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Biometric Assisted Smart e-Public Distribution System

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ABSTRACT: The Government of India in an effort to ensure fair supply of food items to all citizens of India instituted Fair Price Shops (FPS) under Public Distribution System (PDS). Essential commodities are supplied to the targeted underprivileged sections as per the eligibility fixed by the Government of India. In spite of the best efforts by Government officials at various levels, there are a few bottle-necks and inconveniences to the targeted citizens in availing the services provided which includes wrong entry in register about amount of product in the shop, selling the products in other shop with high rates, adding impurities to the grains. People don't have the idea about how much grain is allotted to them for this month. As solution to this problem proposed system proposes the RFID based ration card system using Biometric authentication technology promotes semi-automated and secured ration distribution. It is a transparent and highly scalable Ration Distribution system. The proposed system maintain the database at main control station that is at server and updating the database so that the shopkeeper do not cheat the poor people. In addition user as well as ration distributor will get SMS based alert about arrival of commodities. As a result, this new e-PDS can reduce possible human errors and provide accurate information of public distribution system at any point.

KEYWORDS: Fair Price Shop, Public Distribution System, RFID.

I. INTRODUCTION

India's PDS with a network of 4.78 Lakh FPS is perhaps the largest retail system of its type in the world. One of the main problems with this system is 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 traditional PDS is used to distribute grocery items to India's poor who are valid ration card holders. The public distribution stores or ration stores use ration cards which are in the form of a book are used for general identification of the customer and holds the user's personal information and purchase history. On successful purchase, the details of purchase are entered in the card and in the purchase register at the employee's side. This is the system which is existing at the ration stores now. This system has a lot of drawbacks. There is a possibility of the ration card being torn. In some ration stores, dealers involve in malpractices like diverting food grains to open market to make profits. The Planning Commission had the following to say on the PDS system in its 2005 report. many systemic challenges that plague the PDS system today "For every Rs 4 spent on the PDS, only Rs 1 reaches the poor" "57% of the PDS food grain does not reach the intended people". In order to make it efficient and improve the current PDS we are implementing e-Ration Shop which will help us to avoid the corruption in PDS if not eradicate it.

II. LITERATURE SURVEY

Atomization of Rationing System, Shivabhakt Mhalasakant Hanamant, Suraj V.S [1]. This system proposed to use RFID and GSM technology based Ration cards by showing the RFID tag into the RFID reader. Then the controller checks the user codes and details of amounts in the card. After verification, the user need to entered the required materials by using the keyboard, after receiving the materials controller send the details to centralized server and user through GSM technology. In this system each FPS is having their local database and is connected to centralized server through GSM. So each time SMS is needed to be send for updating a database. But in proposed system software is

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designed in way that nothing is stored in local computer all details are either retrieved or updated in cloud. This ensures utmost security of data and tackles any sort of malpractices.

Closed-Based Ration Card System using RFID and GSM Technology, K.Balakarthik, [4]. This paper 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 and the user can check their purchase details in a dedicated website. The paper proposes web site functionality by accepting requests from the user's browser and responds by sending back HTML documents (Web pages) and files. Database creation and GUI design and provides the details of centralized management and updating of database through web.

III. METHODOLOGY

A. SYSTEM DESIGN

The system consists of three main module namely Hardware module, Software module and Database server. Hardware module is mainly developed for end user that is for customers of ration shop and it is placed at each ration shop, which will completely control the activities at shop like customer identification, grain distribution, alerting the customers at the arrival of grains and updating the database. Software module is nothing but desktop application which is developed for both Admin (Higher authority) and FPS seller. They can perform their individual role by accessing the desktop application which is developed in Java. The third module act as backbone for the proposed system is centralized database server to which every FPS is connected. Data base is designed by using MySQL Server5.5. Those modules are integrated together in order to allow its full functionality. Each module carries its own functions and features.

B. HARDWARE ARCHITECTURE

This chapter describes the hardware requirements and the software requirements for the systems. Figure 3.1 is an overall block diagram of the components of the system. The following sections will discuss each of the components chosen for the system, along with the motivation for each particular choice.

