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Automation of Ration Card Using RFID and GSM Technique

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Abstract RFID based automatic ration system is an approach in public distribution system useful for more efficient, accurate and automated technique of ration distribution. The conventional ration distribution system has drawbacks like inaccurate quantity of goods, low processing speed, large waiting time and material theft in ration shop. In this paper, proposed an Automatic Ration Materials Distribution Based on GSM (Global System for Mobile) and RFID (Radio Frequency Identification) technology instead of ration cards. To get the materials in ration shops need to show the RFID tag into the RFID reader, then 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 keyboard, after receiving materials controller send the information to government office and customer through GSM technology.

Keywords LCD, Microcontroller, RFID, GSM

1. Introduction

The ration distribution system is one of the largest government's economic policies in India. Its main motto is to provide food grains (sugar, wheat, rice, kerosene etc.) to the people at affordable rates. The network of the ration shops is spread all over in India to provide food security to the people. This distribution of ration is controlled and monitored by central government, along with the state government. But it has so many limitations. Most of the ration shopkeepers keep fake ration cards with them. Due to fake ration cards, the dealer receives the extra ration from higher authority and he sales it into the open market. The dealer may not provide a sufficient amount of food grains to consumers. Most of the time people are not aware of the availability of ration in ration shop. The dealer may sale ration at higher rates than recommended by the government or he may do wrong entries in register. In this way, in the current situation we are facing problem of corruption in public distribution system. There is no such effective system through which government gets acknowledgement of consumption of food grains by people. Automatic Ration Dispensing System presented here is an advanced system useful for the efficient way of ration distribution. This project is designed to minimize the manual intervention in the process of ration distribution, so that more transparency & efficiency can be maintained. Our project focuses on design and implementation of Automation of Ration Shop. In this project, the proposed concept is to replace the manual work in public distribution system. The ration distribution system is automated by using ATMEGA328. This automated ration system replaces the conventional ration card system by RFID card. In this project, we have proposed an Automatic Ration Materials Distribution Based on GSM and RFID Technology to avoid the drawbacks. RFID act as ration card and other purpose such as RC book, insurance details, service details etc. GSM used to communicate the information between the two people or more than two persons to update the information depends on the requirements. Radio-frequency identification (RFID) based access-control system allows only authorized or responsible persons to get the materials from ration shops. An RFID system consists of an antenna or coil, a transceiver (with decoder) and a transponder (RF tag) electronically programmed with unique information. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. The embedded controller is pre-programmed in such a way to perform the operations. In this automated ration shop government have control over all transaction that occurs in ration shop. Mainly in this project we are distributing rice and kerosene. Rice is stored in a container on the table. The rice is measured by load cell and distributed through motor mechanism. Kerosene is kept in another container and its distribution is controlled with a solenoid valve. Figure 1 shows the block diagram of automated ration system.

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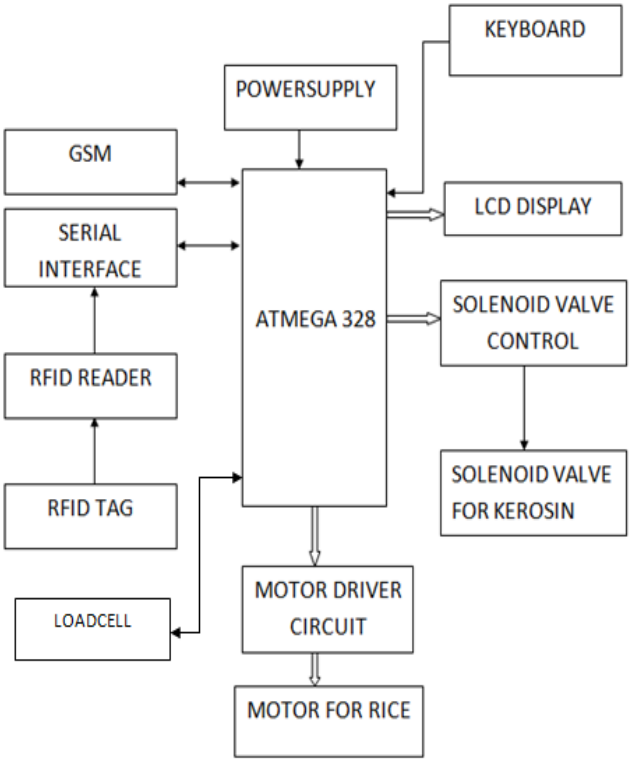

