DESIGN AND IMPLEMENTATION OF RATION DISTRIBUTION SYSTEM TO STOP THE CORRUPTION USING AVR

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Abstract -*Public distribution system (PDS) is one of the important provisioning systems in Our Indian country. This PDS is recognized by the Government of India subordinate Ministry of Consumer Affairs, Food and Public Distribution. The fair price shops are mainly used to distribute the goods with low cost or free of cost. In the proposed system, the concept is to replace the manual work in public distribution system. The ration distribution system is automated by using embedded system technology, which is similar to the ATM. This automated ration system replaces the conventional ration card system by smart card. In addition, the finger print module is placed in the system in order to check the correct user access. If the user is correct user, the next process takes place. For the efficient operation and economic constraints of the system, the power supply unit is fully made alternate to solar power. The future work on this system is to attach a weighing system so that weighing of ration should be accurate. We can also develop an online database for large number of users and receive an acknowledgement for the delivered message.*

*Key Words***:   GSM, RFID, Biometrics(R305), Public Distribution System, Controller, Mechanical Part**

1. INTRODUCTION

Ration distribution an initiative by the Government of India under Ministry of Consumer Affairs, Food and Public Distribution intend for the distribution of commodities to destitute at fair price. In the projected system we use RFID Technology. One of its parts, a RFID tags hold a unique ID is issued to all the BPL card bearers. Here RFID tag (Smart Card) and the biometrics serves the purpose of authentication. Information and the fingerprint impression of the head of the family and one of the family members are cached in the centralized database whose access is only legitimized for a government authority. The first of the two authentication steps needs the beneficiary to swipe the Smart Card against RFID Reader installed at the FPS and the second step towards an authentication is that he/she should scan the fingerprint of his/her thumb against biometric. On matching his/her fingerprint with the id stored in the device, an appropriate fingerprint id interface with database to checks for valid beneficiary's information.

Once authenticated, updated information is obtained by automated ration system concerning the existing subsidies for the beneficiary onto the main interface. A beneficiary is permitted to take only those subsidies on products apportioned to him/her by government according to the available database inventory. After every transaction made

by the beneficiary, centralized database is immediately updated and he/she will be sent a SMS (Short Message Service) specifying the quantity of commodity bought by him/her. With implementation of the projected system prime issues like bribery, uneven distribution and other difficulties faced by beneficiary can be terminated

2. RATION DISTRIBUTION SYSTEM- BACKGROUND

Mr. Abhijeet Chimgave.[1], this project proposes a transparent and highly scalable Ration Distribution system with authentication for Ration Card Holder. Every time ration is collected by the family is logged into the RFID (smart)card. Bharati Chilad.[2], the proposed system replaces the manuawork in FPS. The prime objective of the designed system is the automation of FPS to provide transparency. The proposed automatic FPS for public distribution system is based on RFID technology and biometric authentication technology that replaces conventional ration cards. Kashinath Wakade[3], this paper implements a simple PDA device (personal data assistant) with RFID tag used as an e-ration card in place of a conventional ration card. M.S.Manivannan.[4], the project proposes an approach to automate all the above said manual jobs and the whole thing from data entry to weighing to hammering is prepared by machines and the people have no hand in that. Mohit Agarwal.[5], developed a smart ration card using Radio Frequency Identification (RFID) technique to prevent the ration forgery as there are chances that the shopkeeper may sell the material to someone else and take the profit and put some false amount in their records. Rajesh C. Pingle, P. B .Borole[8] "Automatic Rationing for Public Distribution System (PDS) using RFID and GSM Module to Prevent Irregularities", In this automated system conventional ration card is replaced by smartcard in which all the details about users are provided

2.1 Existing System

The most of the people having a ration card to buy the materials from the ration shops. When get the material from the ratio shop, first need to submit the ration card and they will put the sign in the ratio card depends on the materials. Then they will issue the materials through weighting system with help of human. 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.

The present PDS works in a multiple level where the responsibilities are shared between center and state. The task of procuring or buying food grains such as wheat and rice at minimal cost is the responsibilities of center Allocation of the grains to each state in carried out by center. While the state government are responsible for the identification of household eligible to avail the facilities. The process runs as follows, the grains are transported by the center to every state's central depot, after which the allocated food grains are delivered to respective FPS through state government. Finally FPS being the end point sells the entitled commodities to beneficiaries.

