



# Automatic Rationing System Using Embedded System Technology

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**Abstract:** In this research paper, the 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 the ATM. This automated ration system replaces the conventional ration card system by smart card. In addition, the finger print detector is placed in the machine in order to check the correct user access. If the user is correct user, the next process takes place and the input can be given in the touch screen. As soon as the input is given, the products are obtained from the automated ration shop and the 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 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.

**Keywords:** PLC module, PIC microcontroller, GSM and solar panel.

## I. INTRODUCTION

India's Public Distribution System (PDS) with a network of 4.78 Lakh Fair Price Shops (FPS) is perhaps the largest retail system in the world. Major problems due to this system are the inefficiency in the targeting of beneficiaries and the resulting leakage of subsidies. The TPDS system today supports over 40 crore Indians below the poverty line with monthly supply of subsidized food grains. The Government of India is having a UID (Unique Identification) number system called AADHAR number, which contains all general information like age, count of family, finger print of the family, address, contact numbers, bank account information etc. for every resident in the country. Using the AADHAR number and the contact details, the Government can send a message (SMS) to the individuals, containing information regarding quality and quantity of products allotted to him/her in a respective ration shop. People who are accessing the ration shop for subsidies in the cost of products would allot a smart card that is electronic ration card.

The automatic rationing system, installed at the ration shop which contains three interfaces namely touch screen, billing printer and GSM. All these interfaces are interfaced to the advanced microcontroller. Embedded PIC Microcontroller is interfaced to the PLC and further to the central database of the government. The person would have to swipe the card on the system placed at ration shop counter. After that for security authentication and to

prevent card misuse, the system would ask for the AADHAR number and the finger print detector detect the correct consumer. Once authenticated, automatic rationing system would get updated information regarding the existing subsidies for the current user in the touch screen. The inputs are given by the consumer and select the products by the consumer itself in the touch screen. From the touch screen inputs are given to the microcontroller unit, which are given to the PLC module and the products are obtained from the automated ration shop. Further to prevent irregularities in distribution of ration, government can supply various products (like rice, wheat, kerosene, sugar etc.) to rationing shops in the form of sack stored in the container. Central database would be updated immediately after every transaction made by the users.

## II LITERATURE SURVEY

A.N. Madur, Sham Nayse [1] "Automation in Rationing System using Arm 7", this system is based on radio frequency identification of customer. Here each customer is provided with RFID cards. In this system, by using RFID and by entering the password we can access. First user is authenticated, then system shows the balance of person. User have to enter the amount of Kg he want to withdraw. System checks his account. If the user will have sufficient balance to withdraw the current amount, system

will open the valve. Through valve grain will come and it will get weighted by weight sensor. Once the count reached the entered amount controller automatically shut down the valve and update the account of the customer. The updated account information is send to the customer’s mobile using GSM module. In this system the data base of customers can be made with their account details, password etc.

Rajesh C. Pingle, P. B. Borole [2] “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 including their AADHAR (social security) number which is used for user authentication. This prompted us to interface smart card reader (RFID Based) to the microcontroller (AT89C51) and PC via RS232 to develop such a system. Using such a system, Government would have all required control/monitoring over the transactions at ration shop. To involve government in the process we proposed connecting the system at ration shop to a central database (provided by government.) via GSM module (SIM900D) and RS232. 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.

S.Valarmathy,R.Ramani [3] ”Automatic Ration Material Distributions Based on GSM and RFID Technology”, proposed to use RFID and GSM technology based Ration cards by showing the RFID tag into the RFID reader. Then the controller checks the customer codes and details of amounts in the card. After verification, these systems show the amount details. The customer need to entered the required materials by using the keyboard, after receiving the materials controller send the information to government office and customer through GSM technology. In this system microcontroller is used for executing the process.

K.Balakarthish [4]” Cloud-Based Ration Card System using RFID and GSM Technology”, Presents an efficient method for the user to buy the products in the ration shop by just flashing the card at the RFID reader at the ration store. The user authentication is done by sending a random password text to the user mobile which has to be entered in a keypad. The purchase is validated by the employee only after the details are entered in a windows application which stores the user’s personal and purchase information. Here the user can check their purchase details in a dedicated website.