Figure 1. Block diagram of the ration system

2. Problem Definition

In this project, the proposed concept is to replace the manual work in public distribution system. The ration distribution system is automated by using ATMEGA328. Conventional ration card is replaced by smartcard in which all the details about users are provided in it. In our system, we proposed connecting the system at ration shop to a central database (provided by government.) via GSM module. Hence it is possible to prevent the corruption and irregularities at ration shop. This would bring the transparency in public distribution system and there will be a direct communication between people and Government through this. The conventional Ration shops cannot able to meet the requirements of the user due to the over population of our country. As a result, there is always crowd of people in the ration shop. Due to the human operations the working hours of the ration shops are restricted; so that the user cannot able to get the material at any time i.e. 24*7 basis. To overcome these problems we go for the automation of the ration shops using ATMEGA328. In our project we design the hardware for two commodities namely rice and kerosene. These two commodities are stored in reservoir tanks and they are measured and supplied to the user when required. The user has to enter the required product and quantity using a keypad and LCD Display. For the measuring purpose, we use load cell for rice and time delay for Kerosene. And these parameters are controlled by the controller.

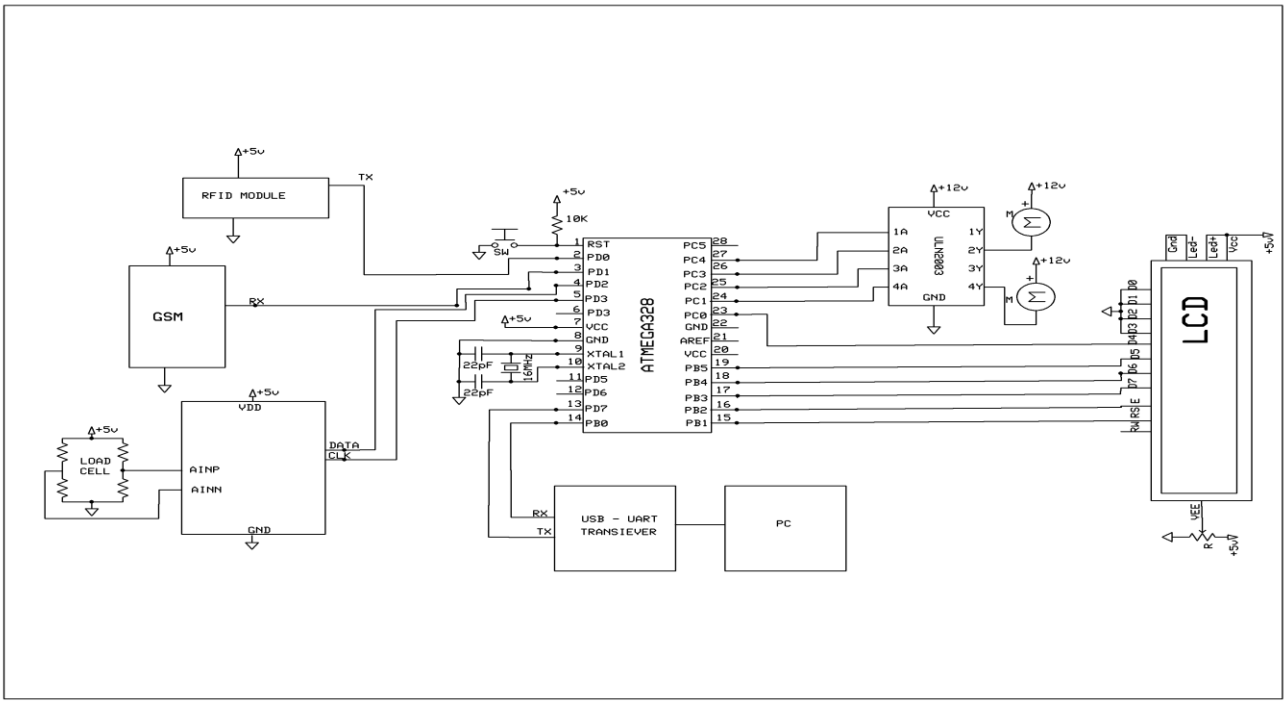

Figure 2. Circuit diagram of smart ration system

3. Circuit Diagram

The main part of the ration distribution is based on the RFID technology. RFID stands for Radio-Frequency Identifications. The RFID is small electronic device that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less. The RFID card is password protected. When the card is showed to the RFID tag, enter the password through the keypad. If the password is not correct, then that RFID card doesn't worked. After entering the correct password, the database of that customer will monitored on the LCD display. Which includes name of customer, type of card, balance of ration material and we can select the material & its quantity. The controller will recognize the data coming from RFID by comparing it with the database. Once the user is identified, the microcontroller will check whether the user had already bought the ration item of to that month. If the user select the ration item for purchasing purpose, then the controller will calculate the price of the items & check with the available cash balance in the card. If the person has sufficient balance, then microcontroller will start the solenoid & motor mechanism to dispense the items. The solid items are measured by load cell and the liquid items are measured by solenoid valve mechanism. After the dispensation of the materials the message will be send to the mobile number of higher authority and the customer's mobile number through the GSM.

