

# Automatic Ration Vending Machine using RFID and GSM Technology

Shrikrishna Huilgol<sup>1</sup>, Sivapuram Ramarohith<sup>2</sup>, Shrinidhi Hegde<sup>3</sup>, Priyanka Shisanalli<sup>4</sup>, Prof. Varsha Jadhav<sup>5</sup>

<sup>1</sup>Shrikrishna Huilgol, Student, Department of Information Science and Engineering, SDM CET, Dharwad, Karnataka, India

<sup>2</sup>Sivapuram Ramarohith, Student, Department of Information Science and Engineering, SDM CET, Dharwad, Karnataka, India

<sup>3</sup>Shrinidhi Hegde, Student, Department of Information Science and Engineering, SDM CET, Dharwad, Karnataka, India

<sup>4</sup>Priyanka Shisanalli, Student, Department of Information Science and Engineering, SDM CET, Dharwad, Karnataka, India

<sup>5</sup>Prof. Varsha Jadhav, Professor, Department of Information Science and Engineering, SDM CET, Dharwad, Karnataka, India

\*\*\*

**Abstract** - The Public Distribution system of providing basic domestic commodities on subsidy to poor families in developing countries like India, is an important aspect to meet basic requirements of people. The existing system in Ration shops needs manual measurement of commodities and maintenance of records of transactions. A lot of issues are encountered by the existing system such as diverting food grains to the open market etc. The project title Automatic Ration Vending Machine proposes an automatic method of distribution of commodities to authenticated card holders. Also, the details of transactions made are maintained in a database. Once they log into their accounts, they can view the stock availability. This system uses a fingerprint matching algorithm which efficiently works with a greater accuracy score. As a first step, one of the family members needs to register themselves to the portal. Once the beneficiary is logged in, he/she can check for the commodities that are available for that particular month. To dispense the commodities, the beneficiary is expected to provide a RFID card and fingerprint for the next level of authentication. Once the beneficiary is verified, the system dispenses a threshold quantity of commodities for the family.

**Key Words:** Public Distribution System (PDS), RFID, GSM Technology, IOT Technology.

## 1. INTRODUCTION

A ration card is one of the most important documents for each and every citizen of India. It is used to purchase various commodities like rice, sugar, oil, wheat etc. at a cheaper price from the ration shops, issued by the government of India. This card serves as both a confirmation of identity and an address. The present ration card distribution system has many disadvantages such as imprecise quantity of goods, physical work, low

processing rate, large waiting time, and unnecessary data. Because India is the world's second most populous country, distribution of ration is not an easy task. One of India's key public sectors is the ration distribution system. It oversees and distributes the essential goods to all the citizens of India mainly people below the penury line and a few reserved categories such as military and police as well. Based on their ration card type such as Above Poverty Line or Below Poverty Line or Antyodaya Anna Yojana, food products will be given. Our proposed system eliminates the disadvantages of existing systems by using RFID and GSM modules. RFID uses an EM field to detect and identify objects. Authentication is done by pin or password. All the details of the beneficiary and his family will be uploaded into the RFID tag. This card will be given to every registered consumer which can be used as a smart ration card. Each ration distribution shop will have an RFID reader which can read 12-bit hex code generated by an RFID tag. Any user who needs ration will have to flash their card through the scanner. Whenever any beneficiary flashes the card it will check in the database whether the beneficiary is valid or not. When a valid beneficiary will flash his card through the RFID scanner, the quantity of ration taken by him/her will be displayed on LCD display and also the deducted system. The customer's registered cellphone number will get transaction data through SMS.

### 1.1 Existing System

The existing system in Ration shops needs manual measurement of commodities and maintenance of records of transactions.

A lot of issues are encountered by the existing system such as diverting food grains to the open market, renewing the ration card every year which has to be done manually.

Another issue is shop opening irregularities and bogus statements of food grain shortages.

Hence, it is better to implement an embedded system for the same.

### 1.2 Proposed System

This machine works by showing the RFID tag provided to the consumer by the government, when an RFID reader recognizes the RFID tag, the consumer is allowed to continue the next authentication process.

Once the authentication is completed, the consumer is allowed to select the type and quantity of the ration, then the selected product of the required quantity will be delivered to the consumer through the product outlet.

The database of the government is updated with the purchased information and the message of Purchases of products are sent to the consumer mobile through SMS.

## 2. DESIGN AND DEVELOPMENT

### 2.1 Objectives

- To Distribute Ration materials using modern techniques.
- Avoiding irregularities in opening Ration shops.
- Restricting unauthorized card holders.
- Decreasing time wastage of waiting in queues for ration materials.
- Cutting down the chain of malpractices.
- Digitally maintaining the stock.
- Avoiding human intervention in updating transactions and maintaining records.

### 2.2 Tools and Technologies

#### Hardware components

- ★ Arduino Mega 2560 - Used as a microcontroller for the project.
- ★ 4\*4 keypad - Used for taking inputs from users.
- ★ RFID reader - For reading RFID card/ tags.
- ★ Servo motor - For dispensing solid materials.
- ★ Load cell - Weighing the solid materials.
- ★ Water flow sensor - Sensing the water flow.
- ★ Solenoid valve - To control flow of liquid materials.

- ★ GSM - For sending the SMS to the users.

#### Software components

- ★ Arduino IDE - As an IDE for Arduino Mega code.
- ★ C/C++ - Programming language.
- ★ ThingSpeak - For cloud storage.
- ★ Windows OS - W7 +

#### Methodology

**Register user:** The system collects information about the beneficiaries, such as their name, residence, date of birth, age, phone number, number of family members, and card category. The database contains all of the information.

