A Smart Ration System using Biometric and RFID

Kavita S. Kumavat ,Chetan S. Kandare, Vaishali R.Tribhuwan, Kalyani R. Kothawade

Abstract — A Smart System using web based application of ration system contain different authentication and matching mechanisms like Thumb Scanner for record of thumb of all members in family, RFID tag and tag reader. In traditional system there are too much probabilities that a businessperson (ration delivery operator) may deliver the ration to allotted person and get the benefit and put something false recodes in government diary. In smart ration system, putting all details of family using tag based RFID because this tag is most important identity regarding ration card details of that family. Reader of RFID is used to read data from tag and thumb scanner is used for confirmation of user by matching thumb impression. Thumb scanner is joined to the system through Arduino UNO microcontroller. Reader of RFID is attached through USB cable to system (Computer). User authenticates by reader of RFID and thumb scanner. If user authentication successfully done then government allocated ration will be deliver to user. A smart system for ration distribution is may be design to reduce improper work in the traditional ration system. System provide facility to deliver ration details directly using web based application to the taluka and district level office without any manual feeding and also used to send message to customer's register mobile number and ration receipt.

Index Terms —RFID tag, RFID Reader, Biometric, Thumb Scanner Ration Card

I. Introduction

As we know that our county is moving as digital country in the world. But still we are surrounded by tradition paper work System. Because of this system is increasing the scam and fraud in ration card system in our Country. Many political leader and government officers are missed used this system for scamming in ration system. Ration system is oldest system.

Ration system is developed for fulfilling basic need of food like wheat, rice, kerosene and sugar in minimum price. Ration card system has been allotted to user as per annual income record. Ration system is depends on the public distribution based system (PDA) in that system. In system ration is coming from government and it is distributed to different district under states then district officer has been spread ration to various ration shop in their areas then ration shop officer has been circulated ration to card customer. This process must take too much time to circulate ration to customer and many chances of ration forgery, ration scam.

So system is trying to overcome all drawbacks in existing system should introducing our project on Smart application using biometric and RFID for ration card. In our project we will focus on main four points

- How to avoid traditional work on paper in ration distribution system
- How to prevent scam and corruption in ration system
- Fastly allocate ration to user
- Provide more secure system for ration card.

System develops in three parts

A] Providing ration card to user using RFID by smart system.
For unique identification or for verification of user RFID mechanism is used.

B] Embedded module of smart application based ration system. That module is used for verification of customer by reader based RFID and biometric. Another function of embedded module is storing data on the web portal.

C] Smart application is used for regions wise data storage and also reporting to taluka and district level authority.

Also check stocks and also show how much stocks are remaining. Newly joined user registration also prepared through this web based application. User comes with its RFID tag. Then users identify by using embedded system that existing in shop. If user is identified and smart ration card is also valid successfully then ration has been distribute. And message is send on user registered mobile. For invalid user not register message display on embedded module and again whole process is continuing.

II. Literature Survey

A] Automatic Ration Materials Distribution [5] uses RFID tag and GSM based technology for smart application for ration card. To use the benefit of government policy customer must examine the code by scanning of the reader to get the information of ration allocated to the specific user, then system controller verify user's information and amount of ration allocated to user. The total details are exposed following verification.

Then customer wants to choose the needed equipment by with user interface. After getting requirements, microcontroller delivers record to that user to the higher authorities and user or customer using GSM technology.

B] Multi-Modality Biometric Assisted [6] Systems follows fingerprint scanning and technique for detection of face for valid user identification.

The database keeps the records of customers purchase detail history. System uses a cloud based centralized system hence it will maintain transparency in system and customer can get access to their information of ration at various fair charge store [6].

C] Automation of Rationing System: System introduces atomization [7] of system distribution for ration shop also for maintaining the records at central main control and updates the entries in database; hence the shop holder cannot do any fraud with people. Tags are maintained for valid user

authentication purpose. GSM is used for updating.

