Biometric Verification Based Automation of Governmental Ration Distribution System for Public Service.

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Abstract: Ration Distribution System is used to distribute essential products to a large number of people. The system is run by the government. Public distribution system (PDS) is slow and needs lots of human efforts. It also may involve corruption, illegal smuggling and distribution of inappropriate distribution of goods. All these happen because every job in the ration shop involves manual work and there are no specific high-tech technologies to automate the job. Our main objective here is to automate the process of the distribution. In this system, we will develop an embedded system project where we have a database of customer and his family. According this data, all goods can be distributed to the customer accurately in less time. In addition the notification also be send in form of SMS on his mobile. It is a new concept which takes into account the various social, economic and general aspects relating to technical as well as day to day disciplines.

Keywords: Automation, PDS, Embedded System

I. INTRODUCTION

The maintenance of a Public Distribution System (PDS) is not an easy job in countries like India. India has a large number of Fair Price Shops (FPS). The PDS is maintain and executed by Public Distribution and food ministry of Government of India [1]. The government of India provides a number of groceries such as oil, rice, wheat etc. at a much lower rate to benefit the poor people. The PDS plays a very important role in food security bill of Government of India. However, our PDS system is affected by ration hijack and corruption [2, 3]. There are many systemic challenges that hassle the PDS system today like: wastages, quantity, quality of materials, lot of human efforts required for weighing the items, system liability and long queues in front of the shop.

By considering the above mention factors, it is require to improve the PDS to make sure efficient delivery of food grains to the right people, adequate supplies and reasonable subsidies [4].

Therefore, our system aims at providing solutions to these problems. In the proposed study, we have designed and implemented biometric and Radio-Frequency Identification (RFID) based automatic distribution system. In this system, only authorized persons can access the ration materials from ration shops. The quantity ration will depend on the amount available in the card. The system can runs efficiently to helps the consumers to buy their ration in convenient way by making the whole process automatic, efficient, smart, easy to use and reliable right from authentication to dispensing of food commodities.