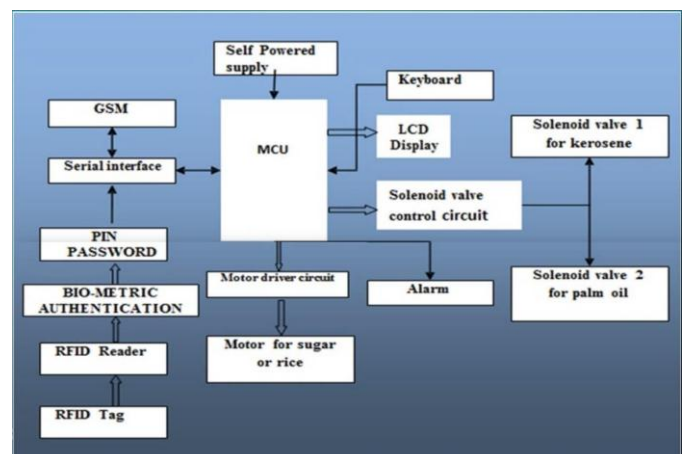
**RFID card verification:** The user flashes the RFID card to the scanner, the system verifies the card if it is valid then it proceeds for pin verification/ fingerprint authentication.

**Pin Verification:** A four Digit pin input will be taken from the user with the help of 4\*4 keypad then the pin will be matched with the respective card pin number if the same verifies the user and proceeds to the next step, else it will terminate the process.

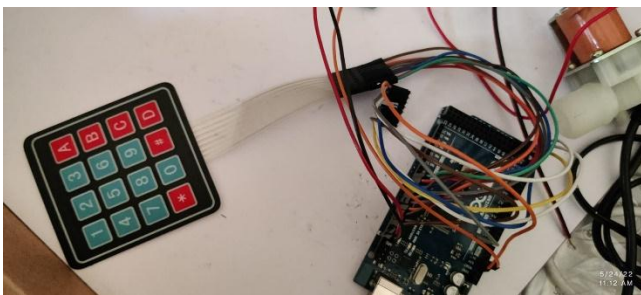
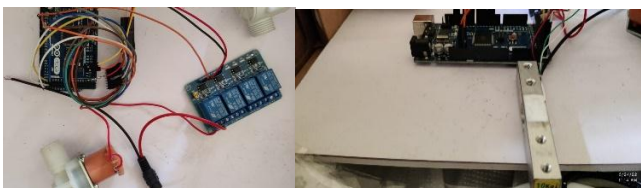
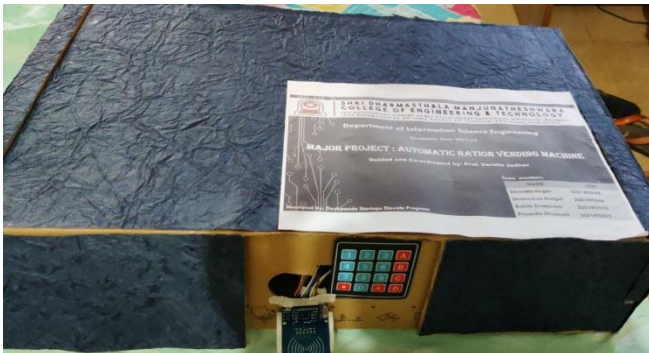
**Ration Dispense:** After verification of the RFID card, the beneficiary is presented with a list of commodities present in the FPS. The beneficiary must choose from a selection of goods that he or she want to acquire. The system will show him the total quantity of the commodities he wants to buy. Once he/she confirms the commodities, beneficiaries are provided with the product.

**Sending SMS:** Using GSM technology send the SMS to the user after dispensing the ration from the outlet.

**Update Stock:** After purchasing the ration, the database will be updated with the new balance for that particular month.



### 2.3 Results



### 3. CONCLUSION

This machine overcomes the primary flaws of the traditional rationing system, such as insufficient product quantities and the creation of bogus entries, as well as material hijacking, card piracy, the black market, and human errors. This project is low-cost, energy-efficient, and better suited for real-time execution. There is a need for this product to overcome all the problems, so we can supply this product nationwide with government support.

### ACKNOWLEDGEMENT

We have been granted the honor of thanking everyone who helped us with the paper's completion. Prof. Varsha Jadhav and Dr. Jagadeesh Pujari, Department of Information Science and Engineering, SDMCET Dharwad, our project adviser and department head, for aiding and directing us throughout the process of polishing the work that resulted in the publication of this paper. Finally, we owe a great debt of gratitude to our parents for their unwavering support and assistance.

### REFERENCES

- [1] A. K. Vaisakh, K. V. Ganesh, "IOT based intelligent public ration distribution", IEEE, July 2019.
- [2] Abhirup Kar, Mohak Gupta, "RFID - based automatic ration vending machine to avoid corruption and malpractices at ration shops", IRJET, May 2018.
- [3] Ginali Goradia, "AUTOMATED ration distribution system", Researchgate, December 2015.
- [4] Sripad V Deshpande, "BIOMETRIC authentication based automated ration disbursement for public distribution system", IJRTE, December 2019.

### BIOGRAPHIES



Shrikrishna Huilgol, Student, Department of Information Science and Engineering, SDMCET, Dharwad, Karnataka, India



Sivapuram Ramarohith, Student, Department of Information Science and Engineering, SDMCET, Dharwad, Karnataka, India



Shrinidhi Hegde, Student, Department of Information Science and Engineering, SDMCET, Dharwad, Karnataka, India



Priyanka Shisanalli, Student, Department of Information Science and Engineering, SDMCET, Dharwad, Karnataka, India



Prof. Varsha Jadhav, Professor, Department of Information Science and Engineering, SDMCET, Dharwad, Karnataka, India