

# Aadhaar Enabled Automated Ration Distribution System for Remote Places using Arduino

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**Abstract—** *The current scenario of Ration distribution is suffering from lot of challenges and issues like corruption and smuggling of goods at different ration centres of India, which involve manual irregularities at the time of measurement and inconsistent entries in the record which demands for replacement of existing system. Hence the proposed project Automated ration distribution system replace the problems involved in manual work and is digitized by the use of database which is directly maintained by the government to avoid corruption by maintaining complete transparency in system hence making the system efficient, more reliable and accessible to the remote places.*

**Keywords:** *Arduino AT mega 2560, GSM, Motor.*

## I Introduction

This project aims at building a smart automated ration distribution system. Which, we think will suit the needs and necessity of the future modern world. Most of the people in the rural area use ration shop to buy their monthly commodities from the government using ration cards. The government uses the ration card as the record to register the candidate details, amount, quantity and type of goods purchased by the people. Then, they get their commodities through weighing systems and this whole process involves manual work and therefore, found to be time consuming and exhausting process. The process that we are following today has a few drawbacks for example, the unavailability of goods happening due to the illegal smuggling of the goods by the ration shop owners and dealers which is the common issue being faced by the poor people. The people are also being cheated by the inaccurate

measuring of the goods by the ration shop workers, which is also a human mistake. Due to which the required commodities may not reach the poor people in a right way. So, this proposed project helps people, who depend on ration shops to buy their monthly commodities in an efficient manner making the whole process smart, efficient, reliable, easy to operate and most importantly prevents smuggling, corruption and forgery of goods by the dealers and workers of the ration shop.

The proposed project involves smart features like IOT interfacing, smart measuring of goods and it maintains the record of all the information regarding the goods brought and delivered to the consumers. The basic working of the device is to know the requirements of the consumer, gets the acknowledgment or confirmation regarding the purchase, measures the needed goods accurately and delivers it to the consumer in a smart way. This entire process is digitalized, automated and registered in the main data base. This device also gives the details of the total amount of the goods received, delivered and remaining in that shop to common people through the device involving complete transparency in entire system.

## II Related works

Author reviewed in [4] that since today ration distribution system facing many challenges in India this includes many controversies like irregular measurement of goods and wrong entries in the manual stock register to overcome this difficulty, we have implemented smart measuring automated ration distribution system which uses the Aadhar number provided by the government. Arduino microcontroller helps in measuring the goods accurately and updating the same in the data base



regularly about the information regarding the transactions carried out in an automated manner and also availability of goods.

Author in [5] proposes increasing use of E-government in the government sector to provide transparency and to battle against the corruption. The government is implementing

E-government in further more areas of its administration which includes both local and national level worldwide. Since computerization can help us in automating the public distribution system, we have designed a smart card in which all the details of the user including their Aadhaar number is provided. This reminded us to interface the smart card reader to PC hyper-terminal via USB and microcontroller.

In [8] Godwin Premi.M.S one of the controversial issue in PDS involves illegal trafficking and corruption of goods. The main reason being, the jobs in ration shop involves physical labour which leads to unconformity. To overcome this, we have implemented RFID and GSM based automated ration distribution.

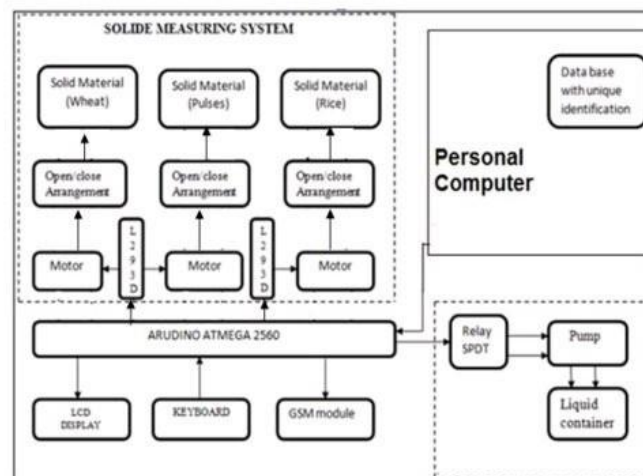
In paper [9] the concept involves the efficient and automated technique with the use of RFID technology in ration distribution system. Main objective of the system is to have complete transparency with the use of RFID and GSM based technology. In this system the government provides data base which is stored in microcontroller, customer scans tag and the material is dispensed in the ration shop as stored in data base.

Manoj Zagare in [13] has conceptualised to automate the PDS by using controller similar to ATM. As soon as the customer enters the necessary inputs in the hex keypad provided, he receives the allocated products from the automated ration distributor. The controller involved is pre-programmed to perform the required operations. In this system government has all the control over the transactions occurring in the ration shop.

Author in [12] has conceptualised to replace manual work in PDS. The ration distribution is automated and this system involves use of smart card and fingerprint detector in order to authorize user access. As input is given through touch screen the ration is obtained by automated distribution

system. In this system the government handles all transaction takes place at ration shops.

### III Proposed Methodology



The smart ration distribution system diagram is divided into 3 parts. The input part is the solid measurement system and the liquid measurement system. Detailed information on the consumer's household is stored in the main database. The database is maintained by HTML and PHP software. The input part is composed of the GSM module of the keyboard and the LCD screen. Consumers must use the keyboard to enter a unique identifier, the Aadhaar number, and compare this Aadhaar number with the main database.