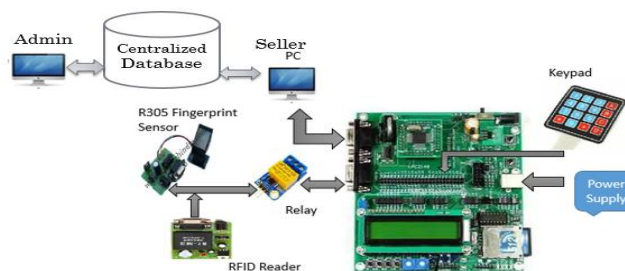


Fig.3.1 Block diagram of proposed system

All customers have to register for the ration card. The registration is done at main control station. For registration all customers have to provide their personnel details about their family. After this head of family is provided with smart card which is used to buy their monthly ration. When the ration is dispatched to a ration shop a message is sent to the shop. The message contains the quantity of grains allotted for this month as well as message is send to all customers related to the particular ration shop to alert the customers that their monthly ration has been arrived. At ration shop we are using smart card and Fingerprint authentication for identification. After reading smart card the LCD will display message "Enter UID no". The user will enter UID no through keypad then controller will send this data to server, server will check that ration card is valid or not. If it is valid then it asks for user authentication using fingerprint. Again the fingerprint is verified with database at server side if valid member then, amount of ration allotted is displayed on the LCD. Using keypad customer has to enter the product's corresponding serial number they want to buy along with quantity. After getting the input from the keypad controller will send this data to server, the server will check for account balance and if it is sufficient user can get the commodity otherwise insufficient balance is displayed on LCD. The transaction details are sending to the customers mobile.



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C. SOFTWARE DESIGN

The software which acts as an interface between the hardware and the server is a Desktop application. It is a Graphical User Interface which will be accessed by the ration shop owner and government authority. The software is designed in a way that nothing is stored in the local computer and all the details are either retrieved from the cloud or updated in the cloud. This ensures the at most security of the data and tackles any sort of malpractices. The smart card based e-PDS system is implemented with the latest javatechnology utilizing extended library which makes layout easy to use and eliminate much of the tedious code. MySQL 5.5 is preferred database system which issued while developing smart card based e-PDS system. The software automates various functions of PDS System like-

1. Registration of a new Ration Card new ration shop
2. Cancellation of Ration Cards and ration shops and Cancellation of members in ration cards.
3. Identification of Invalid users and Cards.
4. Stock status of each shop and transaction reports.
5. SMS alert to the ration shop and customers of shop regarding arrival of commodities.

D. DATABASE

The system database includes following tables shown below.

1. Admin table
2. City table
3. Person table
4. Seller table
5. Grain Quota table
6. Purchase table

E. GRAPHICAL USER INTERFACE (GUI)

The GUI is developed in the form of dynamic web pages, which are database driven. This signifies that the information displayed on the web pages are constructed based on the data extracted from the database. The GUI of the suggested system is designed to be easy-to use and simple. The e-PDS home page is composed of two types of different login pages.

1. Admin Login
2. FPS(seller) Login

1. Admin Home Page:

Administrator of the system is involved in following activities.

- Manage seller
 - i. Add/Delete New Seller.(Fair Price Shop)
 - ii. View Reports.
 - iii. View Quota for particular seller.
 - iv. Send SMS
 - v. Add/Edit/Delete New unit of measurement and items.
- Manage ration card
 - vi. Add/Delete New ration card.
 - vii. Add/Edit/Delete New person in ration card.
 - viii. Add Balance

By logging into the system Admin can access the system. The following fig.4.3 and 4.4 shows Admin login form and admin homepage respectively.

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Fig.4.3 Admin Login Form

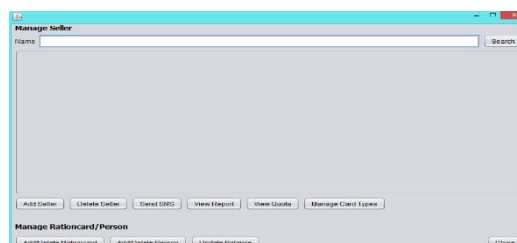


Fig.4.4 Admin Home Page

i. Add/Delete New FPS(Seller)

Admin can add new FPS by clicking on add seller button. The seller registration form is shown in fig.4.5. The form includes registration details, after filling up all required details admin can submit it. He can delete seller by selecting a specific seller which he wants to remove and click on delete button as shown in fig.4.6.

