ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 6 , June 2020

An efficient, Accurate and Automated Technique of ration distribution using RFID

Snehal Jadhav, Sangita Ahire, Manali Aher, Akshay Bhoir,S.S.Vaidya

Student, Department of Electronics & Telecommunication, Sanghavi College of Engineering, Nashik
Student, Department of Electronics & Telecommunication, Sanghavi College of Engineering, Nashik
Student, Department of Electronics & Telecommunication, Sanghavi College of Engineering, Nashik
Student, Department of Electronics & Telecommunication, Sanghavi College of Engineering, Nashik
Professor, Department of Electronics & Telecommunication, Sanghavi College of Engineering, Nashik

ABSTRACT: An efficient, accurate and automated technique of ration distribution using RFID (Radio Frequency Identification) based technology/using of AADHAR number, which is an innovativeapproach in PDS (Public Distribution system). Public distribution system is also named as rationing distribution system, which is one of the widely disputable issues that involve malpractices. The existing ration distribution system has high level of corruption like inaccurate measurement of goods, large waiting time, and material theft in ration shop and manual distribution is not easy to handle crowd. In this paper, the proposed system replaces the manual work in public distribution system. The main objective of the designed system is the automation of ration shop to provide transparency by using, RFID/UID number & networking which is similar to the ATM. This automated ration system replaces the conventional ration card system by RFID tag/AADHAR number, the government Authority provides the customer's database stored in microcontroller. Customer needs to scan tag to RFID reader or enter the AADHAR number, along with the PIN assigned to it, and then microcontroller checks customer's details with stored database to dispense the material in ration shop. After successful authorization, customer needs to enter type of material as well as quantity of material using keypad. After delivering proper material to consumer, proposed ration shop system is connected to the IoT database via Ethernet module to provide information to customer as well as PDS authorities. The Digital India Initiative marks the use of internet for accessing information even in most remote areas. The use of AADHAR numberin the system eases the management of distribution for the government.

KEY WORDS: RFID, PDS, UID, database, microcontroller

I.INTRODUCTION

The PDS is recognized by the Government of India, with a network of 5.05 Lakh Fair Price Shops (FPS) is perhaps the largest retail system in the world [1]. This scheme was launched in India on June 1997. Public distribution system provides a ration card issued by the State Government for the purchase of essential consumer materials like rice, wheat, kerosene and oil. The fair price shops are mainly used to distribute the goods at a subsidized price to the poor.

Public Distribution System is one of the widely controversial issues that involve inefficiency in the targeting of beneficiaries and the resulting leakage of subsidies. The Indian ration card is the authority of the Indian people. It is an important livelihood tool for providing proof of personal identity [2]. Public Distribution System is one of the widely controversial issues that involve malpractice. The manual interference in weighing of the materials leads to inaccurate measurement and it may happen, the ration shop owner illegally uses consumer materials without prior knowledge of ration card holders [1]. In this paper, the proposed automated ration distributed system aids to control Malpractices by replacing manual work with automatic system based on RFID/UID number & Internet Databases.

II. SIGNIFICANCE OF THE SYSTEM

The aim of this system is to build an automatic and convenient system to protect the interests of the public by countering the malpractices. The main purpose of the system is to implement fingerprint matching algorithm for authentication of the user, which in turn reduces the widespread corruption, misuses of cards and to reduce the time complexity of the manual data entries. The system is used to protect the products of fair price shop in black markets.