In the existing system, tasks like product distribution, Ration Card entry, product weighing and delivery of the product are carried out manually by FPS agent. However a present system has diverse drawbacks involved, developing irregularities in the system. Some of the irregularities include replacing actual products dispensed by the government with meager quality products and supplying the same for the beneficiaries, diverting food grains to open market to make profit, false entries in the stock registers that FPS agent needs to maintain and false announcement of deceit in food grains.

2.2 Designed System   In this system , the concept is to replace the manual work in public distribution system. The ration distribution system is automated by using embedded system technology, which is similar to the ATM. This automated ration system replaces the conventional ration card system by smart card. In addition, the finger print smart card is placed in the machine in order to check the correct user access. If the user is correct user, the next process takes place. As soon as the input is given, the products are obtained from the automated ration shop and the amount is taken from account of the particular person. The embedded controller is preprogrammed in such a way to perform the similar operations. In this automated ration shop government have control over all transaction that occurs in ration shop. In order to involve government in the process, the proposed ration shop system is connected to the government database via 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 fully made alternate to solar power.

3. SYSTEM DESIGN
3.1 Functional Requirements

In this system there are some functional requirements for beneficiaries and server side or food department. The functional requirements are as follow:

3.1.1 Functional Requirements for Beneficiaries

- Beneficiary and his/her family member's details are stored and RFID tag is assigned to the beneficiary.
- Fingerprints of beneficiaries and family members are captured and stored to obtain the identity.
- Verification of card is done using RFID Reader installed at the center and once verified the system will verify the fingerprint of the beneficiary or his/her family member.

3.1.2 Functional Requirements for Server Side (Food Department)

- Stocks are updated by food department. They maintain the incoming stock, total   distribution of stocks and also the remaining stock.
- Reports of inventory are updated on the server side.
- The system also has a shopping cart for allowing the beneficiaries to shop and do the payments.

3.2 DESIGNED APPROACH

A) Block Diagram

This ration distribution system mostly performed to reduce the corruption and reduce the wastage of time. Because in our system the goods are distributed automatically without any manpower. Figure 1 explains the basic module of automatic materials distribution and stock maintenance based on smart ration card technology. This system consists of the AVR Microcontroller, smart card, fingerprint module, motor driver, LCD and GSM. The proposed system expresses sharing of grains as well as liquids.
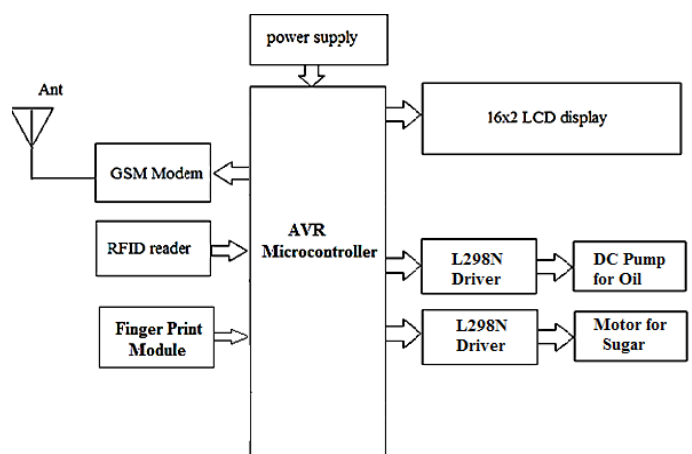

Fig- 1 : Block Diagram of Designed System

The block diagram of an Automatic Ration Materials Distribution Based on GSM and RFID Technology is shown in Figure 1. This system consists of various parts such as RFID, Finger print module, GSM, microcontroller, motor driver, solenoid control circuits and AVR microcontroller.

B) Circuit Diagram.

