

# Digitalization of Rationing System

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**Abstract-** In the present days many immoral activities are taking place in ration shops, which are meant to distribute the commodities to the people who are in below poverty line, as the distribution process is manually operated and time consuming.

To overcome this problem, we can use fingerprint recognition technology. RFID card is used to create a new ration card, that would store all user's information and fingerprint are used to recognize the person from online database. Moreover, this system will also show the left quota of grocery of a particular family, leading to abandonment of fraudulent activities and blackmarketing of those left grocery.

**Keywords-** Smart Rationing System, Digitalization, Malpractices, RFID, Fingerprint.

## I. INTRODUCTION

Public Distribution System (PDS) is an Indian food security system. It is established by the Government of India under Ministry of Consumer Affairs, Food, and Public Distribution and managed jointly with state governments in India. The traditional PDS is used to distribute grocery items to India's poor who are valid ration card holders. The validity and the allocation of the ration cards is monitored by the state governments. A ration card holder should be given 35 kg of food grain as per the norms of PDS. However, there are concerns about the efficiency of the distribution process. In order to make it efficient and improve the current system of PDS we are implementing SMART RATION CARD. Some states like Gujarat and Kerala have already implemented this, but it has a tedious process which we overcame here. Here we are going to use a card similar to the swipe card or the credit card used for our shopping purpose. Using this card, the card holder can get his/her grocery items from the Fair Price Shop's (FPS). The main reason for using this swipe card and making this process computerized is to remove the drawbacks of the present way of issuing products based on ration card. The main drawback in the current system is that the PDS has been criticized for its urban bias and its failure to serve the poorer sections of the population effectively.

The proposed system replaces the manual work in ration shop. RFID means Radio Frequency Identification

technique is used to prevent the ration forgery. Now a day this process is online which comes as a blessing for the applicants who hate standing for a long time in queues for filling the application form and then go to the office again to know the status. In this, each user will be having RFID based ration card which contains user information including Bank details. These cards having unique numbers. Whenever the user wants to buy some grocery he must show his RFID based ration card to the shopkeeper.

## II. MOTIVATION

Few motivational factors of the proposed system are reduced forgery at ration shop and get grocery in an easy way. Also, it involves reduction in manual work. The system will be more transparent. No need to stand in queue for a long time. Automatic generation of the message after Bank transaction. If any fraud to occur, it would get detected easily. Biometric is used in security and access control applications so that measurable physical characteristics of a person that can be examined on an automated basis.

## III. OBJECTIVE

The main purpose of the system is:

- To reduce forgery from ration shops and users will get their grocery in an easy way.
- To reduce manual work.
- Smart ration card system based on the RFID and the BIOMETRICS, in which the user can fill their data online. When the user wants a ration, he/she comes along with the Smart ration card, then the card is swiped and checked whether the user is valid or not.
- The fingerprints of that user are also checked and the allocated ration is distributed to that particular user. Changes of adding and issuing of the ration are done automatically in the government database.

## IV. LITERATURE SURVEY

The Indian food security system is established by the Government of India under Ministry of Consumer Affairs, Food and Public Distribution. It has authority to distribute subsidized food and non-food items to the people that are

below poverty line and the nation’s poor. The Govt. of India has a network of fair price shops such as ration shops that are meant to distribute the commodities like staple food grains, such as wheat, rice, sugar and kerosene. These ration shops are established in several states across the country. Food Corporation of India, a Government-owned corporation, procures and maintains the PDS.

The responsibility of regulating the Public Distribution System is handled by the state and the central governments. The state government has the responsibility to distribute the commodities to the people through their fair price shops (or ration shops). The central government has the responsibility of procurement, storage, transportation and bulk allocation of food grains. The state governments are also responsible for allocation and identification of families below poverty line, issue of ration cards, supervision and monitoring the functioning of fair price shops. A below poverty line (BPL) card holder should be given 35 kg of food grain and the card holder above the poverty line should be given 15 kg of food grain as per the norms of PDS.