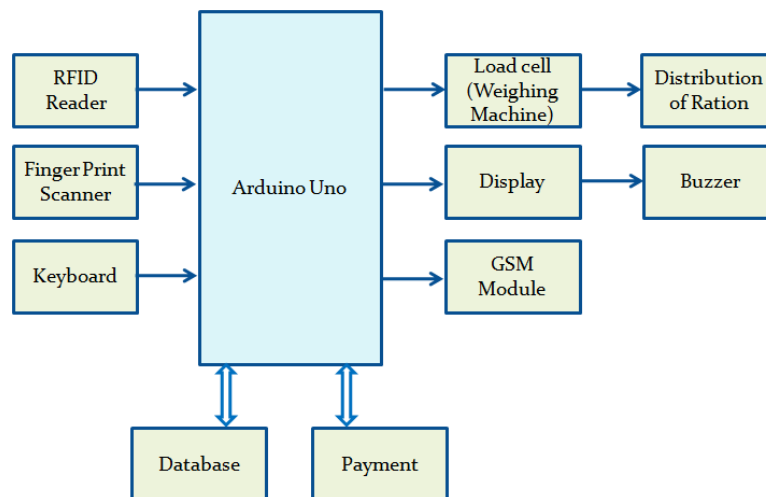## II. METHODOLOGY

A) BLOCK DIAGRAM

Fig 1: Block Diagram for Automatic Ration Distribution

In proposed system, Arduino-Uno controller is a main controlling unit. All the data about customer means ADHAR number, contact number, family member information and their biometric information is stored in controller. The RFID card is allotted to each family. The customer verification and validation can be done by scanning the RFID card and by using thumb expression. Then system will calculate quantity of grocery items according to the number of family members. Then system calculates and displays the stock availability and move forward for payment. When the payment is verified, measure the solid and liquid grocery item by weighing machine and discharge it one by one. Finally With the help of GSM module, notification is send on customer's mobile number.
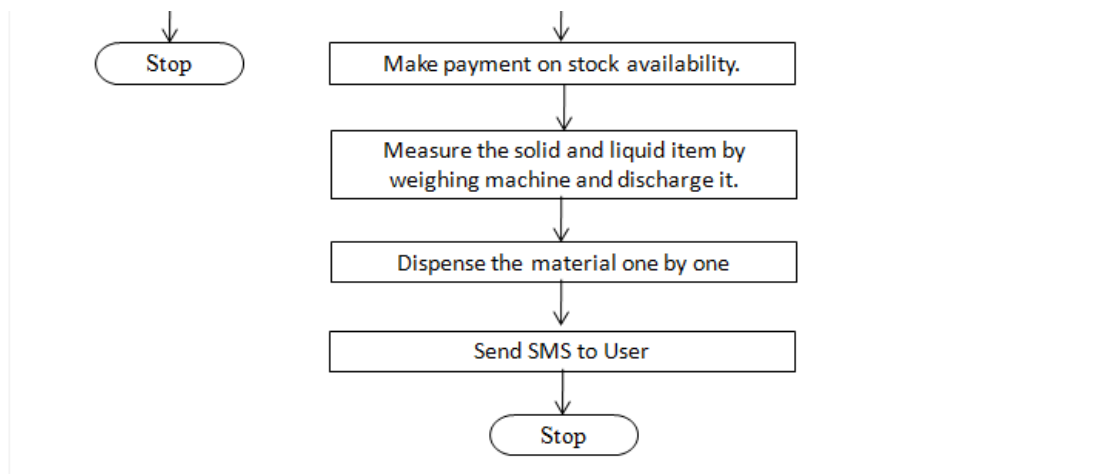
B) FLOWCHART
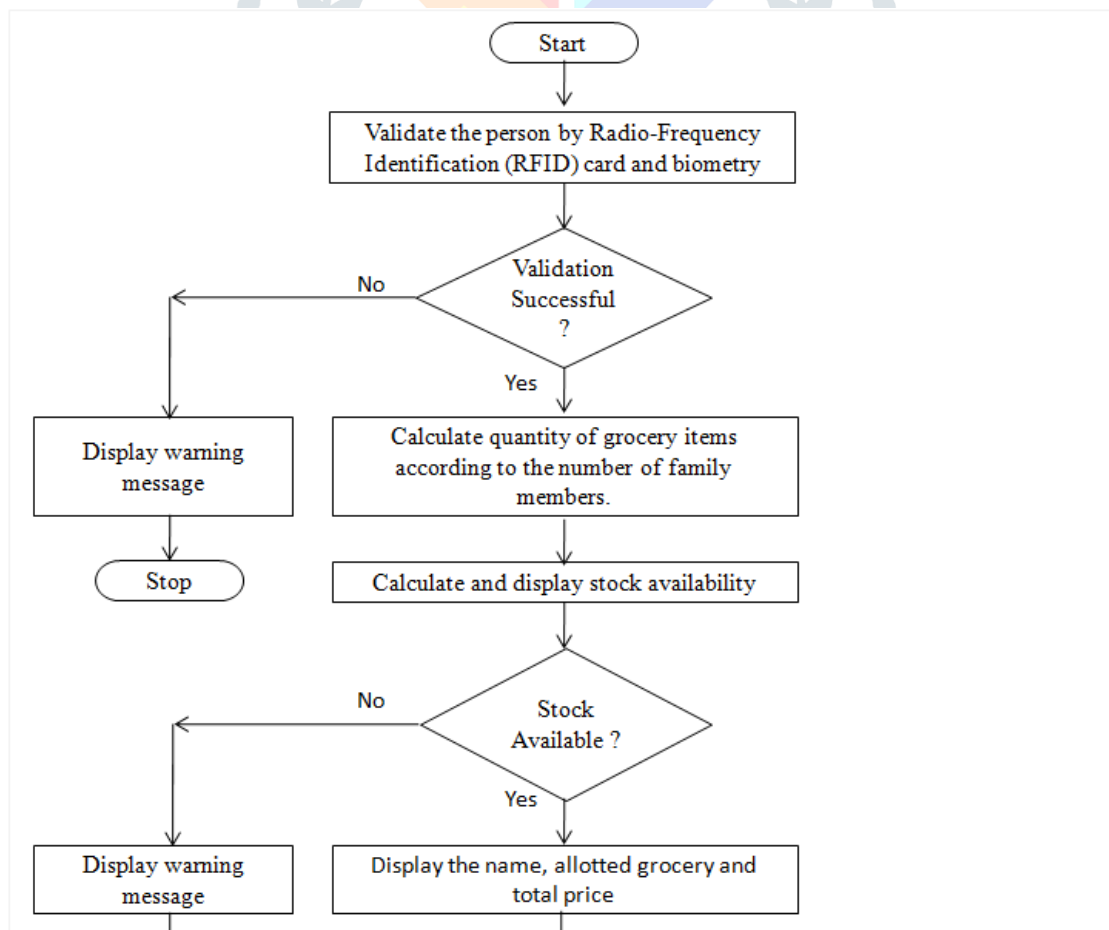
Fig 2: Flow chart for Automatic Ration Distribution