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III. LITERATURE SURVEY

This automated ration system replaces the conventional ration card system by RFID tag, the government Authority provides the customer's database stored in Internet through ThingSpeak Database. The main objective of the designed system is the automation of ration shop to provide transparency by using, RFID &IOT technology.The RFID systems basically consist of three elements: a tag or transponder, a reader and a middleware deployed at a host computer.
The RFID tag is a data carrier part of the RFID system which is placed on the objects to be uniquely identified. The RFID reader is a device that transmits and receives data through radio waves using the connected antennas. Its functions include powering the tag, and reading or writing data to the tag. Consumers are provided with RFID card which acts as ration card.
The PDS system today supports over 40 crore Indians below the poverty line with monthly supply of subsidized food grains [2]. This large crowd can be handled by using UID (Unique Identification) number system called AADHAR number through which government databases could be accessed providing necessary Details. ThingSpeak™ is an open source IoT(Internet of Things) platform that lets one collect sensor data in the cloud and develop IoT applications. The ThingSpeak™ IoT platform provides apps that let one analyse and visualize data in MATLAB®, and then act on the data. Sensor data can be sent to ThingSpeak from Arduino®, Raspberry Pi™, BeagleBone Black, and other hardware.
In this system we have designed and implemented an automated ration distribution system using RFID and IOT.
In this system every consumer is provided with a 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. Consumer can also enter her/his AADHAR Card number instead of RFID Scan.
After successful authorization, customer needs to enter type of material as well as quantity of material using keypad [3]. After delivering proper material to consumer, proposed ration shop system is connected to the government database via INTERNET which updates the database and thereby provide information to customer as well as PDS authorities. By implementing the automated ration distribution system each user is assured to get a correct amount of ration at the Correct Price. The project can be implemented in large scale by using UID (Unique Identification) number system called AADHAR number which can be linked with government databases [4].

IV. METHODOLOGY

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 can carry 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 work. After entering the correct password, the database of that customer will be 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 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 enough 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.

The smart ration distribution based on RFID technology. Instead of ration card everyone will be provided with an RFID card. If the customer has 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 enough 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.

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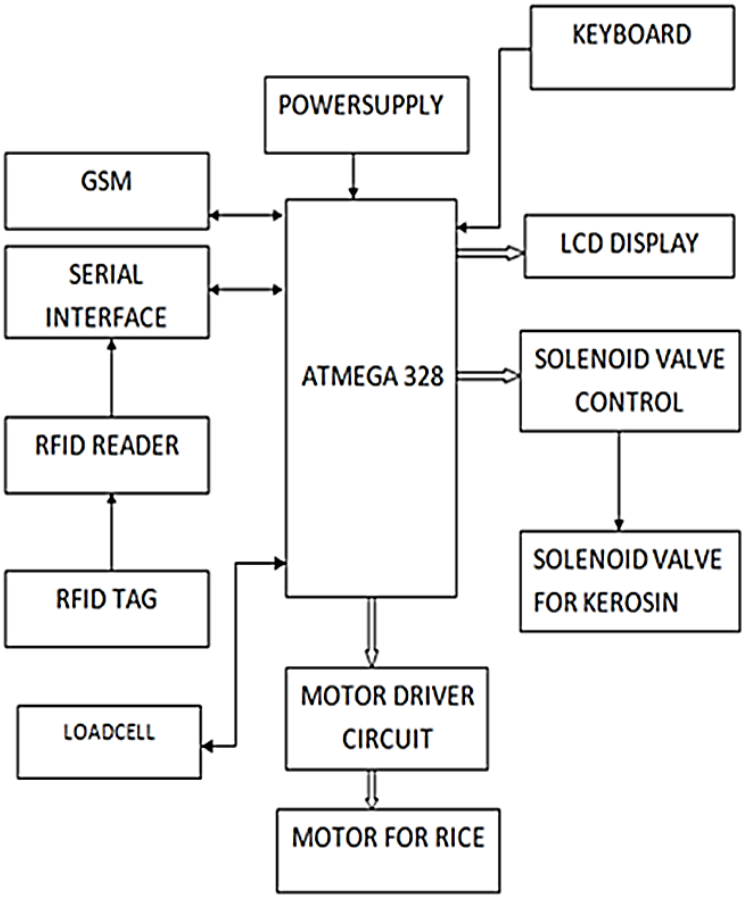
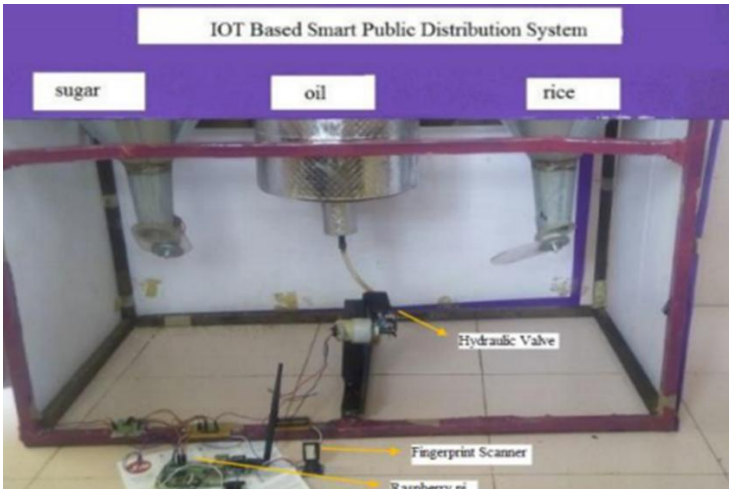