In this traditional system a ration card is allotted to the person who is eligible to purchase the ration at a fair price at ration shop. It is an official document issued by the state government of India and it also serves as common form of identification to many Indians. The ration card contains information about the person and the family members he/she has and the amount of ration to be issued. The person need to go to the ration shop and hand over the ration card to the shopkeeper and thus the shopkeeper will check for the ration to be allocated and issuance to the person. The ration card has to be updated manually and this process occurs monthly. This method is not convenient and has many issues. Many people did research to improve the existing system so that the system becomes less manual and more automatic. In paper [1] we have observed that a RFID card is used as a ration card that stores information of a person, it needs to be scanned on a RFID scanner for verification. If the 12-bit hex code associated with the RFID tag is matched with an entry in database, it shows all the information of the customer on a 16x2 alpha-numeric LCD display. Later, when transaction is done, it’s information is sent to Govt.

In paper [2] we observe that they have implemented a technique that uses a RFID card, and a PIC microcontroller. GSM technology is used to transmit user data to government of India, and they are providing a display at the ration shop that shows credentials of user as well as their purchases.

In our proposed system we have also used RFID cards in place of traditional ration cards but we are also implementing fingerprint authentication as an additional security measure. The user of RFID card has to enter the ration shop, scan his RFID card against the RFID scanner and also provide his thumb print to the shopkeeper. After successful verification of his/her credentials the shopkeeper will allocate ration to the user. We are implementing a web application for the shopkeeper that displays information like allocated ration, list of all users, amount of ration in stock etc. The user can sign into his account on the web application to view the allocated ration. We have also developed an Android application for the same purpose. We have implemented two modes of transaction that are cashless and cash mode so the user can choose any between the two.

**V. ARCHITECTURE DIAGRAM**

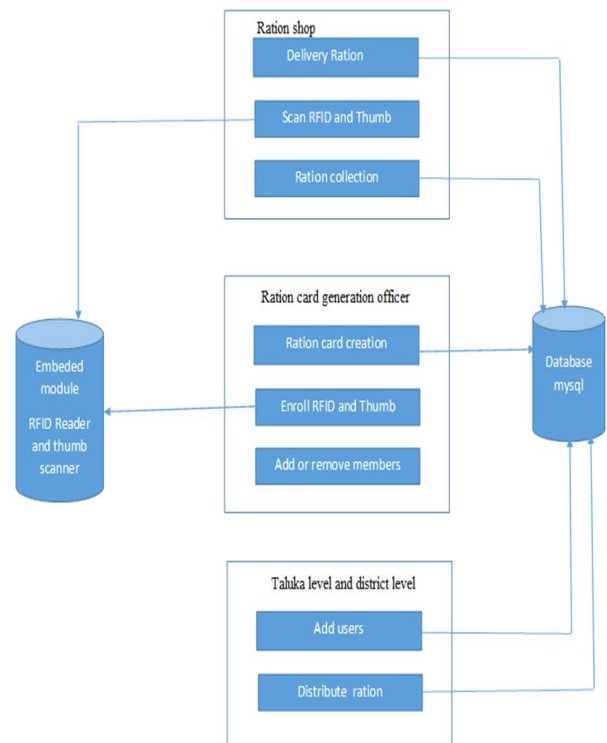


Fig 5.1: Architecture Diagram

**VI. TECHNOLOGIES TO BE USED**

**6.1) JAVA:**

Java has been tested, refined, extended, and proven by a dedicated community of Java developers, architects, and enthusiasts. It is an object-oriented language with a thoroughly worked through object model. It can be used to develop both standalone and web applications and suits both purposes

equally well. Its syntax is based on C and C++, but the language itself is different and focuses more on high-level programming, so its low-level facilities have been reduced, compared to C. Java is designed to enable development of portable, high-performance applications for the widest range of computing platforms possible. The original and reference implementation Java compilers, virtual machines, and class libraries were originally released by Sun under proprietary licenses.

### 6.2)MySQL:

MySQL is the most popular Open Source Relational SQL Database Management System. MySQL is one of the best RDBMS being used for developing various web-based software applications. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company. MYSQL Enterprise edition includes the most comprehensive set of advanced features & management tools for MYSQL. It helps to deliver high performance, scalable database applications.

MYSQL is a popular choice of database for use in web application & is a central component of widely used LAMP open source web application software stack.

### 6.3)AES 128-bit Encryption Decryption algorithm:

The Advanced Encryption Standard or AES is a symmetric block cipher used by the U.S. government to protect classified information and is implemented in software and hardware throughout the world to encrypt sensitive data. The features of AES are as follows:

- Symmetric key symmetric block cipher
- 128-bit data, 128/192/256-bit keys
- Stronger and faster than Triple-DES
- Provide full specification and design details
- Software implementable in C and Java.

