

Smart Ration Card with RFID, Biometrics and Sensors

S. S. Thokal¹, Aarti N. Bhosale^{2*}, Shweta S. Bhor³, Pratima K. Sabale⁴, Pushpak R. Shinde⁵

^{1, 2*, 3, 4, 5} Computer Engineering, JSPM's ICOER, Pune, India

^{*}Corresponding Author: bhosalearti994@gmail.com, Tel.: +917083342928

Available online at: www.ijcseonline.org

Accepted: 16/May/2018, Published: 31/May/2018

Abstract—In this paper, our system is based on a smart ration card. In which we have used sensors, Radio frequency identification, bio metrics and OTP (one time password) to achieve security in existing ration allocation system. For maintaining details of family members RFID card is used. User have to provide thumb impression for authentication. If customer found authenticate then he is allowed to take his allocated ration on that particular month. This ration allocated to customer is approved by taluka admin and provided to shopkeeper. Smart ration card is immune to the theft and forgery, because the information about allocated ration will be send directly to the higher authority (Government), and customer will received information via OTP. A survey conducted for measuring the problem faced by the people on existing Ration Distribution and after that the idea for the Smart Ration Card System is enacted.

Keywords—AES Algorithm, RFID, Microcontroller (Arduino), Weighing and Level Sensors, One time password

I. INTRODUCTION

Ration card is one of the important document in India. It is used for identification purpose and getting the subsidized foodstuff and fuel. Citizen of India uses ration card for mostly address proof. But the very important thing is, it is used to purchase food items like wheat, rice, oil, etc. from the ration shop at very low cost. Actually, government issues particular amount of grains to each ration card holder who's having income less than specified amount granted by government. But the way in which this public distribution system works is very much less transparent, inefficient, time consuming and huge part of corruption. In our current ration distribution system, as there is no transparency shopkeeper tend to show fake quantities of grains available in shop to the customer and higher authority. So, it is necessary to improve traditional public distribution system in India.

In Traditional System of Ration Card the customers needed to make a card for individual family. Any member of family was able to go and take the ration from the shopkeeper but it was time wasting and many a times the shopkeeper use to make fraud while giving the ration. So to avoid such kind of things while collecting the ration the allocation of ration by government is encrypted in this new system by various methods like. AES algorithm, the using OTP, email validation. The allocated full amount of ration the customers gets her without any interfere of shopkeeper. This helps in providing the fraud detection and allocating the correct amount of ration to every family per month.

In Smart Ration Card one web portal is made which help for the registration of officer, shopkeeper and customer. This

web portal also helps in allocation of ration and with the help of AES the allocated ration of individual customer remains safe. The customer when arrives at shop he has to be an authenticated user to collect the ration. With the help of biometric and encrypted RFID card the safety of customers is provided. The Arduino helps in doing all the hardware work of sensors and RFID cards. [1].

While registration the customers need to enter a valid email address for getting OPT while doing online payment.

II. RELATED WORK

Ration card system works in different level. In India, government provides goods like food grains, kerosene, sugar, wheat, rice, etc. via the ration distribution system to the Below poverty line category people. In the ration distribution system shopkeepers are registered to the government dealers. At the different levels, information about quantity of ration and transaction details are maintained in isolated fashion. All this process has manual working. current ration card is simply in the form of paper diary. Which includes each family member's name, age, gender and relation with family head. The ration card which is currently in use is as below



Fig 1:Current ration card

III. METHODOLOGY

AES algorithm is implement with the allocation of ration to store the data in encrypted form in database.