Dhanojmohan,Rathikarani,Gopukumar [5], ”Automation in ration shop using PLC”,proposed a methodology for ration shop automation using embedded PLC. Further the updation to the government database about the stock available and the customer details were not carried out.

#### A. Social Relevance and Usefulness of the Proposed System

To overcome the problems mentioned above in the previous research, the novel PLC based Automation of ration shop plays a vital role[1].

- i) Illegal Usage
- ii) Over crowd
- iii) Processing speed is slow
- iv) Selection of households – Targeting
- v) Bogus cards
- vi) Hijacking of ration cards
- vii) Materials theft
- viii) Mixing of products
- ix) Poor quality of supplies
- x) More than the prescribed rates are charged
- xi) Cannot able to get the accurate quantity of supplies
- xii) Cannot able to get the material at any time

#### B. Benefits of the Proposed System

- i) Corruption in the Government and market sector can be prevented if this system becomes automated.
- ii) Increased adulteration in consumables can be prevented.
- iii) Cost effective approach.
- iv) Time saving approach.
- v) This system helps to maintain the data properly.

### III. PROPOSED SYSTEM HARDWARE

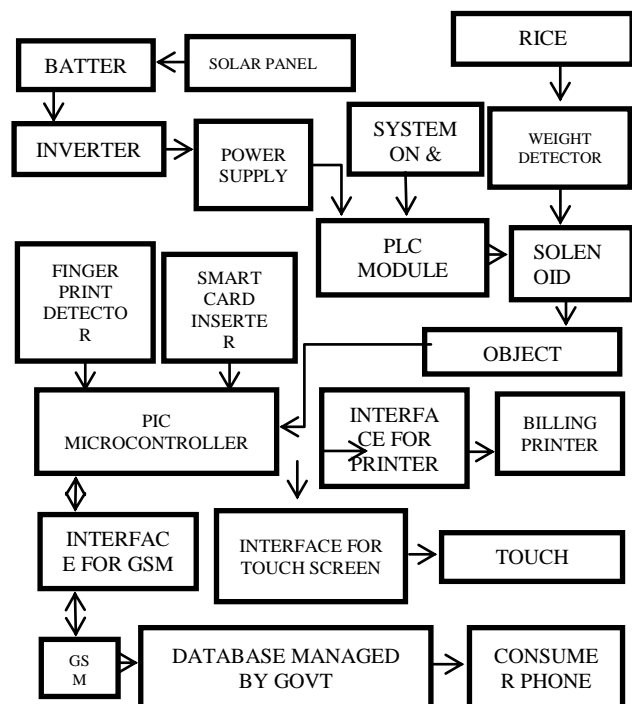


Fig. 1. Block Diagram of Automated Ration Shop

The fig. 1 depicts the overall functioning of the module and proposed system that incorporates PLC based automated ration shop. In conventional system, Indian government has implemented a UID (Unique Identification) number system called AADHAR number, which contains all general information like age, count of

family, finger print of the family, address, contact numbers, bank account information etc. for every resident in the country. Using the AADHAR number and contact details, the government can send a message (SMS) to the individuals, containing information regarding quantity of products allotted to a public in a respective ration shop. Once when the consumer insert the smart card in the smart card inserter, the smart card can be accessed by entering the password, which was given to the all consumers separately. But there is a chance of miss using the smartcard password. To overcome the miss usage, the proposed system includes the finger print detector which detects the finger print of the consumer and their family members. If the password entered and finger print is matched, then the smart card gets accessed and immediately profile of the particular person is displayed in the touch screen.

From the touch screen consumer can select the products needed for him and the process takes place in order to check the account of consumer whether the amount is there or not for the given inputs. If there is enough amount in the consumer's account then automatically the products are collected in the ration shop. If not then the process does not takes place. PIC microcontroller is programmed in such a way to do the above mentioned process automatically without any manual interference. Embedded microcontroller gives the input to the PLC. Consider the consumer has provision for giving four inputs namely rice, sugar, wheat and oil respectively.

