Smart Rationing System using RFID and Raspberry Pi

Prof. Wangikar S. N[1], Rohini Thorat[2], Pooja Yadav[3], Palkar Tamanna[4]

[1]Asst. Prof. Department of Electronics and telecommunication engineering, AGTI'S Dr.Daulatrao Aher College of Engineering, Karad. Maharashtra, India.

[2,3,4] Student of Department of Electronics and telecommunication engineering, AGTI'S Dr. Daulatrao Aher College of Engineering, Karad. Maharashtra, India.

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ABSTRACT:- *Public Distribution System is an important food security scheme implemented by the Government of India under Ministry of Consumer Affairs, Food and Public Distribution. Smart ration card is useful to every householder for various purposes such as family member's details, to get subsidized food items and non-food items, gas connection and also address proof for various purposes. All people having a ration card to get different food grain items such as sugar, rice, wheat and non-food items such as edible oils and kerosene from fair price shops. But current distribution system having many drawbacks like all customer details stored in manually in the registers. Manual based ration system leads to various problems like corruption. For the own benefit, shopkeeper sales fair price gain which allotted by Government for BPL people to outside.*

E-government is increasingly used to improve transparency in the Government sector and to fight against corruption. All these drawbacks are overcome by using RFID and biometric fingerprint system implementation security features in ration cards so it will bring transparency in Public Distribution System.

KEYWORDS: Finger print scanner, RFID, Raspberry Pi, GUI.

I. INTRODUCTION:

The ration distribution system is one of the Govt. economic policies in India. Its main purpose is to provide food grains (sugar, wheat, rice, kerosene, etc.) to the people at affordable rates. The network of the ration shop is spread all over in India to provide food security to people. The validity and the allocation of the ration cards is monitored by the state government. Ration card contains separate record for each family which includes details like no. of members in family, names of the members, head of the family, permanent address, present living address, and phone number databases. India's public distribution system runs based on the ration card, including its purpose of identification, eligibility, and entitlement. Ration card has three categories – extreme poverty level (AAY), below poverty line (BPL) and above poverty line (APL). The poverty lines are identified depends upon the annual income of that particular family. Depends upon the familyincomes the ration card color is decided. The different colors of ration cards are navy blue (BPL), white (APL) and orange (AAY).

Most of the ration shopkeepers to keep fake rations cards with them. The shopkeeper may sales ration at higher rates than recommended rates by Government or may do wrong entries in register. Due to the fake ration cards, the shopkeeper receives the extra ration from higher authority and he sales it into the open market. The may not provide sufficient amount of food to consumers. Most of the time peoples are not aware of the availability of ration in ration shop. In this way, in the current situation we are facing problems of corruption in PDS. In this paper, we have proposed a Smart Ratioing System based on RFID and BIOMETRICS Technology to avoid the drawbacks. In this system, only authentic person can be recovered ration materials from ration shops based on the amount available in the database. The automatic ration distribution system uses finger print technology to automatize the public distribution system thereby minimizing the corruptions. In this system, the manual work is replaced by automated system. The smart card replaces the ration card by including all user information. This system is much more secured and easier to use.

II. BLOCK DIAGRAM:

Fig. shows the smart rationing system block diagram based on finger print scanner and Raspberry Pi.
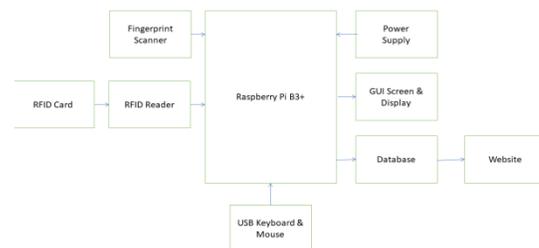
Fig. Block Diagram

System consists of fingerprint scanner, RFID card, RFID reader, raspberry pi, GUI screen, database, and website. The proposed system demonstrates distribution ration. Fingerprint scanner, RFID card, RFID reader, power supply acts as inputs to the raspberry pi and database at the output side which gives information and the updates about stock of rationing.