Pseudo code for Allocation of ration with AES

```

<li>
<a href="#"><i class="fafa-indent
nav_icon"></i>Ration<span class="fa
arrow"></span></a>
<ul class="navnav-second-Level">
<li>
<a href="GetThumbServlet">Get Thumb</a>
</li>
</ul>
<!-- /.nav-second-level -->
</li>
<li>
<a href="#"><i class="fafa-indent
nav_icon"></i>Allocate Ration<span class="fa
arrow"></span></a>
<ul class="navnav-second-Level">
<li>
<a href="allocateration.jsp">Allocate Ration
here</a>
</li>
    
```

1. HARDWARE COMPONENTS USED IN PROJECT:

A. RFID CARD AND READER:

RFID card and RFID reader is used in the project just to store information of user on card and with help of reader read the data. RFID card contain all the detail data of user in

encrypted format. This provides one kind of security in data of customer.

B. BIOMETRIC:

Using biometric for the authentication purpose. While registering new customer the biometric of thumb is taken and registered on his name. When he comes to take the ration the biometric is matched and RFID card is also matched along with it and authentication is given.

C. LOAD SENSOR:

Load cell sensor is also called and weighing sensor. It is used to calculate the load given to it and send the data to server. While collecting the grains from the ration shop.

D. LEVEL SENSOR:

Level Sensor is used to detect the level of liquid given to the user while collecting the ration. This just converts the data from analog signals to digital signals and send the data to server.

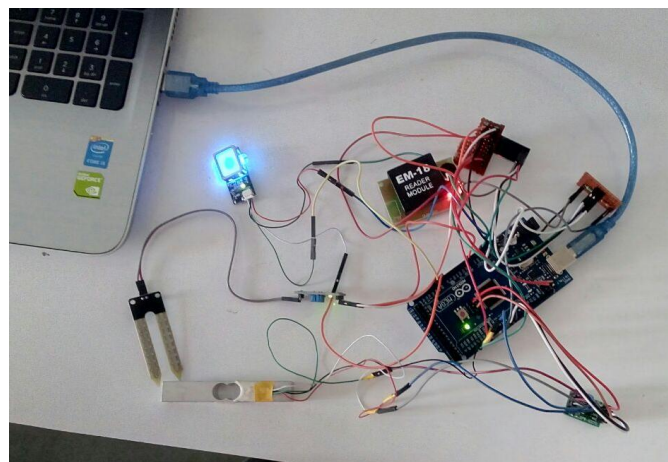


Fig 2:Proposed system

IV. PROPOSED SYSTEM

In proposed system , customer has to register at the government database. All the personnel detail of customer like his family members, income are taken while registering. Customer also have to give his thumb impression which will used for authentication purpose afterwards. Government will verify the details and customer will get RFID card as a smart ration card.

RFID card contains details of one family member along with is name, email id, rfid card number, income, family members password. While collecting the ration ,customer has to tap RFID card to the RFID reader which is present at each ration card. RFID reader will read the data via the card and compares it with the data stored in government database. Appropriate message will get display on screen about user. Message will show that user is valid or invalid. The ration is allocated to the valid customer by government according to the income he has registered.

After validation and allocation the ration are weighed by the weighing sensor and level sensor and given to customer. The data is updated at each level i.e. at shopkeeper level, registration office level, taluka level. The transaction is made accordingly and the generated bill is displayed on shopkeeper device as well as on customer's mobile phone. And for doing online transaction the customer should enter the valid email address and will receive and OTP for transaction completion.[11].

V. SYSTEM IMPLEMENTATION AND DEVELOPMENT

In the Implementation of Smart Ration Card System, Three major stages Consist:

1. Creating database for different users
2. Designing an interactive web portal for user interface
3. Creating mobile application.

1. Creating database for different users.

For creating a larger database that contain data of registration officer, different shopkeeper, and customers as well as the allocated ration is also stored.

Using MYSQL Workbench Database Format we store the relevant data for enhanced effectiveness, several worker threads are generated for directing different API requirements and recovering the consistent dataset concurrently. This whole data is stored in tabular format in database.

2. Designing an interactive web portal for user interface.

The eclipse is used for creating a web pages for providing GUI. The front end of GUI is made with help of Java and Html languages. The System Consist of three main modules in web pages.

