

Automated Rationing System by Using DC Motor through an RFID

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ABSTRACT

Now a day ration card is very important for every home and used for various field such as family members details, to get gas connection, it act as address proof for various purposes etc. All the people having a ration card to buy the various materials (sugar, rice, oil, kerosene, etc.) from the ration shops. But in this system having two draw backs, first one is weight of the material may be inaccurate due to human mistakes and secondly, if not buy the materials at the end of the month, they will sale to others without any intimation to the government and customers. This project deals with the design and execution of a rationing system for Public Distributive Systems. This project presents an RFID (Radio frequency identification) based smart rationing system which would overcome the drawbacks of conventional ration system. This will provide RFID tags to the customers instead of ration cards. The people have to show the card before the scanner and it communicates with the microcontroller there by with the PC, which shows the details completely. The microcontroller is attached with the dc motor and a dedicated liquid submersible pump for kerosene. The mechanical assemble along with the motor helps to pour the required quantity of rice for the person automatically and similarly the kerosene is pumped by the liquid submersible pump and poured in the customer's vessel. As everything happens automatically there is no chance of irregularity.

Keywords: RFID, PDS, LCD, USB, AIDC, PCB and SSR.

1. INTRODUCTION

India's Public Distribution System (PDS) is the largest retail system in the world. Public distribution system provides a ration card issued under an order or authority of the State Government for the purchase of essential consumer materials like rice, wheat, kerosene and oil [2]. State Government issues distinctive ration cards like yellow ration card, saffron ration card, and white ration card depending on family annual income. The consumer material is supplied to ration card holders in the first week of every month by ration shopkeeper. Public Distribution System is one of the widely controversial issues that involve malpractice. The manual intervention in weighing of the materials leads to inaccurate measurements and/or it may happen, the sends information in the form of SMS to related people. The proposed RFID based automatic ration shop system would bring transparency in public distribution system and become helpful to prevent malpractices [8].

RFID Reader and Tag: Radio-frequency identification (RFID) uses electromagnetic fields to automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. Active tags have a local power source such as a battery and may operate at hundreds of meters from the RFID reader. Unlike a barcode, the tag need not be within the line of sight of the reader, so it may be embedded in the tracked object. RFID is one method for Automatic Identification and Data Capture (AIDC). Every consumer i.e. family head provided RFID card which acts as ration card. The RFID card has unique identification number. The consumer scans the card on RFID reader. Every person has to use his RFID in order to get their ration. The ration shop worker can easily collect.

Microcontrollers: A microcontroller is a small computer on a single integrated circuit. In modern terminology, it is a System on a chip or SoC. A microcontroller contains one or more CPUs along with memory and programmable input/output peripherals.

Program memory in the form of Ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips. Ration shop owner illegally uses consumer materials without prior knowledge of ration card holders. The proposed system aids to control malpractices which are present in ration shop by replacing manual work with automatic system based on RFID and GSM. Every consumer i.e. family head provided RFID card which acts as ration card. The RFID card has unique identification number. The consumer scans the card on RFID reader which is interfaced with microcontroller kept at ration shop. Once consumer is validated by password, the system asks the consumer to select appropriate material and quantity of material through keypad. Based on material chosen by consumer, appropriate circuitry will be activated and consumer gets material. GSM interfaced with microcontroller.

2. PREVIOUS ANALYSIS

A ration depot is generally bubbling with life. Long before the opening of the depot, the card-holders stand outside it in a long queue. Sometimes there are separate queues for ladies and gentlemen and for those who want eatables like cereals, pulses, sugar etc. and those who want kerosene oil. Generally, there are three or four workers at every ration

depot. The first worker takes the card from the customer, enters it in a register, takes the payment and issues a slip indicating the quantity of the commodities to be supplied. The second worker receives the slip and supplies the correct quantity of the commodities. The remaining one or two workers look to it that the supplier does not run short of any commodity or attend to the complaint or problems of the customers. If the worker who supplies the commodities is seen running out of an item, a new sack etc. from the store nearby is made available to him immediately. Sometimes, there is a quarrel between two customers. But often it is settled amicably.



Fig 1: Past Billing System

The figure1 shows the past billing system. In the case of certain commodities, the government sells them at subsidized rates to prevent price rise or scarcity in the open. The Public Distribution System has been very beneficial to the common man. Still it needs improvement, particularly at the level of ration depots.

3. EXISTING SYSTEM

Smart Ration Card

First the user gets the smart ration card instead of a traditional ration card for secured ration materials collection [10]. This card used to easily identifies the user's details. In a smart card corner the designer will print the serial number based on family details. Depends upon this serial number the user collect the materials. The shop worker provides the schedule to the user. On that day only the user buys the materials.



