

Automatic Ration Distribution System Using IoT with Anti-theft and Anti-spill alarm

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ABSTRACT:

Ration card is very important for every home and it is used to get information about the family members, to get gas connection, etc. Also it acts as an address proof for various purposes. The poor people having a ration card to buy the various materials like sugar, rice, oil, kerosene, etc. from the ration/ PDS/ fair price shops. But the existing ration distribution system having two draw backs, first is weight of the material may be inaccurate due to human interference and second is, if the materials not buy at the end of the month, they will sale to others without any intimation to the government and customers leading to unavailability to the customers. Here in this work Automatic Rationing for Public Distribution System is proposed using GSM (Global System for Mobile), Smart card. To get the materials in ration shops user needs to authorize his/her identity by scanning the thumb finger in biometric fingerprint scanner. Then controller verifies the customer database for details. After verification, these systems show the amount details. Then customer need to enter the amount of required material/s using a keyboard. After receiving material/s controller will send the information to government office and customer through GSM technology about the transaction. This system provides the materials automatically without help of humans. The project is all about automation in the field of Ration Distribution in India. We have used smart card for individuals ration card identification and a finger print based security. Also, add to cart feature, anti-spill alarm and anti-theft alarm features provides additional security and reduces the time spend to a great extent. The main objective of the project is to get a more secure and interactive approach for automation of Public Distribution System (PDS).

Index Terms: Biometric, GSM, Anti-Theft, Anti-Spill.

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I. INTRODUCTION

The present public distribution system allows for ration distribution to the card holders with the requirement of first submitting the smartcard (ration card) and secondly to purchase the materials depending on the requirements. Then the materials will be dispensed through the weighing system involving the help of humans. This kind of system may leads to inaccuracy of weights due to human errors and if the customer doesn't buy the materials they will sell the items to someone else illegally [1]this framework has mistakes like less weightage of products, processing speed may be low, have to wait long time in queue and theft may happens [2]. In order to improvise this setup, the proposed system will have biometric scanner, GSM [3].In addition to that anti-theft alarm and anti-spill

alarms are being fixed to reduce the forgery and also the customer waiting time can be reduced, with this add to cart facility is also added so that if a customer places a order priorly he can took things from his cart from the ration shop.

This paper is organized as follows – Section II summarizes about the system design. Section III gives details about system functioning. Section IV elaborates module description .Section V gives about experimental results, Section VI gives the advantages and section VII summarizes the paper with conclusion and references.

II. SYSTEM DESIGN

This automatic ration distribution system mostly performed to reduce the corruption and reduce the wastage of time. Because in our system the goods are distributed automatically without any manpower. Fig.1 explains the basic module of automatic materials distribution based on smart ration card technology. This system consists of relay driver, solenoidal valve, gear motor, relay unit, fingerprint scanner, Arduino atmega 2560, pc, GSM, anti-theft alarm and anti-spill alarm. The proposed system expresses sharing of grains as well as liquids.

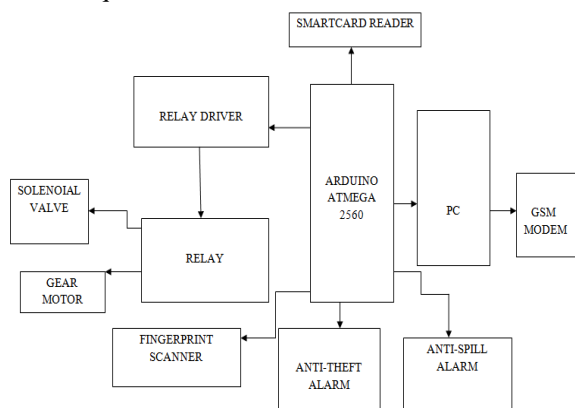


Fig.1 system block diagram

III. SYSTEM FUNCTIONING

First the user is instructed to swipe the smart card in the card reader and then it verifies the data with the government database. Then the user needs to authenticate by keeping the fingerprint on the fingerprint scanner. Fingerprint recognizer is used for high secured purpose. It acts as password for the smart card. If the recent fingerprint and saved fingerprint is similar then the PC shows the user's quantity details. After verifying the user's details the PC displays the particular user's quantity details. Then the user selects the goods with the help of the keyboard.

If user select Rice or Sugar means the user command is passed to the gear motor circuit it rotates in clockwise direction to distribute the rice. For distributing sugar, the motor rotates anti clockwise. If the user selects liquid item means the controller sends command to relay circuit. At this time relay switch ON and pass commands to the solenoid valve. The valve will be open and distribute the liquid items.

After material distribution the PC maintains the stock details and intimates the stock details to the government head office with the help of GSM. Since add to cart facility is available the user can order their items from home then they can be able to purchase quickly at the location from their

cart. In case of any theft in the stocks anti-theft alarm will be triggered and if any leakage of solid items or if oil spills inside then the anti-spill alarm will also give alert to the particular civil supply shop. From this kind of process, we can reduce the corruption and avoid the fake stock entry. Fig. 2 shows the entire hardware design.

