

RFID AND GSM BASED AUTOMATIC RATIONING SYSTEM USING MICROCONTROLLER ATMEGA 328

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ABSTRACT

Nowadays ration card is very essential for every home and used for various field. Huge amount of Govt. money gets wasted due to corruption in the traditional Ration Distribution System. The main motto of the designed this system is the automation of ration shop to provide transparency [1]. All the people having a ration card to buy the various materials (sugar, rice, kerosene, etc.) from the ration shop. But in this system having some draw backs, first one is weight of the material may be incorrect due to human mistakes and secondly, the ration shop owner improperly uses consumer materials (Sugar, Rice, , Kerosene, etc.) without previously knowledge of ration card holders. [2] In this paper, proposed an Automatic Ration Materials Distribution Based on GSM (Global System for Mobile) and RFID (Radio Frequency Identification) technology preferably of ration card. [3] Customer needs to scan tag to RFID reader, then microcontroller check the customer's identity no. and all details in the smart card. After successful verification, customer needs to enter type of material as well as quantity of material using keypad after receiving materials to customer, the microcontroller sends the information to government office and customer through GSM technology. Efforts are put together from our side to avoid corruption and to have better management of public distribution system.

Keyword: - ration card, technology, ATmega328, password

1. INTRODUCTION-

Public Distribution System is one of the widely controversial issues in society that involve malpractice. The manual intervention in weighing of the materials leads to inaccurate measurements and/or it may happen, the ration shop owner illegally uses consumer materials without prior knowledge of *ration card* holders. The proposed system aids to control malpractices in ration shop by replacing manual work with automatic system based on RFID and GSM. Every consumer i.e. family head provided RFID card which acts as *ration card*. The RFID card has unique identification number. The consumer scans the card on RFID reader which is interfaced with microcontroller kept at ration shop. Once consumer is validated by *password*, the system asks the consumer to select appropriate material and quantity of material through keypad. Based on material chosen by consumer, appropriate circuitry will be activated and consumer gets material. GSM interfaced with microcontroller sends information in the form of SMS to related people. The proposed RFID based automatic ration shop system would bring transparency in public distribution system and become helpful to prevent malpractices.

1.1 Literature Review

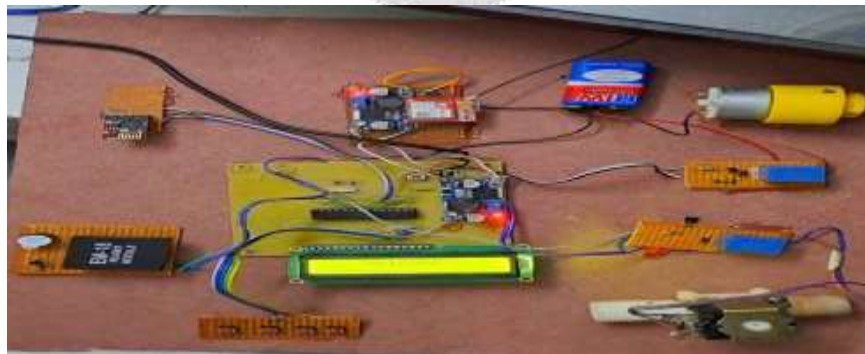
In paper [1], E-ration PDS using SMART CARD and GSM *technology* is an innovative approach in public distribution system (PDS) which is very useful for efficient, accurate, and automated distribution of ration distribution system. Presently ration distribution system has drawbacks like inaccurate quantity of goods, large waiting time, low processing speed and material theft in ration shop. Main objective of the designed system is to replace manual work with the atomization of ration shop to have a transparency in PDS. Proposed E- ration shop for public distribution system replaces conventional *ration card* by smart cards which consist of all the details about the card holder like family details, type of card and its validity etc.