Fig 2: Basic Module of Smart Ration Card

The figure 2 shows the basic module of smart ration card. The last two days per week are allotted for distributing the materials to all users. This process is regularly reducing the user's time wastage; reduce worker's stress; proper maintenance, etc.

Finger Print Recognizer

Finger print recognizer is used for high secured purpose. If user insert the smart card into the smart card reader means the PC provides the user's details with the help of Database. Subsequently the user thumbs Rice and sugar pouring Weight

Sensor Object detection Sensor Smart machine Biometrics
 Touch Screen Personal computer Oil and kerosene pouring.



Fig 3: Basic finger print recognition

The existing system we use is the biometric ration system. Biometric based handheld billing machines have been introduced for the first time in the state of Tamilnadu. In 20 fair shops in the city as a measure to curb malpractices and to ensure that the subsidized commodities are only delivered to the beneficiaries. The figure3 shows the figure of finger print recognition.

The biometric equipment is similar to the handheld billing machines in use at many fair price shops. Every transaction on the biometric enabled machines can be completed only with the authorization of cardholder. Under this new system, the shopkeeper will enter the card number on the biometric machine and one of the family members has to authorize the transaction. After authentication, the machine will allow the shopkeeper to enter the list of items sought. The shopkeeper will also make an entry in the family card. The figure4 shows the advancements of billing systems in ration shops.



Fig 4: Recent advancements of billing system in ration shops

Biometric

Biometrics generally refers to the study of measurable biological characteristics. In computer security, biometrics refers to authentication techniques that rely on measurable physical characteristics that can be automatically checked.

There are several types of biometric identification schemes:

- Face: The analysis of facial characteristics.
- Fingerprint: The analysis of an individual's unique fingerprints.
- Hand geometry: The analysis of the shape of the hand and the length of the fingers.
- Retina: The analysis of the capillary vessels located at the back of the eye.

- Iris: The analysis of the colored ring that surrounds the eye's pupil.
- Signature: The analysis of the way a person signs his name.
- Vein: The analysis of pattern of veins in the back of the hand and the wrist.
- Voice: The analysis of the tone, pitch, cadence and frequency of a person's voice.

Though the field is still in its infancy, many people believe that biometrics will play a critical role in future computers, and especially in electronic commerce. Personal computers of the future might include a fingerprint scanner where you could place your index finger. The computer would analyze your Finger print to determine who you are and, based on your identity, authorize you different levels of access. Access levels could include the ability to use credit card information to make electronic purchases.

In order to reduce all these existing manual system, various projects are done by using various microcontrollers and RFID readers and tags with the help of the mechanical arrangements. Automatic ration distribution system replaces the manual work in the ration shop. Mostly People suffer due to the corruption and time consumption. In this system we use smart card instead of ordinary ration card. The automatic rationing system installed at the ration shop.

The aim of the project is to developing a better, efficient ration card system using QR Code technology. Our project gives active participation in Step towards Digital India. Atomization of distribution system at the ration shop as well as maintaining the database at one main control station and updating the database so that the shopkeeper does not cheat the poor people are what this project aims at achieving. The Coded Card Security System is a novel approach to modern automated security management. By using the above based technology the following are the advantages.

- User friendly
- Access to authorized person only
- Reduce corruption
- Active contribution towards step towards digital India.

4. PROPOSED SYSTEM

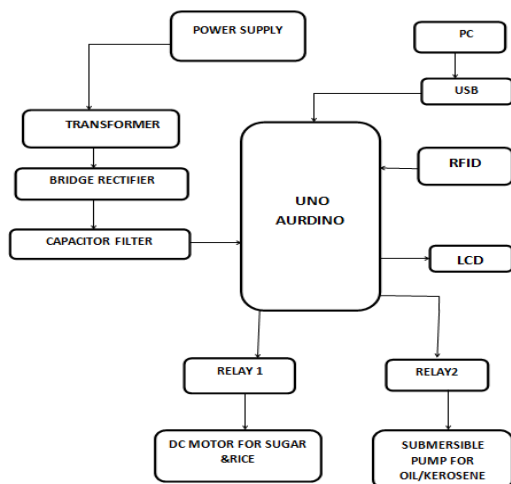


Fig 5: Block diagram

The fig.5 shows the block diagram of automated rationing system using DC Motor through an RFID. The above figure5 represents the basic block diagram of our proposed project. The supply given to the arduino is step down from 230V AC to 12V AC with the help of step down transformer. The output is sent to bridge rectifier to convert AC to pulsating DC. The pulsating DC is sent to capacitor filter to reduce the ripples.

