Automatic Multi-Purpose Ration Dispenser Machine

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Abstract—**The present Indian Government is making every steps to make India as "DIGITAL INDIA". Automation plays a very important role in todays' India. Automation is the most frequently spelled term in the field of electronics. Ration Dispenser machine is used in Fair price shops, also called Public Distribution System. Earlier Public Distribution system involved lots of malpractice and there existed corruptions in the civil supply like deviation in the quantity of the supplied ration items, to stand in queue for a long time which was a major drawback and time consuming for a consumer, similarly, distribution of ration items to the people without ration card for higher value of the products (theft). In this paper, this system uses Ration distribution using RFID Technology (Radio Frequency Identification), GSM Module (Global System for Mobile Communication) and an innovative use of Voice Recognition Device, working on recognizing the voices to the preferred understandable language of users, replacing the manual intervention of human in the Public Distribution System and use of Point of Sale machines for Cashless Transactions also. By introducing this system, transparency will be much higher as it works on the principle wherein the Aadhar Card number, Smart Card Number and Mobile card interlinked to each other. The database of the Consumers will be processed and stored in the Arduino microcontroller.**

Keywords — RFID Reader, RFID Tag, GSM, Micro Controller - Arduino, Solenoid, Sensor, Motor, LCD Display, Touch, Point of Sale, Short Message Service (SMS), Email ID.

I. INTRODUCTION

The Public Distribution System (PDS) is recognized by the Government of India. This Public Distribution System in the country facilitates supply of food grains, sugar, fuel like kerosene, edible cooking oil to a large number of poor people through a network of Fair Price shops at subsidized price on a regular monthly basis. The Fair Price Shops are the largest retail system in the world with a network of more than 4 lakh price shops claiming to distribute annually [1].

The State Government issues distinctive Smart Cards to consumers Below Poverty Line. The materials will be distributed throughout the month and if the materials are not sold during the month, the products will be sold to others without intimation to the government and consumers.

II. SYSTEM OVERVIEW & BASIC COMPONENTS

To provide a solution to avoid such theft and malpractices, this paper discusses about Automatic Multi-Purpose Ration Dispensing Machine based on RFID Technology (Radio Frequency Identification) using RFID Reader and RFID Tags. RFID [2] utilizes a little radio-frequency transponder called a RF tag which is electronically customized with an unique data that be read from a distance. It works from frequencies from a few hundred kilohertz (KHz) to several gigahertz (GHz). RFID reader transmits the required power and information to the tag. There are two sorts of RFID labels, active and passive. Active labels are battery-powered and utilize higher frequencies and involves higher cost, while the passive labels utilize lower frequencies, and don't have the internal power source.

The GSM (Global System for Mobile Communication) module used to communicate the information of the material distribution between two persons or more than two persons to update the information depending on the requirements. The GSM module consists of GSM Modem. It is a standard developed by the European telecommunication standard institute to describe the protocols for 2G Digital Cellular Networks used by Mobile phones. It accepts SIM cards, and operates over a subscription to a mobile operator, just like

mobile phones. Through this GSM modem, SMS is delivered automatically to the consumer about the availability of civil supply products at the Fair Price shop and about the transaction.

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. In this paper, the Microcontroller is programmed used embedded "C" language using Arduino 2560. The Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins - 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button [3]

The Arduino Mega 2560 board is firstly interfaced with LCD to display the cardholder information like their name, monthly withdrawal information, etc. The Solenoid valve and Servo motor is interfaced with Arduino board, the Solenoid valve is controlled by the relay circuit and it is used to distribute the liquid like Kerosene oil.

Voice recognition implies reception and interpretation of any linguistic dictation, by a machine or a program. It is the process of recognizing human speech and decoding it into text form. It basically involves conversion of analog sound waves (vibrations in air caused by words spoken by human beings) to digital signals, which are decoded to appropriate words and then eventually sentences. A speech recognition system generally consists of a speech capturing device (basically a microphone and a Analog to Digital Converter, which samples and digitizes the analog sound signals). [4]

Point of Sale (POS) machine is a machine wherein the merchant calculates the amount owed by the customer, the customer then makes the payment using the Debit / Credit Card as per the indicated amount.

Liquid Crystal Display (LCD) - LCD screen is an electronic display module and find a wide range of applications. We use a 16*2 LCD display and a 16*2 LCD display means it can display 16 characters per line and there are 2 such lines. In this LCD, each character is displayed in 5x7 pixel matrix. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD. We use the LCD display for displaying the result in terms of liters and percentage.