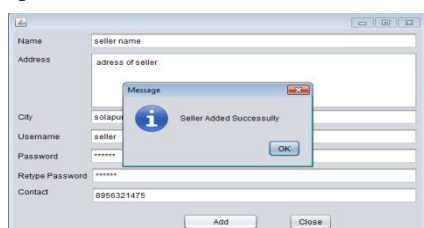


Fig. 4.5 Add Seller

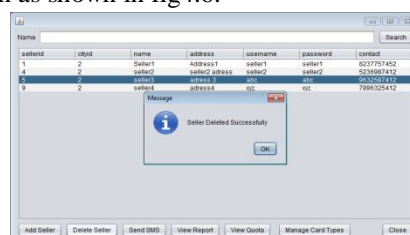


Fig.4.6 Delete Seller

ii. View Reports

The current system involves manual maintenance of record that is each FPS as a register in which all transaction details are entered manually. The same details are submitted to higher authority by seller of FPS. This may involve some malpractices. So to overcome it system will generate a report of each FPS. Admin has to select of which FPS he wants to see the report, after selecting the specific seller the new window will open as shown in fig.4.7. In new window he must select month and year of which he wants to see then by clicking on search button the details will open.

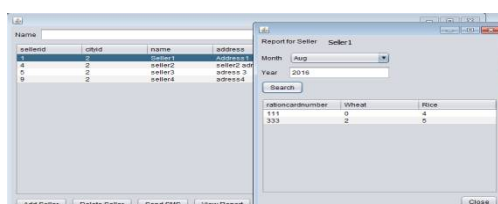


Fig.4.7 View Reports

iii. View Quota

The Admin can view monthly quota of any shop by selecting specific seller and clicking on button view monthly quota. The new window will display total grain allotted including rice as well as grain for that shop.



Fig.4.8 View Quota

iv. Send SMS

Admin can send SMS to Seller as well as customer regarding arrival of commodities at their respective shop.

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For sending SMS admin has to first select seller to whom he want to send SMS after that he can type a message regarding date at which ration is coming and click on button “Send to Seller” to send SMS to Seller shown in Fig or “Send to Customer” to send SMS to all the customer of that seller.



Fig.4.9 Send SMS to Seller

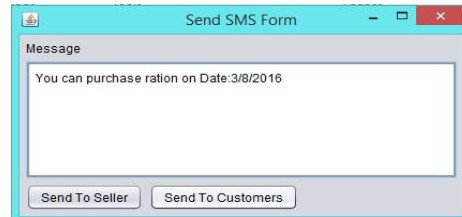
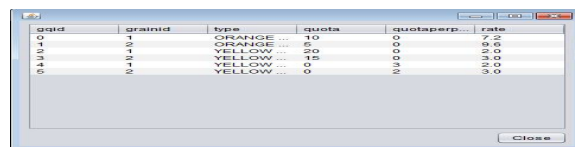


Fig.4.10 Send SMS to Customer

v. Manage Card types

This window shown in fig.4.11 allow the admin to change type of card and rationing scheme allotted to that card that is grain allotted and price of that regarding higher authority demand.



cardid	grainid	type	quota	quotaper...	rate
0	1	ORANGE	10	0	7.2
1	1	YELLOW	20	0	5.0
2	1	YELLOW	0	0	0.0
3	1	YELLOW	0	0	0.0