Now the step down voltage 12V DC is converted to 5V DC with the help of voltage regulator which is in-built in the microcontroller. The program is dumped into microcontroller. An RFID is connected to the arduino. The RFID tag is scanned and the details are shown in the 2x16 line LCD which is connected to the arduino.

The microcontroller verifies the details of the customer and checks if he is eligible or not for the ration. If he is eligible, the output is obtained with the help of two relays connected to the arduino.

One relay is connected to the dc motor which acts as a stepper motor in our project. It has a proper time delay in terms of steps so that the commodities required are obtained from the bottom.

One relay is connected to the submersible pump so that oil/kerosene is obtained with a proper time delay.

Once this process is done the total amount is taken from the bank account of the customer. The output can also be seen in the personal computer by connecting an USB.

5. RESULTS

The DC motors automatically rotates in steps, when the RFID card scanned is valid and the details of the person are displayed in both LCD and PC. The commodities required (rice/sugar/wheat) are obtained mechanically. As well as submersible pump pumps out required amount of liquid (oil/kerosene).

Table 5.1 Outputs in LCD Display

RFID Card	LCD Display
Card 1	Valid
	Put bag for sugar/rice
	Oil is on
	Transaction is done
Card 2	Invalid

The figure 6a, 6b shows the complete view of our project.



Fig 6a: Front View of kit



Fig 6b: Back View of kit

It consists of a 12v step down transformer, bridge rectifier, capacitor filter, 2 relays, submersible pump arduino board in-built with a voltage regulator, LCD display, battery and a DC motor.

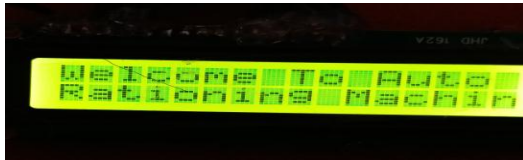


Fig 7: LCD Display 1

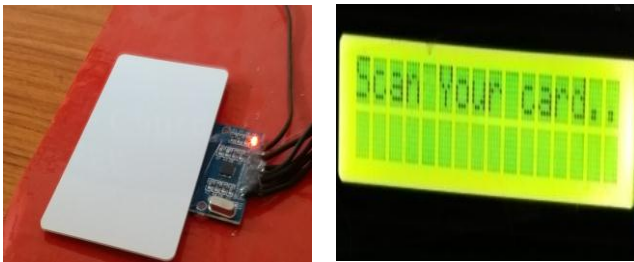


Fig 8: RFID Scanning 1

In the figure 7, we can see the display of an LCD when the circuit is turn on. It shows “Welcome..” and asks us to scan the card. In the figure 8 the RFID given to the customer is scanned through an RFID scanner with a distance of about 1.5cm. Thereby we can know whether the scanned card is valid or not.

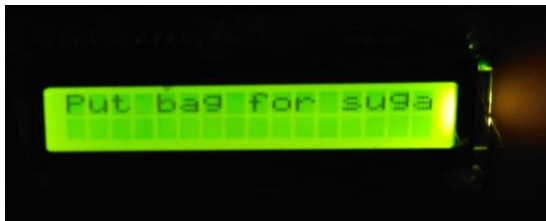


Fig 9: LCD Display 2



Fig 10: LCD Display 3

In the figure 9 once the card is valid we will get a display to collect our commodities which are packed.

In the figure 10, we will get a display when the oil is pumped out.



Fig 11: Materials drawn from the system

In the figure 11, shows the automatic drawing of commodities and pumping of oil after card is scanned.



Fig 12: LCD Display 4

Once the entire process is completed we will get a display which is shown in figure 12.



Fig 13: RFID scanning 2

The figure 13 shows the scanning of another RFID card.



Fig 14 : LCD Display 5

There is no more chance for dealers by mismatching the correct details regarding to this ration items. It automatically displays an invalid and further process stop which is shown in figure 14.

6. CONCLUSION

Radio-frequency identification card uses electromagnetic fields to automatically identify to object. So it may be embedded in the tracked object. RFID is one the ration card

which constitutes intelligent ration cards. The people have to show the card before the reader and the reader communicates with the microcontroller there by with the PC.

Whenever the card is scanned it displays whether the card is valid or not and also displays the number of ration items to be given with the cost and an additional option is given to the card holder to select their ration items. The PC searches for all the data of the customer including their photo and address and details of family members.

By this, the government can easily check whether the items are distributed to all people correctly or not without going to ration centers. There is no more chance for dealers by mismatching the correct details regarding to this ration items. This system is very accurate, simple and low power consumption, which is used for the real time applications.

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