1. Customer Module.
2. Shopkeeper Module.
3. Registration Officer Module.

3. Creating mobile application.

Android Studio is used for creation of the mobile app.

With the help of the application the customer gets to now is collected ration details and bill generated. This application gets connected to database to access the data and display correct details on application to user[10].

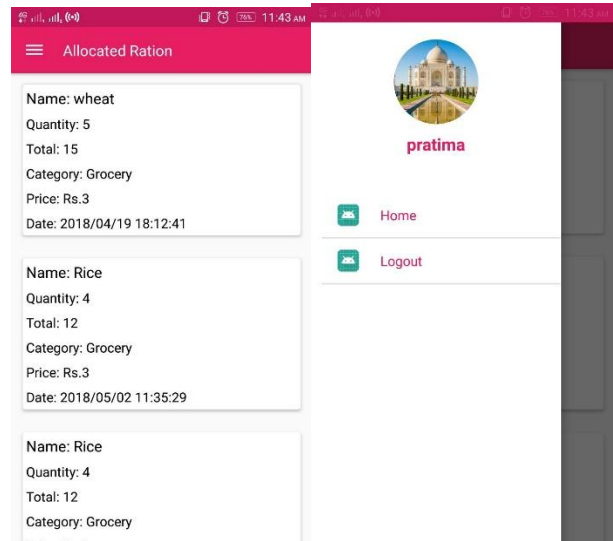


Fig 3: Overview of Mobile application.

VI. RESULTS

A. Registration System

With help of Java and Html we create a web pages. The web pages the registration of customer, officers, and shopkeepers is done. This pages are one kind of interface between the customer and government.

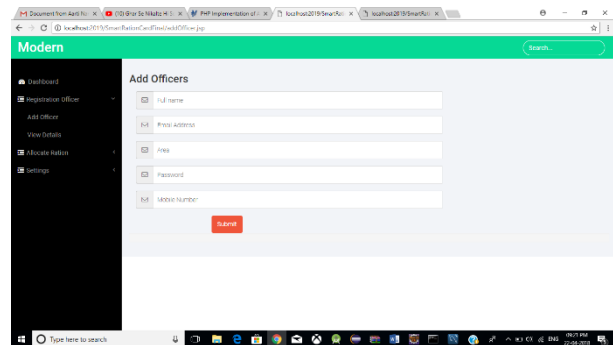


Fig 4: registration page

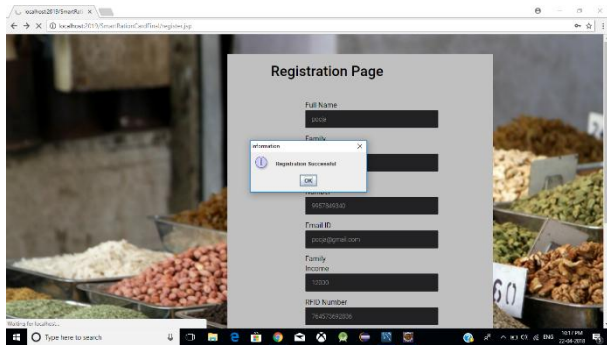


Fig 5a: Registration successful

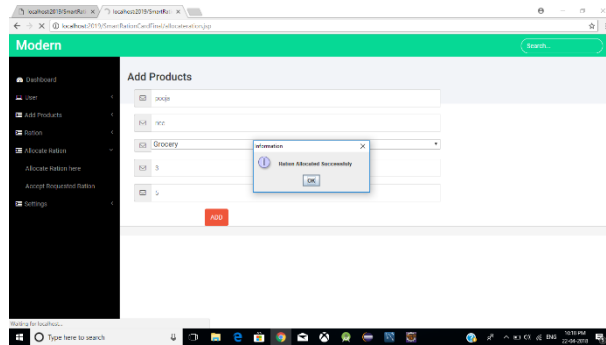


Fig 6: Allocation of Ration.

