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Smart Card Based Public Distribution System

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Abstract: ***Ration card has a very important role in every home and is 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, kerosene, etc) from the ration shops. But in this system having two draw backs, first one is the inaccuracy in the weight of the materials 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. In this paper, proposed a Smart Card Based Public Distribution System using RFID (Radio Frequency Identification) technology instead of ration cards. To get the materials in ration shops we need to show the RFID tag into the RFID reader, then controller check the customer details in the card. After verification, these systems show the amount details. Then customer needs to enter the required materials by using keypad. After receiving materials the controller send the SMS to customer. This system provides the materials automatically without the help of humans.***

Keywords: RFID Tag, RFID Reader, Keypad

1. Introduction

Public distribution system is a government based chain of shops that works for the distribution of basic commodities to the needy sections of the society at very cheap prices. Rice, kerosene, sugar, etc are the major commodities distributed by the public distribution system. The conventional system has frequently been criticized for instances of corruption and black marketing.

In this paper, we proposed a concept on automatic ration materials distribution based on RFID technology to avoid the drawbacks of present PDS. The RFID card is act as ration card. Smart card is very easy to carry and to use and to use. The smart card normally contains details of a family, family head photo, card number and mobile number of family members.

When the person comes to ration shop, they can swipe the card and confirm their identity. In the proposed system smart card is provided to all ration card holders. In this card contain all the details of consumer including thumb impression. The user entered the ration shop and they swipe the card. After validation process was successful they are allowed to purchase products. The lists of bought products are send to their registered mobile number. In this there is no kind of misuse are done. Whenever validation process will be success then only the list of products will displayed. In addition to that the total amount of available quantity as well as the total amount of stock sell is also displayed. After each transaction the count will be reduced. After each transaction the details of the materials allowed is updated. When the accountant updates the goods details in particular shop they are updated in local system. Then the goods are transferred to that shop. The shop keeper cannot able to change any details. It is more user friendly to uneducated people also. These kinds of process can reduce robberies in ration shop. And also can reduce illegal entries in data base.

The main aim of this system is to reduce the illegal entries in ration shop is by providing a smart card. Errors such as inaccurate weight can be avoided. It helps to maintain the data properly.

2. Literature Review

Evolution of public distribution of basic commodities in India had its origin in the rationing system introduced by the British during the World War II. The system was started in 1939 in Bombay and gradually extended to other cities and towns. By the end of 1943, 13 cities had been brought under the coverage of rationing and approximately 771 cities or towns were covered in 1946. Some rural areas, suffering from chronic shortage were also covered. Since there PDS is following the same pattern. There are only little modification is happening in the field of PDS.

One of the proposed concepts of automation of ration shop is based on finger print module[2]. In the proposed system smart card is provided to all ration card holders. In this card contain all the details of consumer including thumb impression. The user entered the ration shop and they swipe the card and also verify the thumb impression. After validation process was successful they are allowed to purchase products.

The another proposed concept is to replace the manual work in public distribution system. The ration distribution system is automated by using PLC, which is similar to ATM machine[3]. This automated ration system replaces the conventional ration system by using smart card. In addition, the finger print detector is placed in the system in order to check the correct user access. If the user is correct, then the input can be given in the touch screen. When the products are obtained from the automated ration shop , amount is taken from the bank account of the particular person. The embedded controller is pre- programmed in such a way to perform the similar operations. In this automated ration shop the government control transactions that occur in ration shop. In order to involve government, the proposed ration shop system is connected to the government database through GSM modules, which further sends the up-to-date information to the government and the consumer. For the efficient operation and economic constraints of the system, the power supply unit is alternate to solar power system.

One of the alternative concept is to show the Aadhar card, then the barcode scanner scans the Aadhar number. The scanned UID number should be matched with the data base. The database consists of all the details of the person including finger print details and also the format of allotted materials for that family[4]. Then a finger print scanner is used to verify the finger print. If all the verification processes are completed, then the person's identity is displayed on graphical interface unit (GIU). After that the person will be asked to enter the quantity of material. Then an itemized bill along with rates and total bill of selected commodities will be displayed. The material will provide only after the payment. Payment is done through debit card. After the completion of all these process a message will be sent to the user using GSM technology. Automatic ration distribution system uses RFID instead of ration card. In the automatic ration distribution system using RFID and GSM method first the person has to show his RFID card which consists of all the details of that person and also the materials allotted for him. Then the RFID reader reads the data and given to the microcontroller. User has to enter a password to verify the correct person. Microcontroller compares the data with the database which is stored in the computer. When the data matches the user has to enter the needed material with quantity. Then the materials will provide to the user through valves. GSM technology is used to send the message to the user.

3. Proposed Methodology

Automatic Ration Materials Distribution Based on RFID Technology is to avoid the drawbacks of present PDS. RFID card is act as ration card. To get the materials in ration shops we need to show the RFID tag into the RFID reader, then the controller check the customer codes and details of amounts in the card. After verification, these systems show the amount details. Then customer need to enter they required materials by using keypad, after receiving materials controller send the information to government office and customer through GSM technology. Here, only authentic person could receive ration materials from ration shops based on the amount available in the RFID.

