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Smart Technology for Automatic Distribution of Ration Commodities

[1]Prof. S. D. Jadhav, [2]Amruta Dhavade, [3]Pratiksha Jaybhaye, [4]Manali Karpe, [5]Anuja Pawar

[1,2,3,4,5]Department of Electronics & Telecommunication, Bharati Vidyapeeth College of Engineering, Navi Mumbai, India

***Abstract* - In this research paper, the proposed system is to replace the manual work in public distribution system. The ration distribution system is automated using RFID which is similar to the ATM. This automated technology replaces the conventional ration card system by smart card. In advanced, the finger print detector is placed in this machine in order to identify the user. If the user is correct user, the next process takes place and the input can be given in the touch screen. As soon as the input is given, the materials are obtained from the automated ration shop and the amount is taken from the bank account of the particular person. The embedded controller is preprogrammed in such a way to perform the similar operations. In this automated ration shop government have control over all transaction that occurs in ration shop. In order to involve government in the process, the proposed ration shop system is connected to the government database via GSM modules, which further sends the up-to-date information to the government and the consumer. To get materials in shop need to show the RFID tag to the RFID card reader, then the controller checks the customer's codes and details in the respective cards. After verification, customer can select material and quantity. After delivering the required material to customer, the microcontroller sends the information to the customer as well as Public Distribution System authorities.**

Keywords: GSM Module, RFID, Fingerprint sensor, Wi-Fi.

I. INTRODUCTION

Government provides subsidies to the ration distribution system for the bellow poverty line people but major problem with such system having insufficiency in the targeting beneficiaries and also material of ration gets wasted in case of the ration card holder not came to collect ration that material is robbed by making wrong entries. To avoid such fraud, we have developed an automatic ration distribution system.

In this proposed system, firstly ration card holder is have to use smart card which is allotted to all ration card holder by inserting his / her smart card if the user is correct then next step takes place, then user have to click on required material as user want like kerosene, rice, sugar, wheat etc. User has to select quantity of the material, based on the selection, appropriate circuit will be activated and customer get the materials. The proposed system would bring transparency in public distribution system and become helpful to prevent corruption. When the material is received by the ration card holder at the same time SMS will deliver to the user and also to the government. This would bring transparency between the governments, ration card holder and ration distributer. As their direct communication between ration card holder and government. When get the material from the ration shop, first need to submit the ration card and they will put the sign in the ration card depends on the materials. Then they will issue the materials through weighting system with help of human. But in this system having two draw backs, first one is weight of the material may be inaccurate due to human mistakes and secondly, if not buy the materials at the end of the month, they will sale to others without any intimation to the government and customers. In this paper, we have proposed an Automatic Ration Materials Distribution Based on GSM and RFID Technology to avoid the drawbacks.

II. PROBLEMS WITH EXISTING SYSTEM

Middle men unfaithful interference is occurred. In Ration shop there is in accurate weighting machine. Also, Problems in database management system occurred that's why data can't be stored in proper manner. Time management is one of the biggest problems in current situation. Illegal usage of Material theft. Over crowed and slow processing speed are the existing problems

III. LITURATURE SURVEY

Smart Public Ration Distribution System is basically an account, the variation and identification of user is done by password and RF tags. For expansion security One Time Password (OTP) is used for two-step verification of the customer, GSM (SIM-900) module sends this OTP to the user. This system gives permission only the valid persons to take the ration.

Dr. R.R. Dube, [2.] they introduce to the smart card can be used in the place of a ration card. The system is placed at all the ration shops of the country which uses the internet to connect to the server. The user has to login to the system each time before collecting ration materials. The payment for the

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ration materials is automatic as it is directly deducted from the customer bank account through web once the user enters data in the application. The details of the transaction are sent to the users mobile. This reduces cheating of employees about the rates of materials. The Government can have overall control and monitoring at all the ration shops of the country through the internet. In addition to this feature, the customers will get an SMS based alert about the commodities arrival dates. Thus, this new ration system, provide accurate information about PDS and reduce all possible human errors at any point.