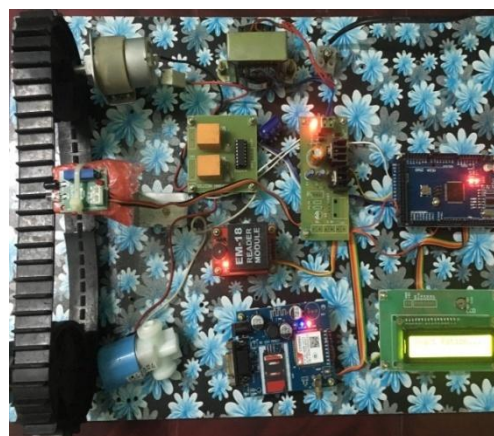


Fig.2 Hardware system

This method used to avoid crowd, long waiting period, properly maintain customer details and stock details.

IV. MODULE DESCRIPTION

A. Liquid Crystal Display

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). They are used in a wide range of applications including computer monitors, television, instrument panels, aircraft cockpit displays etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines. The below Fig.3 shows the power supply connection to LCD.

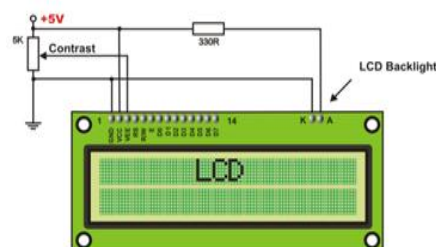


Fig.3 Power supply connection to LCD

B. SOLENOID VALVE

A solenoid valve is an electromechanically operated valve. This valve is being controlled by an electric current through a solenoid, in the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on a manifold.

There are many valve design variations. Ordinary valves can have many ports and fluid paths. A 2-way valve, for example, has 2 ports; if the valve is open, then the two ports are connected and fluid may flow between the ports; if the valve is closed, then ports are isolated. If the valve is open when the solenoid is not energized, then the valve is termed normally open (N.O.). Similarly, if the valve is closed when the solenoid is not energized, then the valve is termed normally closed. Solenoid valves can also be characterized by how they operate. A small solenoid can generate a limited force. If that force is sufficient to open and close the valve, then a direct acting solenoid valve is possible to do the required work. Here we have used solenoidal valve for collecting the liquid related stocks, it releases the products for 15 seconds. It is used frequently in pumping applications.

C. RELAY

A relay is an electrical switch that opens and closes under control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. A relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of electrical amplifier. These contacts can be either Normally Open (NO), Normally Closed (NC), or change-over contacts.

D. GEAR MOTOR

A motor is a machine which converts energy into rotating motion. A DC motor is a motor that uses direct electrical current (DC) as the source of its energy. A gear motor is a motor with an attached set of gears driving a secondary drive shaft. Practical motor designs result in motors that spin too fast for most uses. As a result, almost all gear sets are used to "gear down" the motor. The geared down drive shaft spins slower than the direct motor drive shaft. The geared down drive shaft also spins "harder". Motor speed is generally measured in revolutions per minute (RPM). Rotating force is called torque and for hobby motors is generally measured in inch-ounces or centimeter-grams.

E. GSM MODULE

GSM Module is a class of wireless devices that are designed for communicating the computer with the GSM and GPRS network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM module can perform the following operations:

- Receive, send or delete SMS messages in a SIM.
- Read, add, search phonebook entries of the SIM.
- Make, Receive, or reject a voice call.

The MODEM needs commands, for interacting with processor or controller, which are communicated through serial communication. These commands are sent by the controller/processor. The MODEM sends back a result after it receives a command. Different commands supported by the MODEM can be sent by the processor/controller/computer to interact with the GSM and GPRS cellular communication interfaces like RS-232 (Serial Port), USB etc., so that it can easily network. A GSM module assembles a GSM/GPRS modem with standard interfaced.

V. EXPERIMENTAL RESULTS

We have found that our proposed system is fast, accurate and secure. Hence, the experimental results show that the proposed system is easy to access and prevent the ration from theft activity. Initially when we switch on the system, the system is in initial condition & booting up as shown is in fig 4.



Fig.4 initial stage of the system

After entering our requirements we can collect our items as shown in fig.5.

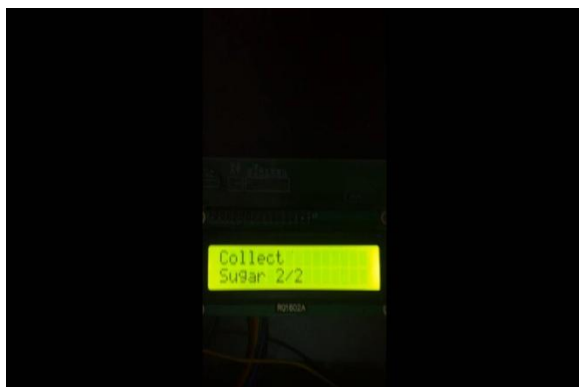


Fig.5 monthly quota for a customer.

Finally at the stage of completion the screen will display a thank you message as given in fig.6



Fig.6 final display of purchasing.

VI. ADVANTAGES

- Increased corruption as well as market sector can be prevented if system becomes automated.
- The problem of hoarding at government super bazaars that give rise to price hike can be prevented.
- Customers will not have to pay overcharge of the goods as all the prices will be known by them.
- The customers will get their rightful entitlement in terms of quantity.

VII. CONCLUSION

This proposed system provides safe, secure & efficient public distribution system. By using this system ration shop can be automated. It solves the problem of manual work in public distribution system & provides benefit to the government by sending current stock information to the government database via GSM & reduces manpower.

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