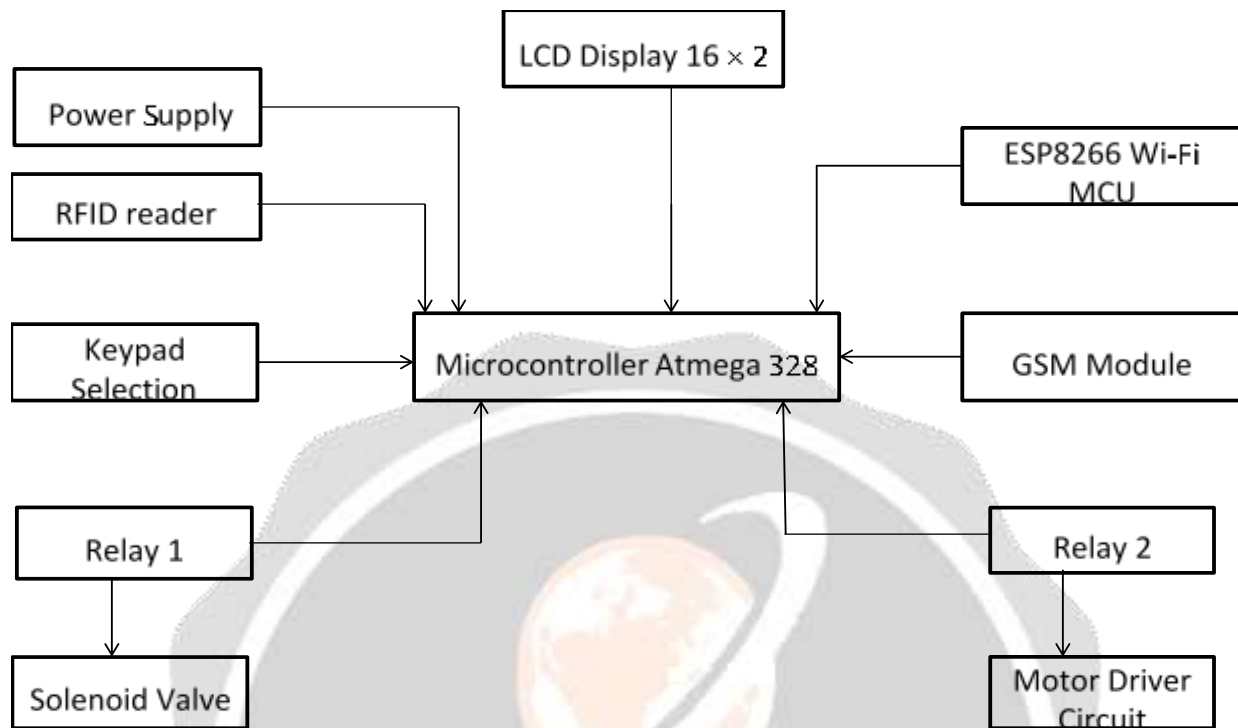
In paper [2], *Ration card* plays a vital role for the household details such as to get gas connection, family member details; it acts as address proof etc. In this paper, we have proposed a smart *ration card* system using Radio Frequency Identification (RFID) Technique and IOT to prevent the malpractices and corruption in the current ration distribution system. In this system conventional ration card will be replaced by a unique RFID tag. This RFID tag will be verified at the fair price shop for the authentication of the user. The user's identity will be verified by microcontroller which is connected to an Amazon Web Services (AWS) database. For added security One Time Password (OTP) is also sent to user's registered mobile number which needs to be entered in the system.

In paper [3], System is to reduce forgery from ration shops and users will get their grocery in easy way. Also, to reduce manual work. In this system we will develop the smart *ration card* system based on the RFID and the BIOMETRICS, in which the user can fill their data online. And also, the manual working is not there. When user wants a ration, he/she comes with the Smart ration card, then the card is swipe and check whether the user is valid or not. The fingerprints of that user also check and the allocated ration is distribute to that particular user, changes of adding and issuing of ration is done automatically in the government database.

