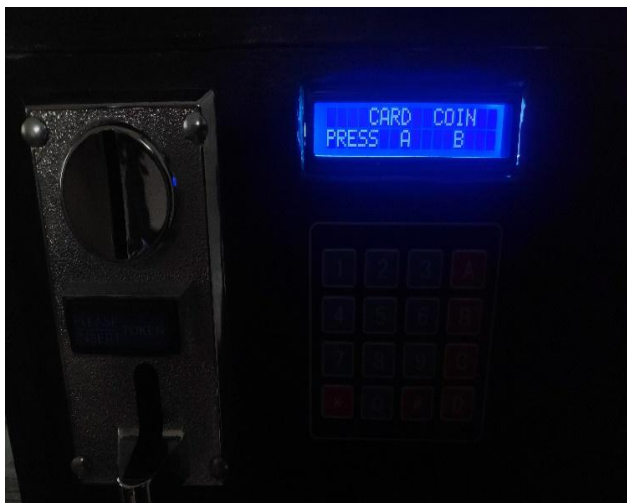**Fig.5:** Selection of quantity of pages

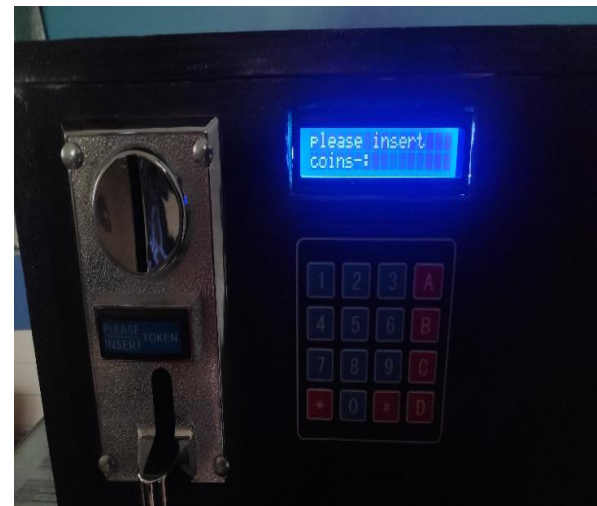**Fig.6:** Selection of mode of payment

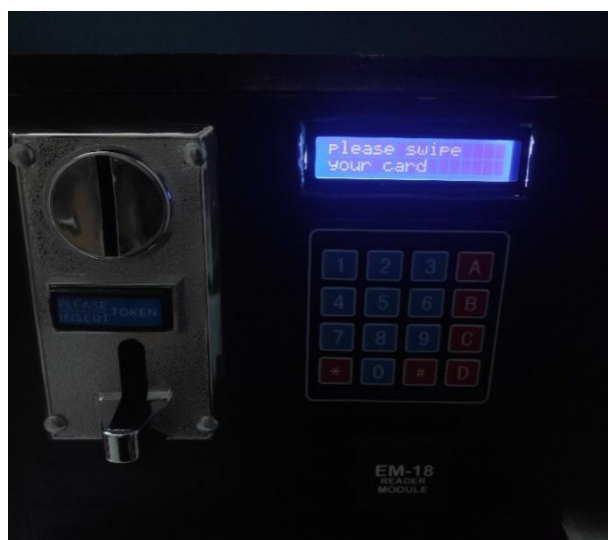**Fig.7:** Selecting coin as a payment mode

Fig.8: Selecting RFID as a payment mode
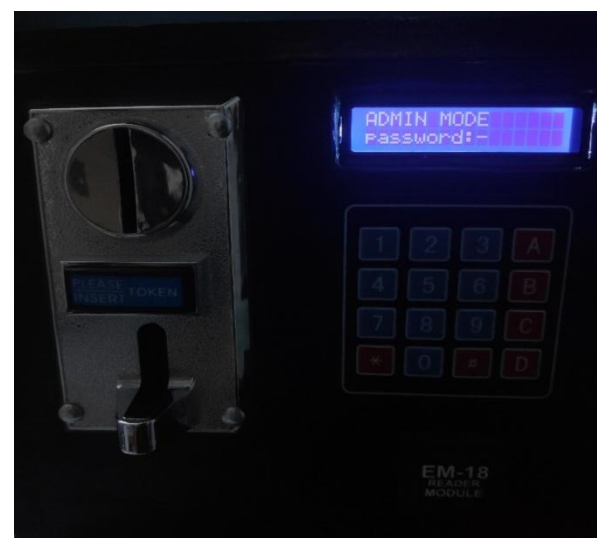

Fig.9: Admin mode to add balance in RFID card

Fig.10: Complete model and result

V. CONCLUSION

The proposed system is the design of the prototype model for a Paper Dispensing Machine. The controller part was tested and it was found that this prototype was working according to the specifications for which it was designed. For getting the paper, payment can be made using a coin or RFID tag. Though different types of dispensing machines are available, the dispensing machine to deliver papers is not developed widely, which is much needed at colleges. So we designed and implemented this machine. Except for colleges this machine can also be used at places such as government offices, courts, etc. Hence paper dispensing machine can be used to minimize human errors and increase efficiency at institutions and work places.

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