D] Public Distributed System with Smart Card using Biometric Device [8]: This system allotted smartcards for all citizens in city. That smartcard involves the brief information of that citizen. Citizen can able to know that how much quantity of the ration is available. Stock of ration is reduces after every transaction in database and citizen get SMS and also get email from government of detail including time and items details with price.

Citizen identification is done using biometric device by checking fingerprint of all family members.

E] In this paper Smart System is created for Ration system in which ration is distributed smartly and record also maintained in database. This smart system uses Public Distribution service for ration distribution [1].

F] RFID and GSM based Smart Ration Card

As mention in paper as Ration System uses RFID tag for validation and for user notification GSM system is used [3].

G] Automatic System for Ration Distribution using LPC2148:

Manual work is replaces by using proposed system for ration shop. To offer transparency the automation is provided for ration shop. LPC2148 is more useful for automation based ration system [2].

III. System Architecture

Figure 1 shows the architecture for smart system for ration distribution. This Smart system includes three parts as ration shop, ration card generation officer and district level and taluka level application. Ration shop is worked as distributor for ration which contains ration delivery, scanning of RFID and customer thumb impression and ration collection. Ration card generation officer work as a middleware for ration shop and database of customer stored at district level. It contained ration card creation, enrollment of RFID and thumb and also having rights to add or remove members. District level or taluka level application contains information about adding user and to distribute ration. All three parts are related to the database using MySQL and embedded module reader and thumb scanner.

IV. System Flow

System Flow in Figure 2 shows, the system working using system flow diagram. Whenever application is started firstly scan RFID card with RFID receiver. It will send a unique number via serial out to the controller. Then database will compare for checking validity. If it invalid then flow will send to the start otherwise display value on GUI screen.

After that using GSM the transaction information is send and updated information on web. If transaction is done successfully then process is completed and ration is distributed. Also alert message is send to the user also to the higher levels as taluka and district level application.

If transaction is not done properly then again the transaction process is started.

Third part is notification message send to the user to notify regarding ration distribution.

