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Automatic Rationing System

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ABSTRACT: Our incredible Indian leaders have insisted us on innovative missions like Vision 2020, Digital India, etc. This paper projects an idea which will be an initiative towards Digital India. In India, the current scenario reflects that the resources are scarce. So, we are in a need to utilize our resources in a more efficient way. In existing system, every Indian family is issued a ration card and they are supposed to renew their card periodically. Man power is highly needed to distribute the ration materials, which makes the system, time consuming. Also, in this system, there exists a possibility of corruption. This paper focuses on automation of ration distribution system using RFID Smart card and maintaining a collaboration with the Government to provide corruption-free and promising service to the common people. Also, the proposed system aims to provide high degree of security.

KEYWORDS: Microcontroller, RFID, GSM, Motor, Driver Circuits, Mechanical parts.

I. INTRODUCTION

India, today is facing scarcity of food grains like rice, dhal, etc. So, there lies an ultimate need of utilizing the resources in a more efficient and an effective manner. The Indian Government has a major challenge to introduce a new kind of system, so that both the Government and the people can be benefited in an equal manner. The automation of Public Distribution System would be a great solution for this.

Our Indian Government is bound to allocate reasonable cost for subsidized products and provide access of these products to the people via Fair Price Shops. In the existing system, humans are employed to distribute the Ration materials like sugar, Rice, Wheat, etc to the people. Hence, it is common to know that it will consume more time to distribute the subsidized products to the people and also there are several other issues such as poor quality, mixing of products, wastage of products, corruption, etc.

In the existing system, every Indian family is issued a Ration Card by the Government of India and the families are supposed to receive the subsidized food grains as per their quota. Quantities of different grains like rice, wheat, sugar, etc are fixed for every month for the families, depending upon their income. However many families do not claim their quota of ration and yet few families manages to acquire the card of other families. This leads to anarchy and black marketing of the subsidized products.

Limitations of Existing System

- Illegal use
- Processing speed is low
- Bogus cards
- Overcrowd
- Mixing of products
- Poor quality
- Inaccurate measurement
- Cannot get materials at any time

II.LITERATURE SURVEY

1) A.N. Madur, Sham Nayse, “Automation in Rationing System using Arm 7”, International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Volume 1, Issue 4, July 2013.



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This paper proposed the idea of automatic rationing system using RFID and GSM module. The RFID reader is used to complete the process of recognition and authentication of the customers. After the process of authentication, the user will be allowed to exercise his choice of products and consume the products within the allowable quantity. Next, the GSM module comes into role for the purpose of mobile balance detection according to the cost allocated for the consumed quantity of products. A central database can also be maintained by the Government for the purpose of providing transparent service to the people.

Inference- From this paper, we derived the concept of using RFID for providing secure access to the users.

2) Rajesh C. Pingle, P. B. Borole, “Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities”, HCTL Open International Journal of Technology Innovations and Research, Volume 2, Pg. No. 102-111, March 2013.

In this paper, the proposed automated public distribution system aims at the replacement of normal ration card by an RFID smart card, which consists of various details of the consumer including his/ her AADHAAR number for providing authentication. This paper projected an idea to interface RFID reader to the microcontroller (AT89C51) and PC via RS232 to develop such an automatic ration distribution system. With the use of such a system, Government would be able to have complete access or control and would be able to monitor the transactions at fair price shop. To involve government in this useful work, this paper proposed the concept of connecting the system at fair price shop to a central database of the Government via GSM module (SIM900D) and RS232. Thus, it will be possible to prevent the corruption and various irregularities at fair price shops.

Inference- Our inference from this paper is to maintain a central database and allowing the Indian Government to have continuous monitoring over public distribution system.

3) S. Valarmathy, R. Ramani, “Automated Ration Material Distributions Based on GSM and RFID Technology”, International Journal of Intelligent Systems and Applications, Volume 5, Pg. No.: 47-54, October 2013.

The system proposed in this paper uses RFID and GSM technology based Ration distribution system in which the user will be able to access the system by showing the RFID tag into the RFID reader. Then the controller checks the unique code allocated for each customer and detail of the amounts in the respective card. After verification, the system displays the amount details. The customer is then intimated to enter the required materials by using the keyboard. After the materials are dispatched to the consumer, the controller send the information regarding the payment and amount deduction to the Government office and customer through the GSM module. In this system microcontroller is used for performing various operations.

Inference- From this paper, we gained the idea of payment & deduction of the amount to be paid from the respective consumer's mobile balance.

4) S. Sukhumar, K. Gopinathan, S. Kalpanadevi, P. Naveen Kumar, N. Suthanthira Devi, “ Automatic Rationing System Using Embedded System Technology”, International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Vol. 1, Issue 8, November 2013

This paper presents a really excellent and an effective method for the people to purchase the products in the ration shop by just swiping their respective card at the RFID reader placed in the automatic ration system. Here, the ration system is automated by using a PLC module. For the purpose of maintaining a good Government- Consumer relationship, a central database is maintained. As an alternative to the regular power supply, solar panel is suggested in this paper as a source of power supply.