The inputs given by the consumer are collected in the automated machine in one by one basis. The first input given by the consumer is rice means, the green light indicates that the rice is coming out from the machine first. Object sensor is placed in the collector side in order to avoid the wastage of products. If the bucket/ object is sensed in the collector side by the object sensor then only the process takes place by pressing the start button. If not alarm circuit turns on, which alarm us to keep bag. Then by pressing the start button solenoid valve opens and the product is collected in the bag.

As soon as the first input is collected then it check it for the second input and the same process takes place for next input and so on.. After all the inputs given in the touch screen by a consumer are collected, with the help of GSM module. The up-to-date information is send to the government and the receipt will come from the bill counter automatically. In order to make the automated system more advantage, power supply is obtained from the solar panel.

#### IV. PROPOSED METHODOLOGY

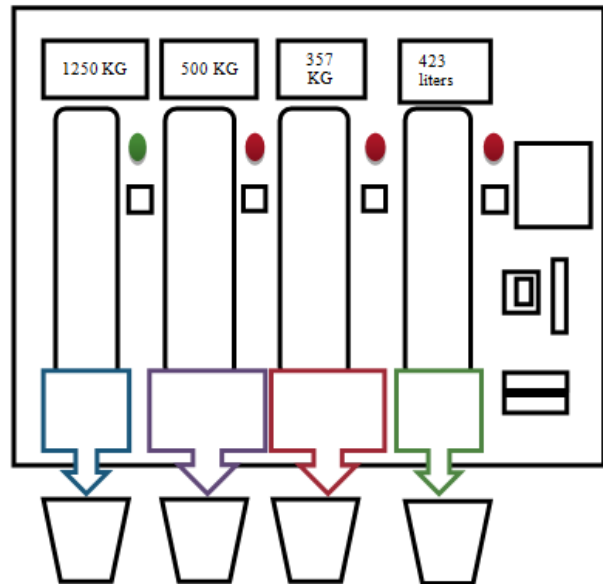


Fig. 2. Proposed Methodology of Automated Ration Shop

#### V. RESULT AND ANALYSIS

The following ladder diagram shows the entire process of automated ration shop distribution of products and output of the PLC.

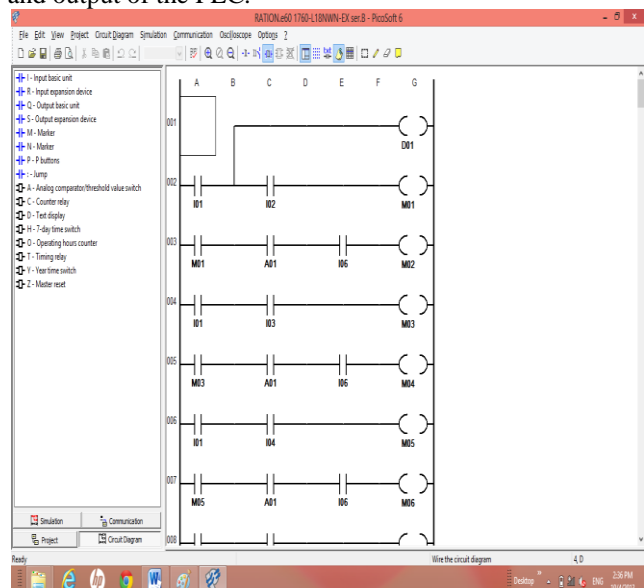


Fig. 3 Ladder Diagram for the Proposed System

#### VI. CONCLUSION

This proposed method can provide a safe, secure and efficient way of public distribution system. By using this technic PLC based automated ration shop; it solves the problem of manual process in public distribution system. This new technology gives solution and this research work will make a great change in public distribution system and provides benefit to the government by sending the current

stock information to the government database via GSM and reduce the manpower.

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