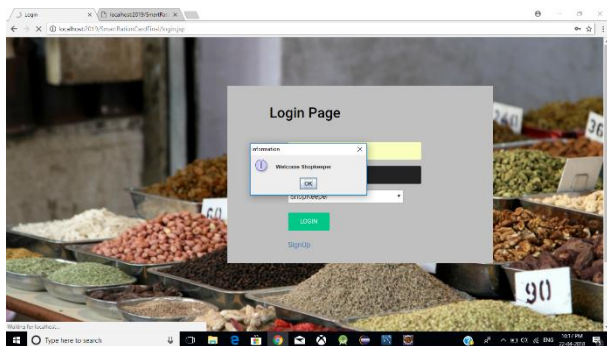


Fig 5b: Overview of Registration System.

The fig: 5, helps for login and registration of the customer, officer and shopkeeper with all these details which are later provided to government.

The use of Java and HTML for Designing the Web Portal Efficient and look reliable. User Interface has a major Impact of Making the System different from other Traditional Recruitment System.

C. Generation of Bill.

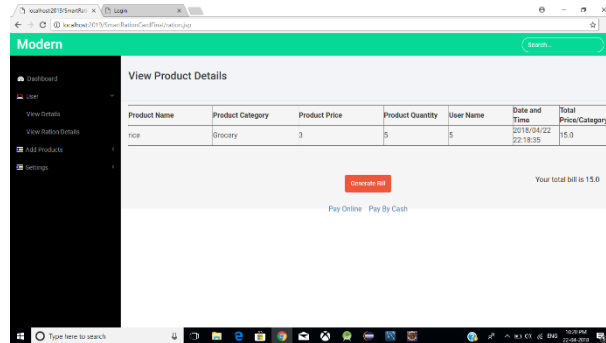


Fig 7: Overview of generation of Bill.

B. Ration allocation System

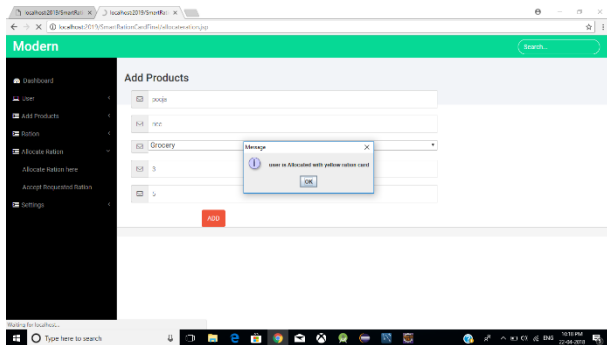


Fig 8: Allocation of ration with income.

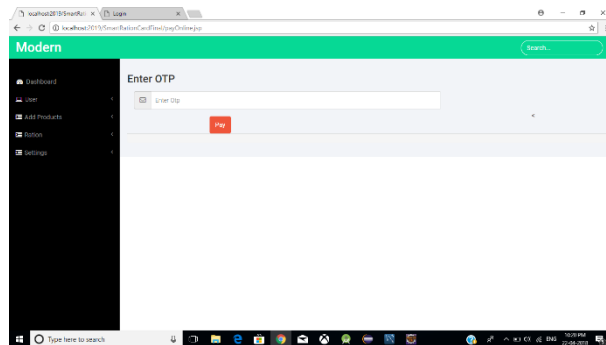


Fig 9: Overview of Online Payment with OTP.

OTP (One time Password) helps for transaction of bill generated after collecting the ration. The generated bill is also displayed on user's mobile application.

VII. CONCLUSION

In this new System with the help of RFID card, Biometric, and Sensors the system gets updated. This helps to reduce the manual work of existing system and as we are using RFID card all the details are present on the card so miss use of card is not possible. With help of Biometric the fraud chances of taking the ration is also reduce and using sensors like weighing and level detection the correct amount of ration is given to the customer. And with this accuracy of system also increase.

The future work on this system can be to link bank account with the system for more efficient online payment.