Fig. Block Diagram

The system software is the interface between hardware and user applications. A computer program that is designed to run a computer's hardware and application programs. Initially the user is asked to scan RFID card. The system compares the unique ID with the data base. If the ID matches, the

V. EXPERIMENTAL RESULTS



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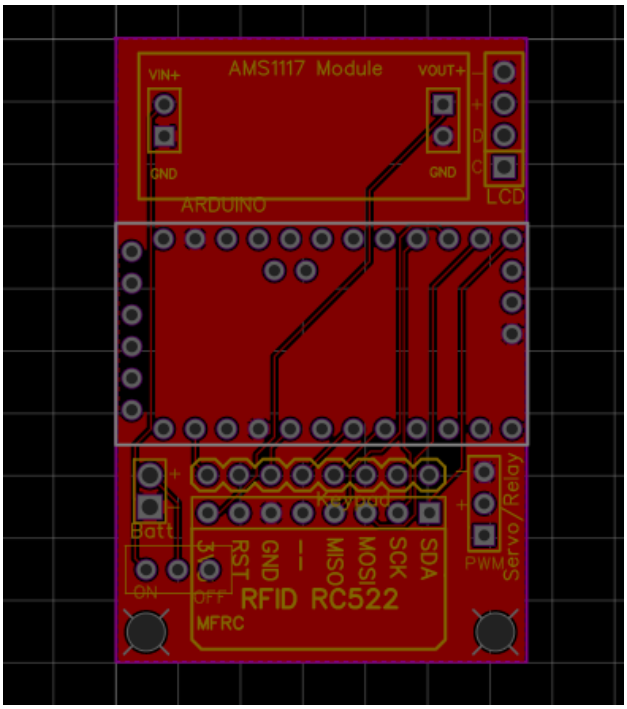

Fig. PCB Layout

VI.CONCLUSION AND FUTURE WORK

IoT based Smart public distribution system is an automation system and it is a recompense over the present fair price shops. Fingerprint authentication uses Minutiae extraction-based algorithm, which makes the system more secure and accurate. It eliminates fake ration card holders and protects the interest of the common people ensuring the country's food security. By means of its performance one can reduce the corruption level. Selecting the commodity and quantity through the android app will make the system smarter and more robust. It will help the country's economy to reach new heights. The automated PDS is easy to implement and requires much less hard work when compared to the other system. Using this system one can avoid the malpractices because there are no manual operations and all information is stored in a database. So, this system will be helpful to the people. Project can be further extended by making the payment to the purchased commodities can be done online. Thus, it will make system more automatic. Distance of communication between server and client can be increased using internet.

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 6 , June 2020

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