Inference- This paper gave us the idea of employing user authentication, so that card misuse may be prevented and also to use an alternative power source in future enhancements.

5) Dhanojmohan, Rathikarani, Gopukumar, “Automation in ration shop using PLC”, International Journal of Modern Engineering and Research, Volume 3, Issue 5, Sept-Oct 2013.

This journal proposed a methodology for fair price shop automation using embedded PLC. Further, the updation of details regarding the transactions of various consumers over the entire country to the government database about the stock availability and the customer details were supposed to be carried out.



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Inference- This paper instilled us to make periodic updations to the Government database regarding consumer activities.

III. PROPOSED SYSTEM

Indian subcontinent's Ration Distribution System with a network of over 4.78 Lakh Fair Price Shops is the largest retail system in the entire world. Major and serious issues prevailing in the current system are the improper and irregular activities in satisfying the beneficiaries and the unnecessary wastage of subsidized products. The Public Distribution System today serves a range of over 40 Crore Indians below the poverty line with the periodic or regular i.e., monthly supply of subsidized ration products.

The Government of India should issue an RFID Smart Card, which may be similar to the AADHAR card issued recently. The card is supposed to contain all general information like name of the family head, their corresponding card type, etc for every resident in the country. People who are accessing the ration shop for subsidies would be allotted an RFID smart card.

The automatic rationing system, installed at the ration shop which contains interfaces namely LCD, RFID reader, open and close valves, GSM module. All these interfaces are interfaced to the advanced microcontroller, which is ATMEGA 2560.

The person would be required to swipe the card on the system placed at the public distribution shop. RFID Reader will automatically detect the unique ID assigned for each customer. Once authenticated, automatic rationing system would get updated information regarding the existing subsidies and the current mobile balance for the respective user in the display.

The inputs are ought to be given by the consumer and the consumer selects the products themselves. From the keypad, inputs are given to the microcontroller unit, which are displayed in the LCD and after the required processing of the microcontroller unit, the products are obtained from the respective containers in the tapered section. The customer would then be able to fetch the collected grains from the tapered section. In future, to prevent irregularities in the distribution of ration, Government can supply various products (like rice, wheat, sugar etc.) to the rationing shops in the form of sack/packets stored in the container. Central database, which is maintained by the Government should be kept up-to-date after each and every transaction made by the users. Thus, public can make use of the system in an effective and corruption-free manner.

Benefits of the proposed system

- Our automated public distribution system will be acting as a great anti-corruption tool.
- Higher level of adulteration in subsidized products can be prevented.
- An economic approach.
- Consumes very less time.
- This system helps the Government to be up-to-date with the FPS.

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IV. BLOCK DIAGRAM DESCRIPTION

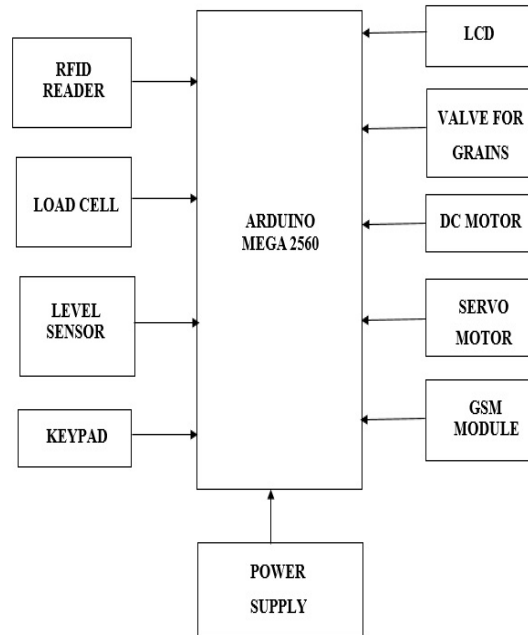
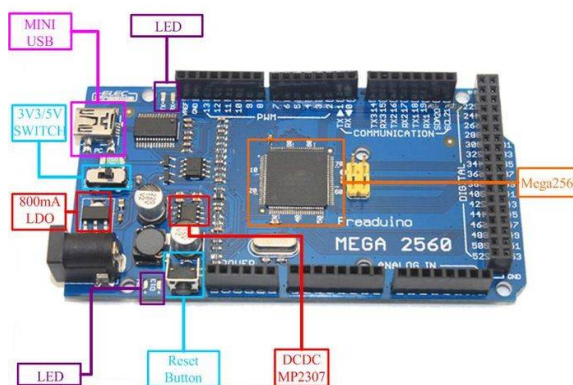


Fig: Block Diagram

i) Microcontroller Unit

The brain of the automatic rationing system is the microcontroller board. It is interfaced to various other main components such as RFID Reader, LCD, keypad, load cell, DC Motor, servomotor, power supply, GSM module, etc for performing respective functions.



ii) RFID Reader

The access granting block is the RFID reader module. When the customer shows the RFID tag near the reader, the RFID reader senses the unique code with the help of the transponder present inside the RFID tag. Thus, the authentication process is carried out.