The advantages of the new portal are as follows:

1. Accuracy is generated in between government and customer.
2. Less time consuming.
3. Scalable System and OTP Delivery System.
4. Mobile application to every customer.

REFERENCES

- [1] Balekar Swati D, Kulkarni Rituja R, "Online Ration Card System by using RFID and Biometrics", International Journal of Advanced Research in Computer Science and Software Engineering, 2015.
- [2] Yogesh Kumar Sharma, Dr. K. B. Shivakumar, "Multi-Modality Biometrics Assisted Smart Card Based Ration Distribution System", International Journal of Application or Innovation in Engineering and Management (IJAIEM), 2014.
- [3] Parvathy A, V.R. Raj, Venumadhav, Manikanta, "RFID Based Exam Hall Maintenance System", International Journal of Computer Applications (IJCA), 2011
- [4] S.Santhosh, "Design and Development of a Security Module with Inbuilt Neural Network Methodologies and an Advanced Technique on Fingerprint Recognition", International Conference on Circuit, Power and Computing Technologies (ICCPCT), 2014.
- [5] M. Agarwal, M. Sharma, B.Singh, Shantanu, "Smart Ration Card Using RFID and GSM Technique", International Journal of Computer Application (IJAC), 2014
- [6] Md. Wasi-ur-Rahman, Mohammad Tanvir Rahman, Tareq Hasan Khan and S. M. LutfulKabir, "Design of an Intelligent SMS based Remote Metering System", Proceedings of the IEEE International Conference on Information and Automation (ICIA), 2009.
- [7] K. Michael, L. Mccathie, "The Pros and Cons of RFID in Supply Chain Management", Proceedings of the IEEE International Conference on Information and Automation (ICIA), 2005.
- [8] Bundesamt für Sicherheit in der Information Stechink, "Advanced Security Mechanisms for Machine Readable Travel Documents Extended Access", IEEE International Conference on Information and Automation (ICIA), 2010.
- [9] R. H. Clarke, D. Twede, J. R. Tazelaar, and K. K. Boyer, "Radio frequency identification (RFID) performance: The effect of tag orientation and package contents", Packaging Technology and Science, 2005.
- [10] J. Korhonen, T. Ojala, M. Klemola, and P. Väänänen, "mTag-Architecture For Discovering Location Specific Mobile Web Services Using RFID and Its Evaluation", IEEE Computer Society, 2006
- [11] H.Y. Chien, SASI, "A new ultralightweight RFID authentication protocol providing strong authentication and strong integrity", IEEE Transactions on Dependable and Secure Computing, 2007.
- [12] Jeff Brown, Bill Shipman, Ron Vetter, "SMS- The Short Message Service", IEEE International Conference on Information and Automation (ICIA), 2007.

Authors Profile

S. S. Thokal pursued Master's Degree in Computer Science & Engineering from Pune University in 2015 and completed her Bachelor's Degree in Computer Engineering from Pune University in 2013.

Her current research interests are Data Mining, Artificial Intelligence. Having a work experience of 4.9 years in Teaching.



Aarti N. Bhosale is currently pursuing Bachelor's Degree in Computer Engineering from JSPM's Imperial College of Engineering and Research, Wagholi

Her current research interests are IOT With a vast knowledge Website Development.



Shweta S. Bhoris currently pursuing Bachelor's Degree in Computer Engineering from JSPM's Imperial College of Engineering and Research, Wagholi .

Her current research interests are in Internet of Things, and Cloud Computing With vast knowledge of different programming languages.



Pratima K. Sabaleis currently pursuing Bachelor's Degree in Computer Engineering from JSPM's Imperial College of Engineering and Research, Wagholi.

Her current research interests are Cloud Computing, and R language.



Pushpak R. Shindeis currently pursuing Bachelor's Degree in Computer Engineering from JSPM's Imperial College of Engineering and Research, Wagholi.

His current research interests are Embedded System and android Development.