The circuit diagram of the designed system as shown in figure In this, the interfacing of controller(ATmega2560, Arduino board)with LCD display, two DC motor drives, GSM module, RFID reader, Fingerprint module, Toggle switches.
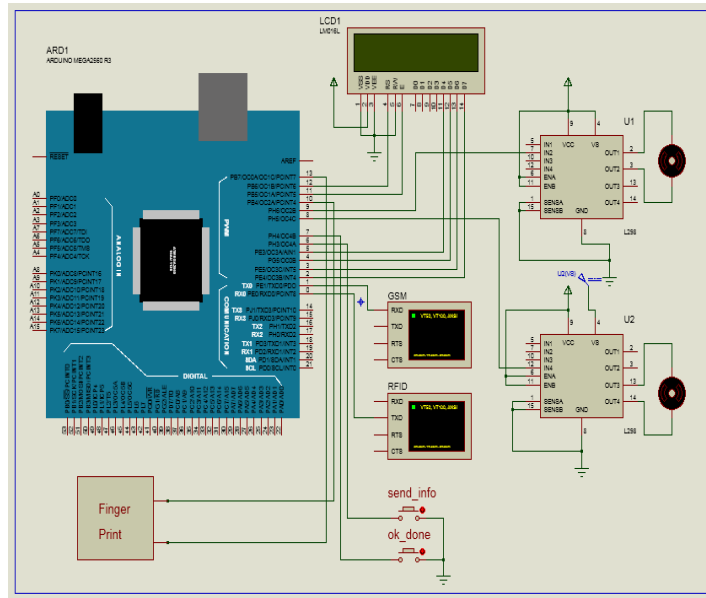

Fig- 2: Block Diagram of Designed System

In this designed system when the ration of the peoples is send by govt. Then system will get activated in the ration shops, the particular user gets SMS on his mobile number about the ration send at PDS shops.Every user is provided by the smart card, the users have to come with smart card at the PDS shop.First he will scan the smart card by RFID scanner then the thumb impression will be verified. If the user is get validate the ration distribution system gets activated, on LCD display step by step the ration names is appears according to that the user will conduct his ration.At the end, the PDS authority gets an acknowledgement through SMS regarding ration.

3. PERFORMANCE ANALYSIS AND RESULT

In system performance, when the proposed system is implementing in real world, Beneficiary can check the availability of commodities online, by viewing the website. It contains the information of various ration shops available nearby and can also check the commodities available in the respective Ration shop. The beneficiary can also check the details of the FPS available nearby. Admin can add new shop, get detail of each shop, delete shop, and edit shop stock. And also upgrade the user profiles.
The website contains various fields like:

- "About the Project"- briefly describes the project.
- "Features of Project"- gives various aspects with respect to project.
- "Contact us"- for any query regarding the Ration system.

3.1 ANALYSIS OF DESIGNED PROTOTYPE WITH STANDARD DEVIATION

To analyze the system performance some users are considered and number of trials executions are carried out and the results are summarized in below Table1.

Table- 1: Test Result Analysis Table

Sr. No.	Users	No. of Successful Trials (out of 10)					Efficie-ncy
		SMS Unit	Authentication Unit		Ration Distribution Mechanism		
			RFID	Fingerprint	Rice	Oil	
1	ID-1	10	10	10	10	10	
2	ID-2	10	9	10	10	10	
3	ID-3	9	10	10	10	10	**98.8%**
4	ID-4	10	10	9	10	10	
5	ID-5	10	10	10	10	10	
SD		0.40	0.40	0.40	0	0	

The number of successful trials is carried out for each section in the designed prototype and for each subject.Standard Deviation of a system provides an indication of how far the individual responses vary or "deviate" from the mean. For this system the value of standard deviation ranges from 0 to 0.40. Standard deviation should have small value for desired performance. Here deviation is small. In all five types of analysis some subjects are unable to perform all operation successfully due to illiteracy of subjects to handling the system. Also some unsuccessful events are due to controlling operations in the system. Even though all types of subjects can handle system in full fledge manner after certain trials. This system will surely help to people without corruption in ration distribution system at fair price shop. Table 2 shows the comparative study of existing and proposed system.

Table- 2: Comparative study of existing and proposed system

Sr.No.	Existing System	Proposed System
1	Ration sheets are used	RFID tag act as ration card

2	Ration materials distributed manually	Ration materials distribute automatically using automated system
3	Inaccurate	Accurate
4	Slow process	Fast process

4. RESULTS AND DISCUSSION

The Automatic Ration Materials Distribution Based on GSM and RFID Technology used to distribute or vend the liquid or solid material, which is used for Ration materials distribution in ration shops. Initially In this proposed system when the ration of the peoples is send by govt. Then system will get activated in the ration shops, the particular user gets SMS on his mobile number about the ration send at PDS shops. Everyone will be provided an RFID or smart Card, instead of a ration card. If the customer needs to get any ration material, the user has to show the ration RFID tag card to the RFID reader Kit, the reader that is incorporated with the project kit will recognize the RFID numbers show by the user. Each user will have a unique number, which is not visible to the user.This recognized RFID number will be given to a microcontroller, which compared the input number with the database. Before starting the system, the unique RFID number of the ration user will be programmed in the controller. Therefore the controller will recognize the data coming from RFID by comparing with the database. After this the thumb impression will be verified for the correct user authentication.