Fig.4.11 Manage card types

vi. Add/Delete new Ration card

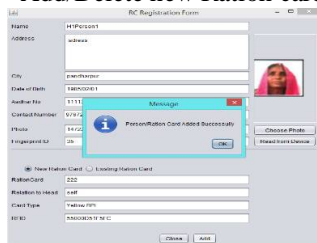


Fig.4.14 Add Ration

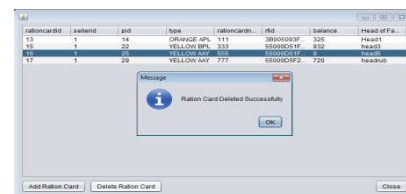


Fig.4.15 Delete Ration card

vii. Add/Delete new Ration card

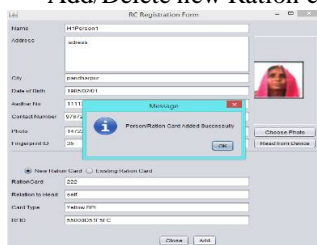


Fig.4.14 Add Ration

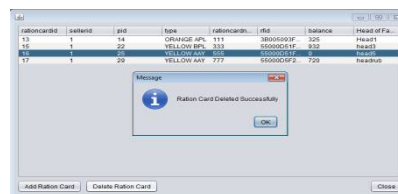


Fig.4.15 Delete Ration card

2. Fair Price Shop(Seller) Home Page

Fair price shop user of the system is involved in following activities:

- i. Distribution of items to the Ration card holders. (Sell goods)
- ii. View monthly Quota

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By logging into the system FPS Seller can access the system. The following fig.4.12 and 4.13 shows seller login form and seller homepage respectively

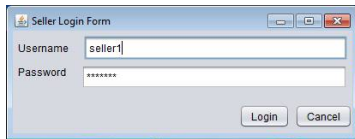


Fig.4.12 Seller Login



Fig.4.13 Seller Home

i. Sell goods

The sell goods window allow seller to sell the items to user .If seller is not login to this window the customer cant access the hardware to buy goods. The user details including grain selected and quantity as well balance is displayed to seller in this window.

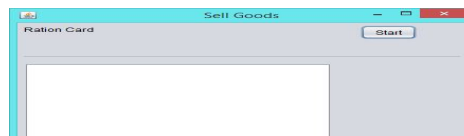


Fig.4.19 Sell goods

ii. View monthly Quota

The FPS owner(seller) can view monthly quota of his shop by clicking on button view monthly quota,from this seller will get to know the total rice as well as grain allotted for shop.



Fig.4.20 Available Quota

IV. RESULTS

To obtain the result of the proposed system the system is tested on database of 50 persons.The proposed system is able to successfully authenticate person for providing service based on different cases, provides faster service compared to manual method at the same time eliminate fake user.

A. SYSTEM ACCESSIBILITY RESULT

The following table shows the result of system accessibility for end user. The results are obtained by performing different cases which can be involved by handling the system.

Card No	Family/Person	Aadhar No	Finger scan	Authentication	Balance		Transaction Result
					Grain Quota	Account Balance	
111	H1P1	111122223333	H1P1	✓	✓	✓	✓
	H1P2	111122223333	H1P2	✓	✓	✗	✗
222	H2P1	222233334444	H2P1	✓	✗	✓	✗
	H2P2	222233334444	H2P2	✓	✗	✗	✗
	H1P1	222233334444	H1P1	✗	—	—	—
	H1P1	111122223333	H1P1	✗	—	—	—

Table 1.System accessibility



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B. SERVICE TIME (EXCLUDING GRAIN WEIGHTING AND LIFTING)

To obtain the time required for the end user to deal with the system is calculated by considering ten user .Service time includes user authentication,menu selection that istype of grain and weight they want to buy and final transaction acknowledge SMS. Each one is allowed to access the system.Time required for the persons to get service is shown in table 2.

Persons	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Time required to service(min)	0.54	1	0.45	1.52	2.0	0.57	2.15	.59	0.50	1.26

Table 2 Service time

Average service time required by proposed system to service a user is 1.058min whereas manual system takes5 min. By comparing service time of both system we can conclude that the proposed system is faster than existing system.

V. CONCLUSION

- The proposed system provides transparency as there is no manual data stored in register,all the data is stored in centralized database. Hence it is easy for higher authority to cross check the data at any point. So implementing this will be really helpful to targeted people.
- The proposed system distributes commodities in allowed quantity at specified rate to the eligible people.
- System provides SMS based alert regarding arrival of grain to seller as well as customer.

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BIOGRAPHY

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