Vinayak T Shelar and Mahadev S Patil [3.], describes a system where the consumer has to scan the RFID tag to the RFID reader, the Microcontroller Unit verifies the data from the RFID tag with the data stored in the database. Once the data is verified by MCU it allows the consumer to enter the quantity and type of materials required through the keypad. Thus, the system delivers materials required to the customer and also sends an SMS about the material distributed to the customer as well as the PDS authorities using Global System for Mobile Communication (GSM) technology.

Krithika Patil, et al. [5], describes a system where the RFID card is used for the authentication process and the information about the ration material delivered will be directly sent to the Government automatically using Global System for Mobile Communication (GSM) technology. In Real Time Automatic Ration Material Distribution System, the ration system uses RFID cards for authentication and it is verified with the data in the database once it is verified the user has to input the materials needed through push buttons and keypad the grains start filling in the container the solenoid valve closes once it reaches the required weight and the GSM sends message to the user as well as the PDS authority.

Parvathy A, et al. [7], presents an efficient method for the management of examination hall. The system is designed mainly for students to identify the respective examination hall during exams. An RFID card and an RFID reader is used for this purpose. This system helps in identifying the floor or to get directions of their respective examination halls immediately. The card reader is located at the entrance of the building so that the students can identify their respective examination halls while entering the college itself. Thus, this system explains the use of RFID technology in the field of education.

IV. PROPOSED METHOD

The internet to connect to the server. The user has to login to the system each time before collecting ration materials. The payment for the ration materials is automatic as it is directly deducted from the customer bank account through web once the user enters data in the application. The details of the transaction are sent to the users mobile. This reduces cheating of employees about the rates of materials. The Government can have overall control and monitoring at all the ration shops of the country through the internet. In addition to this feature, the customers will get an SMS based alert about the commodities arrival dates. Thus, this new ration system, provide accurate information about PDS and reduce all possible human errors at any point.

V. HARDWARE DISCRIPTION

a) RFID

By using RFID which utilize a little Radio Frequency Transponder called as RF tag which is Electrically customized with unique data that can be read from distance. The system mainly consists of three components, the transponder, antenna and the reader. An RFID tag is an object that can be applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. RFID RC-522 Reader Module is used to scan the RFID tag. Each user has a RFID tag which is authorized.

b) Fingerprint Sensor

The fingerprint sensor will secure system with biometric. The R307 fingerprint module consists of optical fingerprint sensor, high speed DSP processor, high performance fingerprint alignment algorithm. The user can store the fingerprint detect the module and configure it in 1:1 or 1: N mode for identifying the person. The customer should enroll their fingerprint in order to get ration material. When the user newly registers their fingerprint, they will be placing a finger on the fingerprint scanner. If the scans are successful then, a message of acceptance will appear and the ID number of fingerprints will be stored in database.

c) Microcontroller

Microcontroller used in the proposed system is Arduino UNO. It is the main component of the system which assigns and handles all the works performed by the different modules. Microcontroller is a controlling device for monitoring the project. This Microcontroller collects the data, reads and sends the data through the Wi-Fi network to the cloud computing web page.

d) Node MCU

This is open-source, Interactive, Programmable, Low cost; simple and Smart WI-FI module. It is wi-fi serial wireless module which runs on ESP8266 wi-fi from Es press if system and hardware. It connected server into firebase. The firmware uses the Lua scripting language.

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e) GSM Module

Global system for mobile communication is a globally accepted standard for digital cellular communication. It accepts the sim card and operates over a subscription of mobile system. GSM is an interface that allows to sends information to costumer's mobile number after receiving the material.

f) Load Cell

It is transducer used to convert force into electrical signal. The output of load cell is plugged into algorithm to calculate the load cell. Here it is used as automatic weighting machine on selecting the product and dispatch the required product. The HX711 ADC is 24 bits analog to digital convertor design for weight scale. The output of load cell is converted into digital form and then it passes to Arduino.

g) Servo Motor

Servo motor controls position and speed. It is tiny and has got very light weight. It has high output power. It can be rotate approximately 180.