4.1 Prototype System Model

Figure 3 shows identification of customer using fingerprint module.
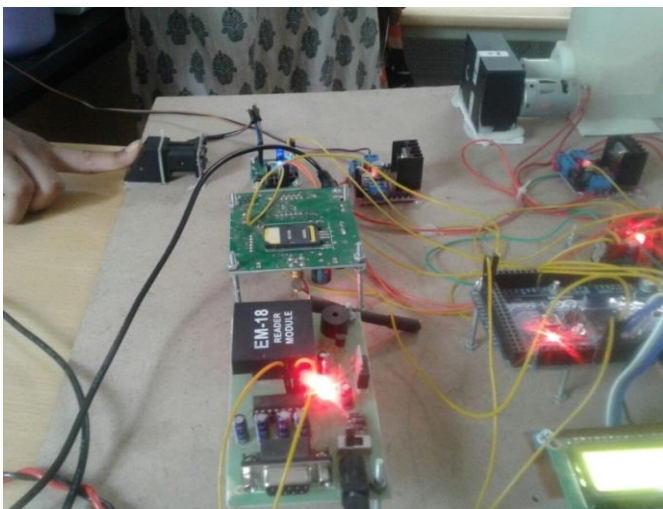

Fig -3: Identification of Customer

After Reading of RFID Tag now system is ready to authenticate the fingerprint registered by card holder (user) and this process of authentication is done with the aid of fingerprint scanner once fingerprint is matched with the registered fingerprint then ration distribution system goes activated.

Fig - 4: Rice Distribution

Above figure 4 shows the ration distribution mechanism, It shows the distribution of rice. As Ration distribution system is activated after process of authentication then allocated ration material is distribute by system with desired quantity and controlled by arduino controller connected to motor driver as well as DC motor.

Fig -5: Oil Distribution

After the rice distribution there is another mechanism for oil distribution which is shown in figure 5. For oil there is a special mechanism connected with DC submersible pump in oil tank and that mechanism is also controlled by controller and motor driver to distribute desired quantity send to GSM.

send the text SMS to the PDS authority on the ration item, he or she purchased.

4.2 Result Analysis of Automated Ration Distribution System

Table 3 shows result analysis of automated ration distribution system. As we know initially in this system when the ration of the people is send by government. Then system will get activated in the ration shops The particular user gets SMS on his

mobile number about the ration send at PDS shops. Once the user is verified the ration distribution will start.

Table-3: Result Analysis of Automated Ration Distribution System

User	Time (in seconds)	Defined Quantity of Ration to User (in gm)	Ration Type	Error (+/- 5 to +/- 10%)
User 1	30	80	Rice	**+/-** 5%
	5	100	Oil	**+/-** 10%
User 2	60	160	Rice	**+/-** 5%
	10	200	Oil	**+/-** 10%

Here the defined time for rotating the motor to pour the ration is shown in the table. The test values of defined ration quantities, this is the method to test the designed prototype of automated ration distribution system. It shows that there is some error or we can also say it as Instrument error refers to the combined accuracy and precision of a measuring instrument or weight meter and the difference between actual amount of quantity received and the amount of quantity defined in system to particular user. As here we used a dc motor and dc pump to distribute the stored material from container this can create a Instrumental error also addition to that here the digital weight meter is used for weight verification after the ration received by the user and it has some tolerance in measurement. In this way this both combined error will generate the total error of (+/- 5 to +/- 10) %.

5. CONCLUSION

The design and implementation of Ration Distribution system is successfully designed and implemented to stop the corruption based on embedded technology. In the existing system having some draw backs like weight of the material may be inaccurate due to human mistakes, if not buy the materials at end of the month, they will sale to others without any intimation to the government and customers, low processing speed, material using proxy entries in

Register without acknowledgement to Government and Consumer so to prevent this all problems. The above drawbacks rectified by this method. Here the automatic ration shop concerned smart card and controller for distributing the materials. In this system, ration card is changed by smart card and send the delivery details ration to PDS office using GSM module. Here all the works are done automatically with full precision and accuracy without any manpower. Also this proposed system used to maintaining the stock details properly and updating the details easily. It provides a secure, safe and efficient way of fair price shops.

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