Smart Rationing System Using RFID Technology

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Abstract: Ration card is very important and useful for family member’s details, to get gas connection, it acts as address proof for every person etc. Government provides ration card at every rations shops so that every person can purchase materials like oil, grains, kerosene etc. But the system has two drawbacks, first is weight of the material which may be inaccurate due to human mistakes and the other one if not buy the materials at the end of the month, they will sell the goods to other people without any intimation to the government and customers. In this paper, the concept is to replace the manual work in PDS (public distribution system).

The ration distribution system is automated by using RFID technology, which is similar to that of the ATM. This automated ration system replaces the conventional ration card system by smart system. In addition, the GSM module is placed in the machine in order to check the correct user access. If the user is authorized user, the next process takes place and the input can be given in the LCD screen. As soon as the input is given, the products are obtained from the automated ration shop and the amount is taken from the bank account of that authorized person. The ATmega16 controller is pre-programmed in such a way to perform the similar operations. In this automated ration shop government controls all transaction that occurs in ration shop. In this process the government is involved and in proposed system the government database is connected with the system via GSM module, which further sends the up-to-date information to the government and the consumer.

Keywords: Atmega16 controller, GSM technology, RFID card.

1. Introduction

Ration card is very important document for every citizen in India. Ration cards are essential to purchase the various materials like oil, sugar etc. at cheaper rate from various ration shops issued by the government. The ration card act as address and identity proof. We can also use ration card as an important document when you can apply for passport, Pan Number, driving license etc. But the drawbacks are existed here, if the items are not sold till the last month, then the shopkeeper will sell to other customer and take the profit into his pocket and take a note of false reading on government record diary.

The automatic rationing system, which will be installed at the ration shop which contains three interfaces namely LCD screen, billing printer and GSM. All these interfaces are interfaced to the advanced microcontroller. ATmega16 Microcontroller is interfaced to the GSM and further to the central database of the government. At ration shop centre the particular person would have to swipe the card on the system.

After this for the purpose of security authentication and to prevent card misuse, the system would ask for the OTP (One Time Password) that will be sent to the authorized consumer’s registered mobile number after the card is read to verify the authorized consumer. Once authenticated, automatic rationing system would get updated by the information regarding the existing subsidies for the current user in the LCD screen. The inputs are given by the consumer and the required products are selected by the consumer itself in the LCD screen. From the LCD screen inputs given to the ATMega16 microcontroller and the products are obtained from the automated ration shop. Further to prevent irregularities in distribution of ration, government can supply various products (like rice, wheat, kerosene, sugar etc.) to rationing shops in the form of sack stored in the container.

After every transaction made by the users the central database would be updated immediately.

2. Hardware implementation

Atmega16: It is an 8-bit high performance microcontroller with low power consumption. Atmega16 is based on enhanced Reduced Instruction Set Computing (RISC). Most of the instructions execute in one machine cycle. The maximum
frequency of Atmega16 microcontroller is 16MHz. Programmable flash memory is 16 KB, static RAM of 1 KB and EEPROM of 512 Bytes.

**Power Supply:** Firstly, power supply is the most important part of our project. We require +5V regulated power supply.

**LCD Display:** A liquid-crystal display is a flat panel display, or video display that is used to display any information of that particular database. It does not emit light directly. Applications include computer screen, instrument, television, mobile displays, aircraft cockpit displays, and signage. The most common use devices such as video players, gaming devices, clocks, watches, calculators, and telephones. The LCD screen is more energy efficient than a CRT. The power consumption is very low while compare with other devices.

**RFID Circuit:** RFID stands for Radio-Frequency Identifications. The RFID is a tiny device that includes a little chip associated an antenna. The chip generally is capable of carrying two,000 bytes of knowledge or less. A major advantage of RFID devices higher than the others devices, RFID device doesn’t need to positioned exactly relative to the scanner. The RFID devices can work inside a couple of feet (up to twenty feet for high-frequency devices) of the scanner. The RFID tag accustomed browse data regarding the client through RFID Reader.

**GSM Module:** GSM electronic equipment may be a specialized variety of electronic equipment that accepts from the mobile operator perspective, a GSM electronic equipment appearance rather like a mobile. Once a GSM electronic equipment is connected to a pc, this permits the pc to use the GSM equipment to speak over the mobile network. While these GSM modems area unit most often accustomed give mobile web property, several of them may be used for causation and receiving SMS and MMS messages. A GSM electronic equipment may be an obsessive electronic equipment device with a serial, USB or Bluetooth association, or it may be a mobile that gives GSM electronic equipment capabilities. For the aim of this document, the term GSM electronic equipment is employed as a generic term to check with any electronic equipment that supports one or a lot of the protocols within the GSM organic process family, together with the two,5G technologies GPRS and EDGE, yet because the 3G technologies WCDMA, UMTS, HSDPA and HSUPA a SIM card, and operates over a subscription to a mobile operator.

3. Working of the proposed system

When the RFID reader reads a RFID tag, it sends an OTP (One Time Password) to the registered mobile number. Once the consumer receives the OTP, he/she has to enter the OTP in order to verify the RFID tag.

After verifying the RFID tag, the details of the consumer are displayed on the LCD display and also the options to be selected are displayed (options here means the quantity of grains and oil).

The consumer has to select the options for grains or oil and then select the quantity of the goods.

Once the quantity is selected the ATmega16 sends signal to the relay. The relay turns on the motor to the entered quantity of the grains or oil.

The grains or oil are dispensed. After the consumer obtaining the goods, the AT mega sends a signal to the GSM module which in turn sends an SMS to the consumer’s registered number and also to the government.

Here we also have a theft sensor. If any mischievous activity is done to the goods container, the theft sensor will send a signal to the AT mega which in turn will give relay a signal and the relay will turn on the alarm and also the GSM module will send the message to the government.

4. Role of the system to overcome the current problems

1) Illegal Usage
2) Over crowd
3) Processing speed is slow
4) Selection of households Targeting
5) Bogus cards
6) Hijacking of ration cards
7) Materials theft
8) Mixing of products
9) Poor quality of supplies
10) More than the prescribed rates are charged
11) Cannot able to get the accurate quantity of supplies
12) Cannot able to get the material at any time

5. Advantages

1) Material theft can be prevented
2) Reduction in distribution of poor quality products
3) Proper charges will be charged for every product
4) Consumer can get material at any time
5) Accurate quantity of product will be distributed

6. Expected results

The government services are reached to poor people effectively and also the corruption in PDS and FPS can be reduced or avoided to a great extent.

7. Future benefits

1) Corruption in government and marketing sector can be prevented if this system becomes automated

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**Fig. 2. Circuit diagram**
2) Cost effective approach
3) Time saving
4) Maintains data properly

8. Conclusion

- Time and Cost saving
- Secure and efficient way of public distribution system
- Solves the problem of manual process in public distribution system.
- Provides benefit to the government
- Reduce the manpower
- Easy access by consumers

9. Future scope

1) They can make use of an application that would show the past transactions and also the can make the goods home delivery which can provide employment.
2) They can the registration online so that the consumers need no stand in a long queue.

References