III. PROCEDURE:

The smart rationing system is installed at the ration shop which interfaces fingerprint scanner, RFID card & reader, raspberry pi, database, website. This system consists of the fingerprint sensor on which the fingerprint of the customer is scan if the fingerprint of customer doesn't match with the data in the database it again asked to the customer for his/ her fingerprint is match. Once the fingerprint is match with the data in the database then the RFID card will be scanned through the RFID reader. Each RFID card contains unique code. The customer will have unique number and scanning RFID card, RFID reader will identify it. Raspberry Pi 3 B+ acts as main controller. Raspberry pi takes sequential number from reader and access corresponding record in the database then the send to the server. When the unique code of RFID card matches with stored database then it displays the customer is valid. After that user account will display with total quantity of food grain on screen. Shopkeeper can give input by using keyboard and enter the items which customers wants to buy. Then the message sends to the customers which contains information about buying ration. After completing this process database will be updated and this updated information displayed on the government website and the SMS to the customer's related the ration.

IV. DATABASE MAINTAINCE:

We will have three databases for three different categories i,e. one for the card holder, second one for the shopkeeper to store the details of the products that are being distributed to the people, third one is for the government to store the details of the products that are being distributed to the shopkeeper. So, every time the distribution has been made there is a necessary of updating and maintaining the database to avoid the miscalculations.

V. CUSTOMER DATABASE:

For maintaining this database, we have to collect all the information and have to store it in the database. Every time if there is any change in the details provided by the customers. It should be immediately updated in the database. When the distribution of the products then the message will be sent to the customers on the registered number.

VI. HARDWAREDESCRIPTION:

Raspberry Pi: Raspberry pi is the heart of the ration materials distribution system. Raspberry pi is a mini computer which is designed in a single board with the entire essential component required for running and operating system. The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi s3 range.

- Boasting a 64-bit quad core processor running at 1.4GHz, dual-band +2.4GHz
- 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate PoE HAT.
- 4 USB port
- 40 GPIU pin
- Display interface
- Micro sd card slot

Fig. Raspberry Pi 3 B+

FINGERPRINT SCANNER: Used for the scanning the customers fingers. Also used for security purpose.

- Fingerprint sensor type: Optical
- Sensor Life: 100 million times
- Verification Speed: 0.3 sec
- Scanning Speed: 0.5 sec
- Template size: 512 bytes
- Storage capacity: 1000

Fig. Fingerprint Scanner

RFID Card:

- The RFID cards are two types active and passive.
- The RFID tags contains the on number which is there inside the card and it will have one magnetic coil in the card when we place the RFID tag on the reader it will generates a magnetic flux and reads the card number.
- High security and high endurance RFID 13.56 Smart Card is designed for simple integration and user convenience which could allow complete access control transaction tobe handled in less than 100 ms.

Fig. RFID Card

RFID Reader:

- MF RC522 is used in highly integrated 13.56MHz contactless communication cardchip to read
- The application launched a lowvoltage, low cost, small size, non-contact card chip to read and write, intelligentinstruments and portable handheld devices developed better.
- The MF RC522 use of advanced modulation and demodulation concept completelyintegrated in the

13.56MHz all kinds of passive contactless communicationmethods and protocols.

Power Supply:

- Power supply is a unit used for providing voltage the raspberry pi.
- It needs 5V DC.240 V AC for computer monitor.

VI. Software Details:

Here is some software which is used in proposed system.

1. VNC Viewer:

VNC is a graphical desktop sharing system that allows you to remotely control the desktop interface of one computer from another computer or mobile device. VNC transmits the keyboard and either mouse or touch events to VNC server, and receives update to the screen in return. VNC connect from RealVNC is included with Raspbian.

Direct connections are fine when connecting to your Raspberry Pi over the same private local network. E.g. at home, school, in the office. Cloud connections are both safer and more convenient when you want to control your Raspberry Pi over the internet.