C) PROPOSED HARDWARE AND SOFTWARE

1) ARDUINO DUE:

The Arduino Due is a microcontroller board based on the Atmel SAM3X8E ARM Cortex-M3 CPU. It is based on a 32-bit ARM core microcontroller. It has 54 digital input/output pins, 12 analog inputs, 4 UARTs, a 84 MHz clock, an USB OTG capable connection, 2 DAC, 2 TWI, a power jack, an SPI header, a JTAG header, a reset button and an erase button [5].

2) RFID CARD

RFID Tag is the general description of RFID transponders that to receive, store and transmit data with RFID reader via radio waves. The RFID card is distinguished with its obvious physical characteristics and used for specific applications. In simple, every RFID card embeds with an antenna that connected with an RFID IC, hence it can receive, store and transmit data via radio waves. RFID card usually is using passive RFID technology without an internal power source. The RFID card powered to work by the electromagnetic energy received that transmitted from RFID reader.

MF RC522 use the advanced modulation system, fully integrated at 13.56MHz with all kinds of positive non-contact communication protocols. MFRC522 support Mifare series higher speed non-contact communication, duplex communication speed up to 424 kb/s. As a new family member in 13.56MHz RFID family, MF RC522 has many similarities to MF RC5200 and MF RC530 and also has more new features [6].

3) RFID CARD READER [6]

This module can fit directly into handheld devices. The module uses a 3.3V power supply and can communicate directly with any CPU board by connecting through SPI protocol, which ensures reliable work, good reading distance [6].

4) THUMB READER R307

This sensor makes fingerprint detection and verification super simple to implement with Arduino, Raspberry Pi and other microcontrollers. This is the updated latest model of the R305 Finger Print Sensor. It offers greater strage capacity (1000 fingerprints compared to 250 of the older R305) and faster scanning speeds. It comes with a TTL UART interface which can be directly connected to a micro controller with no additional external components or circuitry required. The finger print module can directly interface with 3v3 or 5v Microcontroller [6].

5) WEIGHING MACHINE

A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. This is a standard load cell for measuring weight up to 20 Kg. The output of the load cell is in mili-volts and cannot be directly measured by a micro-controller. So an ADC with high resolution or an instrumentation amplifier is required to make the output of the load cell readable to a micro-controller [7].

6) SERVO MOTOR

The Tower pro MG90S Mini Digital Servo is 180° rotation servo. It is a Digital Servo Motor which receives and processes PWM signal faster and better. It equips sophisticated internal circuitry that provides good torque, holding power, and faster updates in response to external forces. They are packed within a tight sturdy plastic case which makes them water and dust resistant [7].

7) GSM Modem

SIM900A Modem is built with Dual Band GSM based SIM900A modem from SIMCOM. It works on frequencies 900MHz. SIM900A is an ultra compact and wireless module. The Modem is coming interface, which allows you connect PC as well as microcontroller with RS232 Chip(MAX232). It is suitable for SMS, Voice as well as DATA transfer application in M2M interface. The onboard Regulated Power supply allows to connect wide range unregulated power supply. Using this modem, can make audio calls, SMS, Read SMS, attend the incoming calls and etc [8].

8) Liquid Crystal Display (LCD)

A liquid crystal display (LCD) is a flat electronic panel display that uses the light modulating properties of liquid crystal. LCDs are more energy efficient and other than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic devices.

9) Software

The Arduino Due can be programmed using a common Arduino Software (IDE), that is compatible with all Arduino boards and can work both ways: online and offline.

CONCLUSION

In this project the identification of individual customer, accurate measuring of solid goods, stock information and authentication is processed. This will in turn create a bridge between the common people and the government that would allow us to step forward making India a developed country. It would provide easy access to the local community in legal manner. It will make the process of buying commodities from ration shop smart, automated and time saving. Electronic devices used in this project can also be modified and made to be used in the glossaries shops and markets as an automated machine.

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