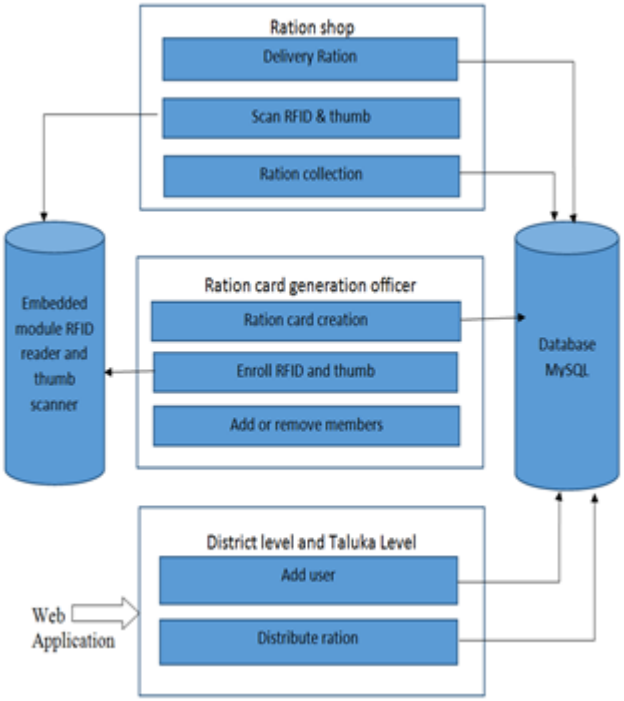

Figure 1. System Architecture

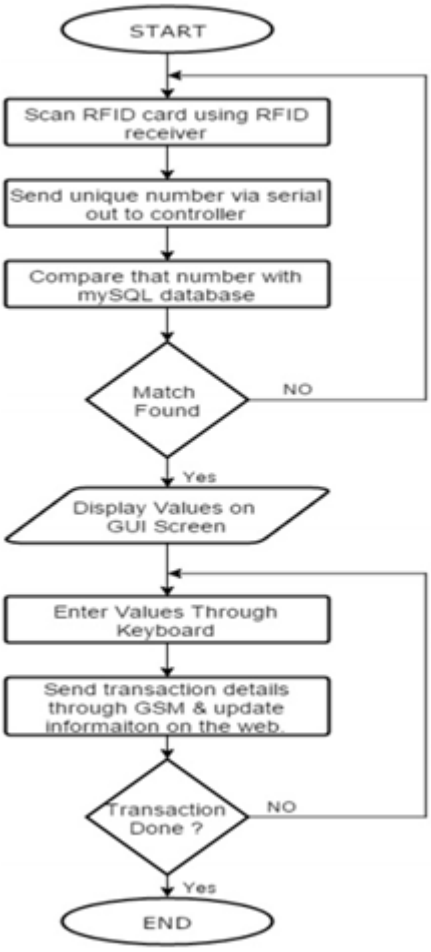

Figure 2. System Flow Chart diagram

V. IMPLEMENTATION DETAILS

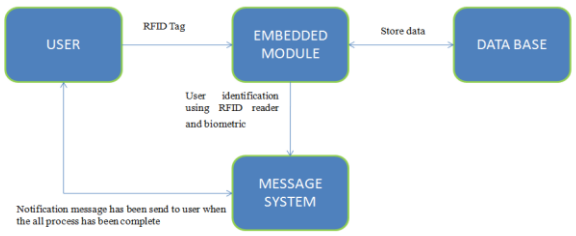

Figure 3. System Flow

Figure 3 shows, System Flow which is divided in three parts first part is embedded module which is for user authentication using RFID reader and thumb scanner. Second part is web portal which is used to manage data and deliver government allocated ration to user.

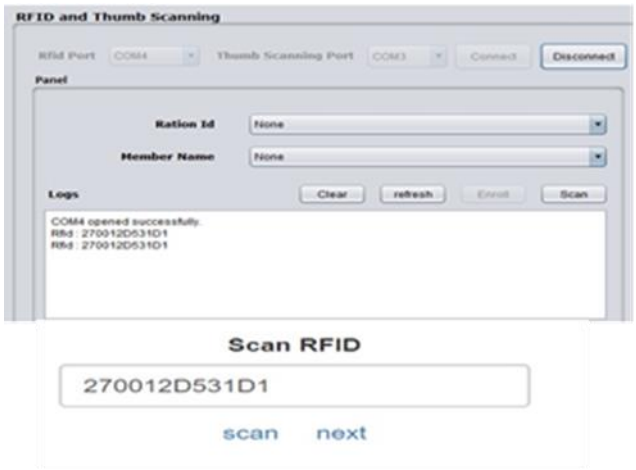

Figure 4. RFID Reader Record

Figure 4 shows, result contain two software window, 1. Web portal 2, Connectivity Software. Connectivity software is dependable for move data between hardware to web portal. Connectivity software is also mentioned for communicate with hardware.

```
void ReadFID() {
  //  lcd.clear();
  //  lcd.print("Scan RFID");

  Serial.println("Enter Finger");
  //  lcd.clear();
  //  lcd.print("Entr Finger");

int fid = GetFingerID();

// scan finger id of a stored/registered user

  Serial.println("@@finger@@"); // display read finger id
  Serial.print(fid);
  delay(200);
}
```

Above Arduino code is use to scan RFID tag and to scan figure id of stored or registered user.

```
While (p! = FINGERPRINT_NOFINGER) {
   p = finger.getImage();
 }
p = finger.fingerFastSearch();
  if (p == FINGERPRINT_OK) {
    Serial.println("Found a print match!");
  }
 else if (p == FINGERPRINT_PACKETRECIEVEERR) {
 Serial.println("Communication error");
    return 300;
  } else if (p == FINGERPRINT_NOTFOUND) {
    Serial.println("Did not find a match");
    return 300;
  } else {
    Serial.println("Unknown error");
    return 300;
  }
```

Above code is used for checking user finger print validity then respective error message is display on screen.