2. PuTTY:

PuTTY is a free and open source terminal emulator; serial console and network file transfer application. It supports several network protocols, including SCP, SSH, Telnet, rlogin, and raw socket connection. PuTTY was originally written for Microsoft windows, but it has been ported to various another operating system. It supports many variations on the secure remote terminal, and provides user control over the SSH encryption key and protocol version.

Features:

1. Windows client. Mac and Linux ports exist.
2. Supports both 32- and 64-bit windows.
3. Supports public key authentication and active directory.
4. File transfers only using a separate Command line programs.

3. Raspbian Operating System:

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. Raspbian provides more than a pure operating system, it comes with over 35000 packages, pre-complied software bundles. Raspbian is highly optimized for the Raspberry Pi line's low performance ARM CPUs.

4. Python:

Python is object-oriented programming language. Python is designed for rapid prototyping of complex applications. It interfaces to many operating system calls and libraries and is extensible to C or C++. Python is used on a server to create web applications. It can connect to database system. It can also read and modify files. Python used to handle big data and perform complex mathematics.

VII. Flow Chart:

Fig. shows the system flow chart of proposed system which will indicates the actual flow of proposed system to gain the appropriate result.
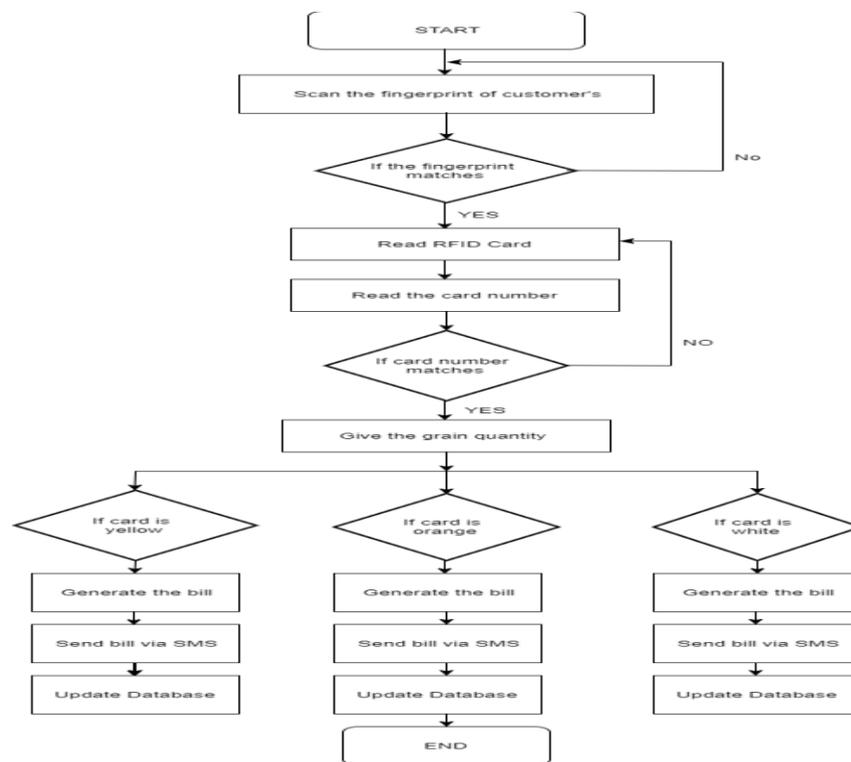
Fig. Flow diagram of proposed system

VIII. ADVANTAGES:

- The ration items will be effectively delivered to the valid ration card holders.
- The government services are reached to poor people effectively and also stop the corruption in PDS.
- Using the smart rationing system Government easily access the information of customer's and shopkeepers.

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X. CONCLUSION

This system is the computerized version of PDS and its advantages over the present ration cards. The biometric and RFID based PDS is simple to implement and require much less hard work compared to the other systems. Using this biometric enabled fingerprint management system can have managed better ways of smart ration card system to stop the corruption. The proposed system has advantages like it is helpful to prevent malpractices at ration shop, maintain data properly, reduces paper work, time saving approach, increase security and cost effective.

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