4. Working of the System

The smart ration distribution based on RFID technology. Instead of ration card everyone will be provided with an RFID card. If the customer have to buy any ration material, he has to show the ration RFID tag card to the RFID reader kit. The user will be having a unique number & the reader will recognize it. The recognized RFID number will be given to the microcontroller, which compares the input number with the database. Name, address details, date of expire of card etc. are programmed in the controller will recognize the data coming from RFID by comparing it with the database. Once the user is identified, the microcontroller will check whether the user had already bought the ration item of to that month. If not, then the ration item to be dispensed will be displayed on the LCD screen. The user has to enter the details of the item he wants to purchase. If the user selects the ration item for purchasing purpose, then the controller will calculate the price of the items & check with the available cash balance in the card. If the person has sufficient balance, then microcontroller will start the solenoid & motor mechanism to dispense the items. The solid items are measured by load cell and the liquid items are measured by solenoid valve mechanism.

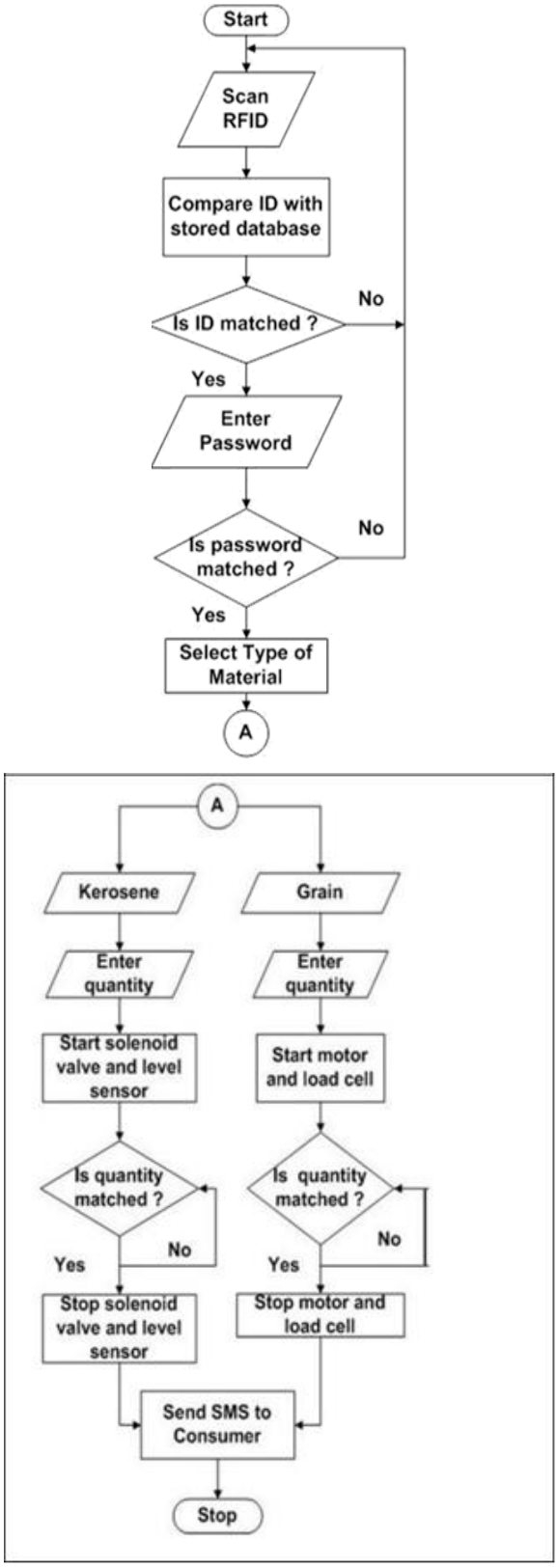

Figure 3. Flowchart of Smart Ration System

5. Conclusions

Some of the limitations of conventional ration shop system are due to the manual measurements. The user can not able to get the accurate quantity of material and the dealer may sale ration at higher rates than recommended by the government or he may do wrong entries in register etc. Through our project we overcome these problems. This method can provide safe, secure and efficient way of public distribution system. Using this modern system we can have Better management of the ration distribution.

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