FOOD SAFETY PLAN

Apartfrom the Hardware and software requirements, it is proposed that the SS Vessels used for measuring, dispensing, storing of materials will be made of SS316 or SS304 Food grade Stainless Steel. All the Fair Price shops should display the Food Grade Certificates for the knowledge of the consumers. As a Food Business Operator should display the FSSAI Licence, the Fair Price Shops should also display these certificates.
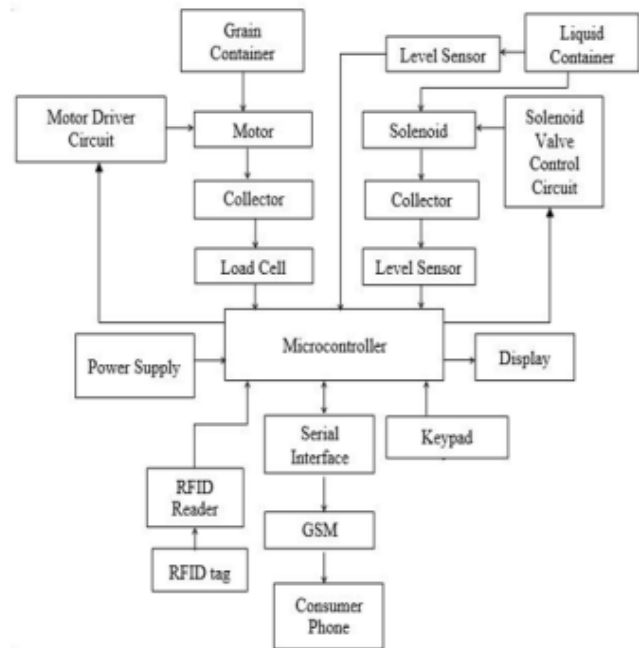
III. SYSTEM ARCHITECTURE

Fig.1 : Block Diagram

IV. ALGORITHM

1. Every consumer is provided with a RFID card which is registered and linked to the PDS and Government database.

2. At the time of ration distribution at ration shop, either consumer scans the RFID card or enters the 12-digit AADHAR NUMBER.

3. User is prompted to enter the unique 4-digit {IN for validation which is sent via SMS on the registered mobile number updated in the Aadhaar Card / RFID reader.

4. OTP is verified. Password of consumer is verified with the database provided by the Government authority which is stored in the microcontroller.

5. Once verification is successful, User ID is displayed on LCD, consumer is asked to select the material required (1. Grains 2. Edible Oil 3. Kerosene) through keypad.

6. Based on type of product chosen, the consumer is asked for the amount or quantity to be entered through keyboard.

7. Meanwhile, Database is updated with the current transaction. If the asked quantity is not within Allowable Amount, Transaction fails.

8. Otherwise, the Solenoid valve and level sensor is activated for Kerosene and whereas the Solenoid valve and load cell is activated for Grains, Sugar and edible oil pouches.

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9. After dispensing exact quantity of material motor or solenoid is disabled.

10. Database also gets updated.

V. BLOCK DIAGRAM
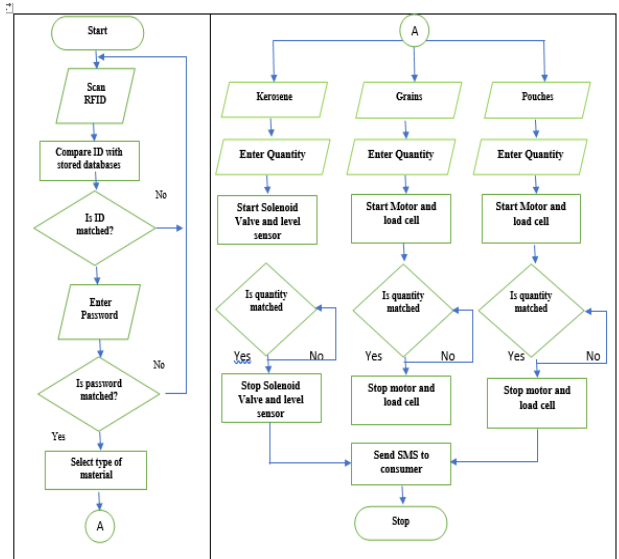
ADVANTAGES

- Contribution to Digital India
- Avoid Malpractice
- Corruption free India
- No deviation in quantity or measurement
- User friendly
- Useful in providing transparency to both government and customer.

Only access by the persons Authorised in the Card

Figure __ shows 1 Kg of rice being dispensed, if user needs another kilograms of rice then they have to press the rice button once again.

CONCLUSION

Public distribution system is an automation system and it is a recompense over the present fair price shops. It eliminates fake ration card holders and protects the interest of the common people ensuring the country's food security.

By means of its performance, corruption level will come down. Selecting the commodity and quantity will make the system more smart and robust. It will help the country's economy to reach new heights. The automated PDS is easy to implement and requires much less hard work when compared to the other system. Using this system one can avoid the malpractices because there is no manual operations and also all information are stored in the database. So this system will be really helpful to the people.

As there is no manual data stored in books or register, all the data is stored in 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.

XI. ACKNOWLEDGEMENT

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