If the Aadhaar number is correct, the authorized person will receive a message, for example, if and only if they accept the message, their configuration account will be opened. Otherwise, if the authorized person accepts this message, you will get the OTP by using the OTP consumer to enter your account.

The second step is called the solid measurement system. It consists of three containers through which solid materials flow into the solid measurement system. The solid measurement system consists of a motor valve connected to an Arduino microcontroller. The mechanical timing of the opening and closing of the mechanical valve completed by the Arduino 1293d IC single-chip motor driver is used to drive the motor. The third step is called the liquid measurement system. Used to exchange SPDT relays. The output composition of the pump liquid container and the liquid flow sensor microcontroller is DC 5V, but the pump runs



on AC 230V, so the SPDT relay is used to drive the pump here. The Arduino microcontroller is used to power the pump. The liquid float sensor adopts it according to the requirements of consumers. Measure the liquid flow to calculate the pulse, and they will get the product here. The Arduino microcontroller accurately measures the product and updates the database regularly. Consumers and government officials can view digitally completed transactions, access information, and update information.

## IV. Proposed Work

### Hardware Requirement

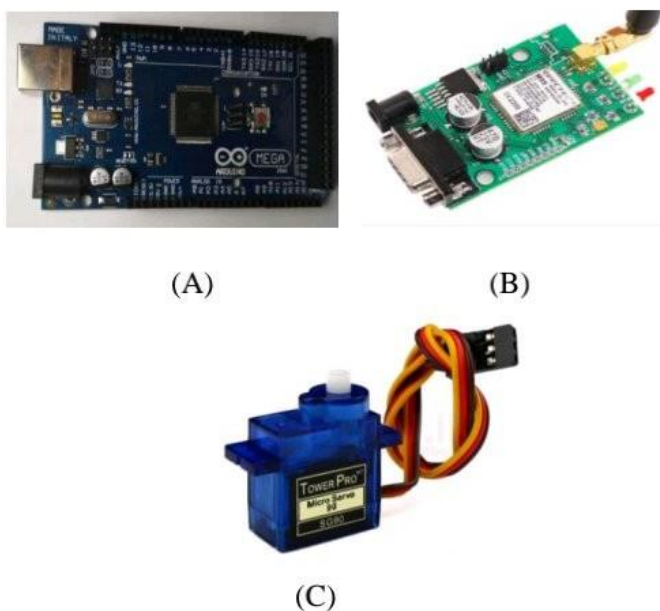


Fig. 2. From left to right, pictures of (A) Arduino AT Mega 2560 (B) GSM Module (C) Servo Motor

The AT mega controller can be powered via the external power supply or with USB connection. The board operates on external supply of about 6 to 20 volts. The Arduino can simply be connected to the computer through USB cable or powering it with AC to DC adapter to battery to get started, it is as shown in above figure. The GSM module minimise and digitizes the data by sending it through the channel with different streams of data which has its own particular time slot. It has ability of carrying 64kbps to 120Mbps data rates. LCD is a technology which is used for displaying on notebook and smaller computers. LCDs allow display to be

thinner than Cathode ray tube. Hex keypad is used to provide required input such as Aadhaar number and OTP, and has 16 keys connected in matrix form. The servo motor is an electric device which is used to rotate or push an object with precision and is rated in kg/cm. The servo motor position can be determined by electrical pulse.

### Software Specifications

Arduino programming is a set of C/C++ functions. Structures, functions and values (constants and variables) are three main parts of Arduino programs. It provides wide libraries to access the front part of hardware. Instead of displaying using some display device lcd, we can display it on Arduino IDE serial monitor which reduces development and writing time. Arduino IDE has very simple GUI and is widely popular among students, designers and start-ups.



Fig.3. Arduino IDE

C# is a type-safe and elegant object-oriented language used in robust applications that run on dotnet framework. C# can be used to create XML Web services, windows client application, client server application, distributed components and many more. Source code that is written in C# is compiled into intermediate language that follows CLI specification. We use C# to write back-end code which interacts with database.





Fig.4 Template of Ration Distribution System

## v. Conclusion

This project involves identification of each consumer followed by accurate measuring of all commodities and access to stock allocated, with efficiency and transparency in the system. This project contributes towards the “digital India” and takes a step towards “corruption free India”. It makes the whole ration distribution system to be automated and secured. It acts as a bridge between government and common people by providing transparency. This paper describes the design and implementation of smart ration distribution system, in which initially the consumer enters the unique Aadhaar number using the keypad provided which is compared with the data in the main database. If matched the authorized person receives OTP, on the entering the same in the keypad the consumer can have access to their account and is ready to collect the allocated commodities.

In future work, we can further enhance the entire ration distribution system by including face and voice identification to improve security. This ideology may be expensive but is a powerful approach for high level ration distribution system. Further, more accurate sensors could be used and for the GUI the regional language support can be provided. The system can be further automated by

implementing various online payment modes. Adding on GPS tracking can be used for tracking the ration distribution delivery trucks. Finally, the delivered food grains can be verified using the image of purchased commodities.

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