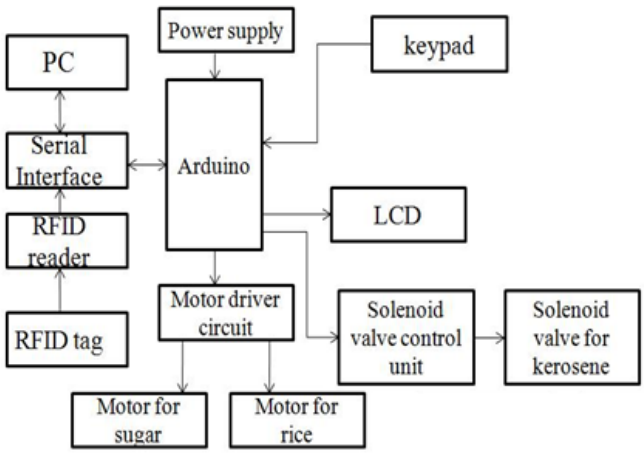

Figure A: Block diagram of proposed methodology

RFID

RFID (Radio Frequency Identification) is one of the methods for identifying unique items using radio waves. Basically RFID systems are made of three components like readers, antennas and tags which can carry the data on a single microchip. Now a day's RFID technology is used in many applications, including security and access controlling, transportation and supply chain tracking etc. It can be used to track the products in a similar way by using the bar codes for product identification, but RFID have additional benefits. RFID does not require line of sight to read the tag, has a longer read range than bar code reader, and these tags can store more data than bar codes ca have. Readers can simultaneously communicate with multiple tags**.**

Micro-controller

A micro-controller is a system with peripherals, memory and a processor that can be used as an single embedded system. Most of the programmable micro-controllers that are used are embedded in other consumer products like phones, peripherals, automobiles and household appliances for computer. The micro-controller used here is ATMEGA328. It is programmed with help of Arduino. Arduino is an open source computing platform based on flexible design with the help of micro-controller and software development environments. The Arduino integrated development environment (IDE) is a cross platform application written in Java and most of the programs are written in high level language. It can run in all operating systems like Windows, Mac OS and Linux. It is basically designed to introduce programming skills to artists and other new comers.

Solenoid Valve

One solenoid valve is used in the proposed system for the distribution of kerosene. The valve will be controlled by solenoid valve controller circuit. The actual withdrawal of materials takes place through the solenoid valve which control elements in fluid.

Power Supply

The Power Supply is most important for micro controller and all other electronic circuits. Here 5V power supply is required. It consists of 230V, 50 Hz step down transformer which gives 12volt, 1A AC voltage. Rectifier is used in order to convert AC voltage to corresponding DC voltage. Then filters are used to remove the ripples in the output. To maintain the output voltage at a fixed value 7805 voltage regulator is used.

LCD

A liquid-crystal display is an electronic visual display that uses the light modulating properties of liquid crystals. A 16x2 LCD means it can display 16 characters per line and there are 2such lines.

4. Flow Chart

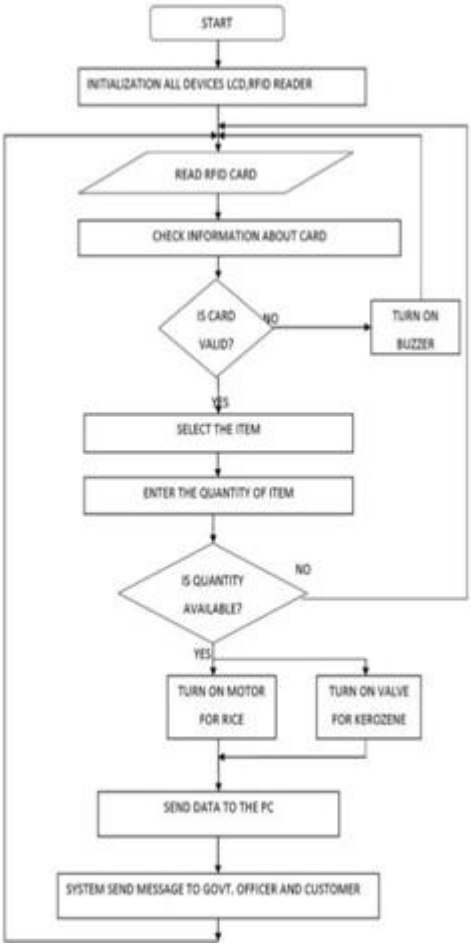

Figure B: Flow chart

First step is start. Next is to initialization of all devices such as RFID reader, LCD etc. The user has to show the RFID card first then the RFID reader reads the card. Then controller will check the information provided in the card with details that already stored in the system. If the card is valid the user can select the needed item using the keypad. Otherwise buzzer will make sound. Then after selecting the item user should enter the required quantity of the item. If the entered quantity is available in the card then the motor for rice will be turned ON, if the selected item is rice. If the selected item is kerosene then the valve will be turned ON. Otherwise if the quantity entered is not available, then the user has to show the card again. After the purchase the data is send to the PC for the updating process. After that the system send message to the government officer and customer about the purchase. Then the system is ready to accept the next card.

5. Results

In this system, kerosene and rice is distributed through automatic mechanism without any help of humans. After receiving the materials, controller sends the information to customer. This system is very simple in construction and has low power consumption, so that it can used for the real time applications.

6. Applications

Automation of ration shops is the relevent system which can help the people to buy the ration shop things more easier , this is the idea that can be used in the government ration shops in all over the India. Here is an advanced system useful for the automatic system. The proposed system focuses on design and implementation of automation of ration shops. The various products like rice, sugar and kerosene are distributed using this automated ration shop system

7. Conclusion

Automatic ration system is an advanced ration system that based on RFID technology. In this proposed system, RFID tag is used instead of ration cards. This system has greater scope in future. This system has no manual data stored and all information is stored in database, the higher authority can check the details as and when it's necessary through the use of servers. The drawbacks of the existing system are rectified by this method. In this system, ration materials distributed through automatic mechanism without any human errors. This system helps to prevent the corruption and hoarding.

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