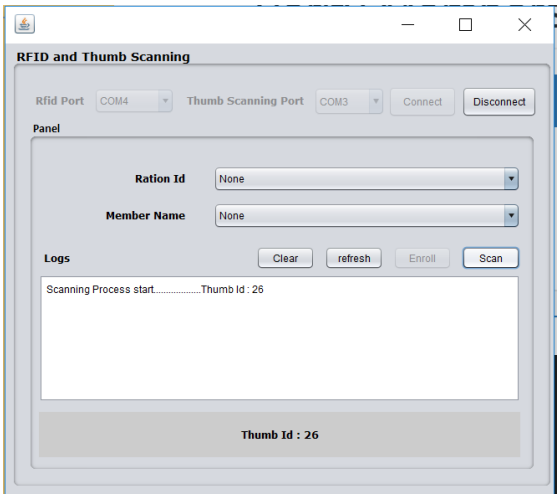

Figure 5. Thumb Scanning Result

Figure 5 shows, Above results shows thumb id if user already exist, otherwise its display message “user not exist ”. if create new thumb id then Enroll the thumb option is used.

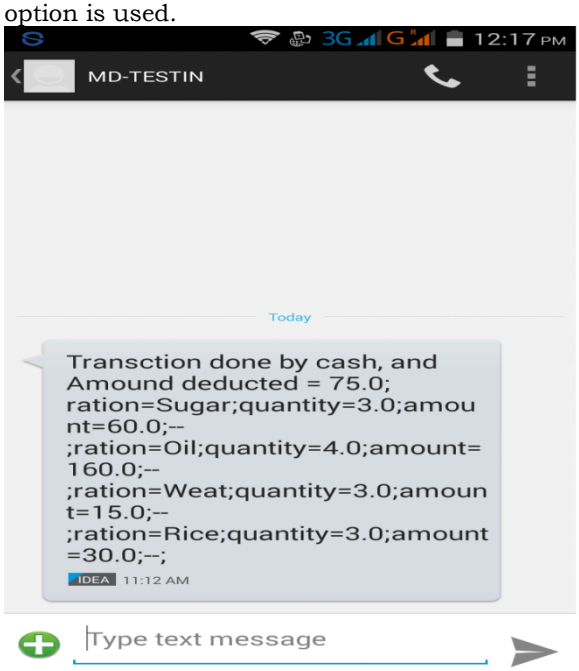

Figure 6. Sample of SMS on Mobile

Figure 6 shows, after ration delivery above notification message is send to user with it's register mobile number.

Conclusion

Smart system for ration is implemented for eco-friendly and corruption free working. System provides a transparent and more secure working than existing system. System is providing benefit to detect corruption and fraud entry of data in the ration database. In the system thumb scanner is used for customer authentication and card is identified using tag after that data is read using RFID reader. Then both RFID tag data and thumb records are matched with existing record of customer and then allotted ration will be distribute. System also keeps records of customer ration distribution at taluka and districts level. Security in system is maintaining using SHA and AES algorithms. Hence smart system for ration is a better mechanism for maintaining security in ration system.

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Authors' Detail

Kavita S. Kumavat
Assistant Professor,
Brahma Valley College of Engg., & Research Institute, (SPPU) Computer Department, Nashik, MH, India
Email: kavitakumavat26@gmail.com

Chetan S. Kandare
Brahma Valley College of Engg., & Research Institute, (SPPU) Computer Department, Nashik, MH, India
Email: chetancsk1060@gmail.com

Vaishali R. Tribhuvan
Brahma Valley College of Engg., & Research Institute, (SPPU) Computer Department, Nashik, MH, India
Email: vaishalitribhuwan8856@gmail.com

Kalyani R. Kothawade
Brahma Valley College of Engg., & Research Institute, (SPPU) Computer Department, Nashik, MH, India
Email: kyshirode@gmail.com

Cite this Article As :

Kavita S. Kumavat ,Chetan S. Kandare, Vaishali R.Tribhuwan, Kalyani R. Kothawade, "A Smart Ration System using Biometric and RFID", International Journal of Technology and Science, vol. 5, Issue. 2, pp. 34-37, 2018