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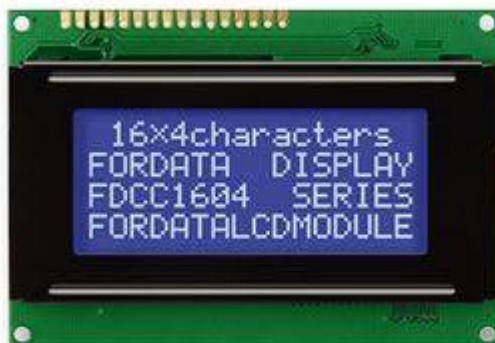
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Vol. 5, Issue 4, April 2016



iii) LCD

This acts as the main user interface. It is used for displaying welcome screen, customer details, available stock, processing span, etc.



iv) Keypad

Another user interface in this system is the keypad. It facilitates the user to enter his/her choice of products into the automatic rationing system.

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4x4 Matrix Keypad

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v) Load cell

Load cell is basically a transducer and majorly consists of strain gauge, which deforms when force is applied to it. Load cell is used for converting the applied force into proportional electrical voltage. The output voltage from the load cell is of the order of few microvolts, which is amplified by means of an instrumentation amplifier and fed to the microcontroller unit.



vi) DC Motor

A shunt motor is used to drive the grains from their respective containers to the tapered section. The shaft rotation of the DC motor facilitates this operation.



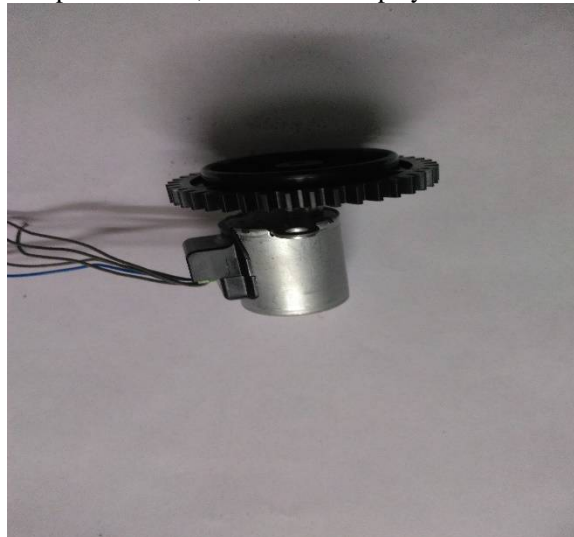
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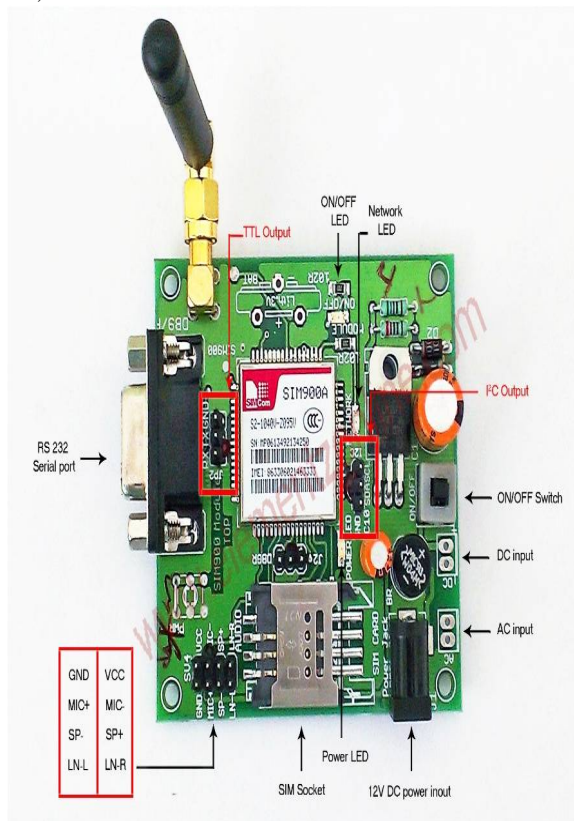
vii) Servomotor

Servomotor is used for the opening and closing of valves provided at the end of the tapered section. Once the selected quantity is collected in the tapered section, the servomotor plays its role.



viii) GSM Module

The GSM module is used for providing SMS alerts to the stock manager as well as the customers regarding stock availability, amount detection, etc.



ix) Power Supply

A 12 V AC-DC adapter is used for providing power supply to the entire unit.



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V.CONCLUSION

The automatic rationing system proposed in this paper highly aims at providing a safe, secure, corruption-free, 24x7 service, etc to the common people. Also, this system would be a great initiative towards the progress of Digital India.

VI.ACKNOWLEDGEMENT

The authors feel so pleased to thank the Head of the Department for his kind and intuitive guidance and would highly appreciate the anonymous readers to suggest valid points to improve this paper.

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