5.1 Block Diagram

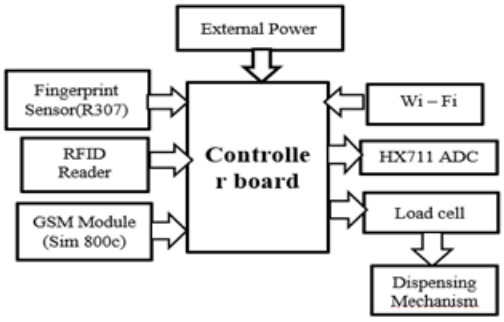

Figure 1: Block Diagram of system

VI. PROPOSED SOFTWARE

6.1 Arduino programming

The Arduino Integrated Development Environment (IDE) is a cross-platform application that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards. The required quantity of product entered in the VB window is serially passed and get the program written on them. The Arduino coding process the values for calculating the running period of motor to dispense the ration material accurately. After writing the coding, the program will be compiled and downloaded into the Arduino board using USB cable.

6.2 Firebase

The Firebase Real-time Database is a cloud-hosted database. Data is stored as JSON and synchronized in real-time to every connected client. When you build cross-platform apps with our iOS, Android, and JavaScript SDKs, all of your clients share one Real-time Database instance and automatically receive updates with the newest data. The data like person identification dispense material data will be stores in firebase.

6.3 Algorithm

- Every consumer is provided with a RFID card.
- User ID verified with the database provided by the Government authorized is stored in the microcontroller.
- Consumer will scan their fingerprint.
- Once verification is successful, consumer is asked for a select type of material and quantity required.
- Based on type of material chosen, the motor will get activated.
- The load cell will be checked for proper quantity.
- After collecting proper quantity material motor will be get disabled.
- GSM module will send the information in form of SMS to the user as well as PDS authority.
- Current stock in the ration shop will be get updated on database.

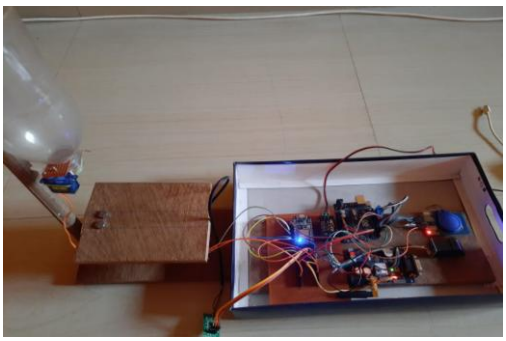

Figure 2: Output of system

VII. APPLICATIONS

1. This proposed system can provide safe, secure, efficient & corruption free public distribution system.
2. The ration items will be effectively delivered to the valid ration card holders who are below poverty line
3. The main advantage here is that the beneficiaries get their rightful entitlement in term of quantity. Hats meant for them cannot be diverted to the open market because of maintaining the database correctly.

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4. The government services are reaches to the poor people effectively and also the corruption in PDS can be reduce or avoided to a great extent.
5. This system is reliable & flexible.

VIII. FUTURE SCOPE

This system can be improvement of including securities, remote access and also it reduces manpower. Also, the technology introduced can be used in various places like malls, supermarkets, etc. As there is ease of access, it can remove the constraint on time for various types of applications. So, the users have 24x7availability.so it reduces a lot of time. For better authentication of subscribers, a biometric system can be used. The provision can be made such as PDA device will update data directly to server online.

IX. CONCLUSION

This system is an alternative method for monitoring the supply of distribution of food grains, corruption free and transparent. It has played a great role the poor people earlier died of malnutrition and also those who could not afford got a silver lining in their lives. Using this proposed modern system, we can have better management of ration distribution system. The conventional Ration Materials Distribution system has drawbacks like weight of the material may be inaccurate due to human mistakes, low processing speed, long waiting time at ration shop to get material and material theft in ration shop. If materials are not buying at end of the month by consumer, they will sale to others without any intimation to the government and consumer. To overcome above problems, automatic ration shop played important role. The automatic ration shop involved RFID as well as GSM technology to distribute the wheat or grain material. Ration card is replaced by RFID and information is sent to consumer using GSM module.

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