### 6.4) OTP Password generation:

One-time password(OTP) is a password that is valid for only one login session or transaction, on a computer system or other digital device. OTP's avoid a number of shortcomings that are associated with traditional password-based authentication, a number of implementations also incorporate two-factor authentication by ensuring that the one-time password requires access to something a person has as well as something a person knows(such as a PIN).

The most important advantage that is addressed by OTP's is that, in contrast to static passwords, they are not vulnerable to replay attacks. This means that a potential intruder who manages to record an OTP that was already used to log in to a service or to conduct a transaction will not be able to abuse it, since it will no longer be valid. A second major advantage is that a user who uses the same (or similar) password for multiple systems, is not made vulnerable on all of them if the password for one of these is gained by an attacker. A number of OTP systems also aim to ensure that a session cannot easily be intercepted or impersonated without knowledge of unpredictable data created during the previous session, thus reducing the attack surface further.

## VII. OVERALL DESCRIPTION

### 7.1 PRODUCT PERSPECTIVE:

Proposed system involves an important role of the user.

There are four types of users to this system:

1. Taluka level admin
2. Ration card registration officer
3. Shopkeeper
1. 4.User

Each user has their specific tasks to interact with the system.

Users have smart ration cards or RFID tags. All information related to a bank account and family members are added to Smart ration card.

- Firstly user has to register to the system at Ration card registration office.
- The user has to interact with RFID scanners to read RFID cards at Ration shop.
- The user has to interact with finger print scanner for thumb scan at ration shop.
- User can see bank transaction messages and Ration details on mobile.

### 7.2 REQUIREMENTS:

- **SOFTWARE REQUIREMENTS:**
  - 1) Eclipse Java 1.7
  - 2) Tomcat 7
  - 3) MySQL 5.3
  - 4) Android Studio 3.0.1

5) Arduino IDE

• **HARDWARE REQUIREMENTS:**

1. Fingerprint Sensor



Fig 7.21: Fingerprint Sensor

2. RFID Cards



Fig 7.2.2: RFID Cards

3. RFID(Radio-Frequency-Identification) Scanner

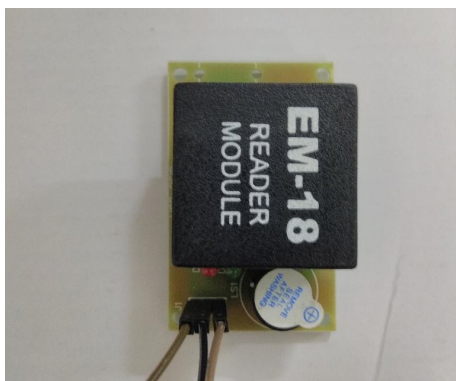


Fig 7.2.3: EM-18 RFID Reader

4. Wi-Fi Hotspot Module

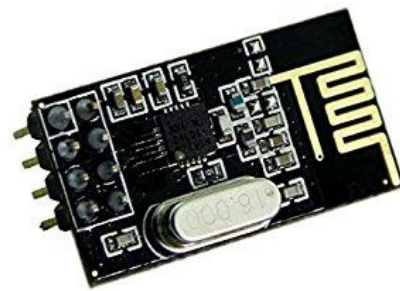


Fig 7.2.4: Wi-Fi Hotspot Module

5. Arduino Mega 2560

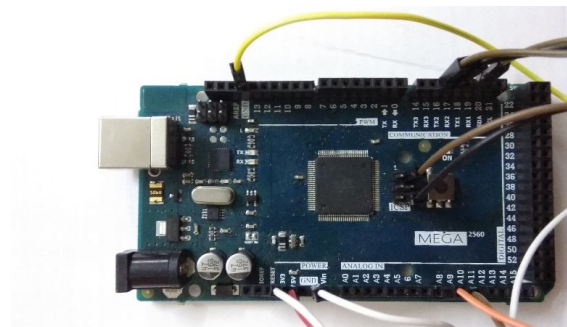


Fig 7.2.5: Arduino Mega 2560

**7.3 PRODUCT FUNCTION:**

- Initially, the user will get registered to the system at ration card registration office i.e. (his thumb will be scanned and stored in the database, a RFID card will be given for identification).
- Whenever the user will go to the shop for receiving the ration he has to give the RFID card first, the RFID card will be read and the thumb has to be scanned using biometric thumb scanner.
- If the credentials of user are valid then all the data related to the user (name, address, image, previous ration details, etc.) will be displayed.
- If the thumb prints do not match, then the proper error will be displayed.
- The bank account of the user should be linked to a RFID card (RFID), whenever user buys ration the amount should be deducted from his bank account (not real-time banking will be used, just a demo portal).
- After the transaction is complete the ration related detail (how much ration is left for this month, amount of

purchase, date) has to be sent to the user on his mobile as SMS.

- The user’s family member’s details can be added or deleted at ration card registration office.
- User can also view the details of transaction on the Android application as well as on web application by signing into it with proper email id and password.

**VIII. MATHEMATICAL MODEL**

$$S = \{s, e, X, Y, T, F_{main}, NDD, DD, Success, Failure\}$$

**S(System)** = Is our proposed system which includes following tuple.

**s (initial state at time T)** = GUI of the search engine. The GUI provides space to enter a query/input for user.

**X (input to system):** - Input Query. The user has to first enter the query. The query may be ambiguous or not. The query also represents what user wants to search.

**Y (output of system)** :- List of URLs with Snippets. User has to enter a query into search engine then search engine generates a result which contains relevant and irrelevant URL’s and their snippets.

**T (No. of steps to be performed)** :- 6. These are the total number of steps required to process a query and generates results.

**f<sub>main</sub> (main algorithm)** :- It contains Process P. Process P contains Input, Output and subordinate’s functions. It shows how the query will be processed into different modules and how the results are generated.

**DD (deterministic data):**- It contains Database data. Here we have considered MySQL, SQLite which contains a number of queries. Such queries are used for showing results. Hence, SQLite is our DD.

**NDD (non-deterministic data):**- No. of input queries. In our system, the user can enter numbers of queries so that we cannot judge how many queries user enters into a single session. Hence, Number of Input queries are our NDD.

**Memory shared:** - MySQL. MySQL will store information like User Authentication, Performing Operations like Add Election Details like Election name, Date, venue, Add Candidate Details, Show List of Elections with Candidates. Since it is the only memory shared in our system, we have included it in the MySQL.

**CPU<sub>count</sub>:** - 1. In our system, we require 1 CPU for server.

**Success** = successfully recommended best system as per user’s interest

**Failure** = If application will not send the notification to user it will fail.

State Transition Diagram:

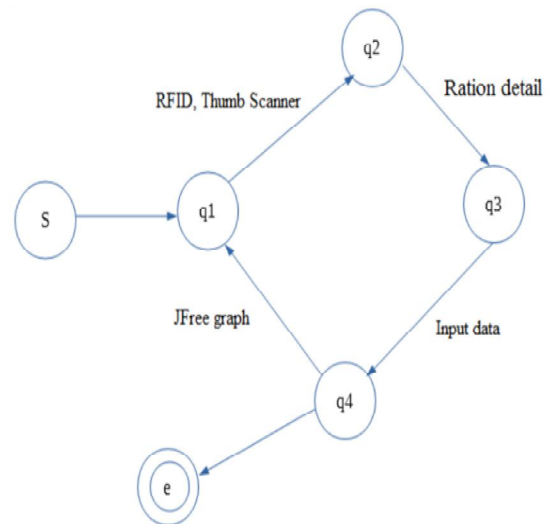


Fig 8.1: State transition diagram

**IX. CONCLUSION**

The proposed system is more secure and transparent than the normal existing system. Influence of fraud data entry in the ration database can be maintained simply with the use of this smart ration card system. Only authorized person can maintain the database. Also, we use three layers of authentication that are Taluka Admin, Registration Officer, and Shopkeeper. The user can be easily identified by using RFID card and thumb print detection. It is expected that the proposed system will be more transparent, reliable than the existing ration card system. It can bypass all the forgeries and frauds conducted at ration shops and achieve transparency in transactions.

**REFERENCES**

[1] “Smart Ration Card Using RFID and GSM Technique”, 2014 5th International Conference-Confluence The Next Generation Information Technology Summit (Confluence)

[2] “Automatic Ration Distribution System”, 2016 International Conference on Computing for Sustainable Global Development (INDIACom)

- [3] Multi-Modality Biometric Assisted Smart Card Based Ration Distribution System  
<http://www.ijaiem.org/Volume3Issue6/IJAIEM-2014-05-29-099.pdf>
- [4] Design and build a secure e-voting infrastructure  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6578240>
- [5] “An Elementary Electronic Voting Protocol Using RFID”  
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=4267566>