2. TITLE PROPOSED SYSTEM

The block diagram of an Automatic Ration Materials Distribution Based on GSM and RFID Technology is shown in the Fig. This system consists of various parts such as RFID, GSM, microcontroller, motor driver, solenoid control circuits and keypad. The proposed system demonstrates distribution of solid as well as liquid consumer materials that is grains (Sugar, rice and kerosene). RFID reader, IR sensor, load cell and keypad acts as inputs to system and 16X2 LCD display is used for displaying information about ration stock and related activities which are done by customers. The microcontroller outputs are used to motor driver circuit and solenoid valve control circuit. Every customer has provided a RFID card which is enrollment by the Government authority. Customer scans that RFID card, at the time of ration distribution at ration shop then he enters his password. User ID confirmed with the database provided by the Government authority which is stored in the microcontroller. Once verification is successful, customer is demand for a select type of material and quantity necessary through press key on the keypad. Based on type of material selected, the motor or solenoid valve is activated. The load cell or level indicator is checked for appropriate quantity. After collecting correct quantity material motor or solenoid is deactivated Current stock of materials in the ration shop is displayed using LCD. GSM module will send the information in form of SMS to the customer as well as government.





2.1 Microcontroller Atmega 328

The *ATmega328* is a single-chip microcontroller created by Atmel in the (later Microchip Technology acquired Atmel in 2016). It has a modified Harvard architecture 8-bit RISC processor core. *ATmega328P* is a high performance yet low power consumption 8-bit AVR microcontroller that's able to achieve the most single clock cycle execution of 131 powerful instructions thanks to its advanced RISC architecture. It can commonly be found as a processor in Arduino boards such as Arduino Fio and Arduino Uno.

2.2 ESP8266 Wi-Fi MCU

The ESP8266, designed and manufactured by Espressif Systems, contains the crucial elements of a computer: CPU, RAM, networking (WiFi), and even a modern operating system and SDK. That makes it an excellent choice for Internet of Things (IoT) projects of all kinds. *ATmega328* is a single-chip microcontroller created by Atmel in the family

2.3 GSM Module

A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMs to identify their device to the network.

2.4 Motor Driver Circuit

A motor driver IC is an integrated circuit chip that controls motors in autonomous robots and embedded circuits. L293D and ULN2003 are the most commonly used motor Driver IC that is used in simple robots and RC cars. It takes a low-current control signal and then turn it into a higher-current signal that can drive a motor.

2.5 LCD Display 16X2

LCD is electronic visual display that uses the light modulating properties of liquid crystal. System uses 16x2 LCD module which is easily programmable and economical. Interfacing of 16x2 LCD module with LPC2148 which operates on +3.3V is not same as interfacing with microcontrollers like AVR which operates on +5V. LCD module is interfaced successfully with LPC2148 using CD4050 IC.

2.6 Keypad

System uses 4x3 matrix keypad. Both the terminals of the switches of 4x3 matrix keypad are connected to the port pin i.e. four rows and three columns. Each row and column section pulled by high or low to scan particular key press.

2.7 RFID Reader

The RFID reader is a network-connected device that can be portable or permanently attached. It uses radio waves to transmit signals that activate the tag. Once activated, the tag sends a wave back to the antenna, where it is translated into data. The transponder is in the RFID tag itself. RFID devices use electromagnetic fields to automatically identify and track compatible RFID tags. The tags contain unique electronically stored information, which is read by the RFID readers. RFID tags are used in many industries and commonly in security applications.

2.8 Relay

A **relay** is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

2.9 Solenoid Valve

A solenoid valve is an electromechanically operated valve. The valve is normally closed, it is controlled by current through it. The solenoid valve is interfaced with LPC2148 using relay circuitry. Solenoid valve is used in system for controlling the flow of kerosene. As soon as consumer selects kerosene and its quantity, solenoid valve switched on by relay circuitry. The ON time of Solenoid valve depends on selected quantity of kerosene. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the material used, low control power and compact design.

3. SOFTWARE REQUIREMENT

3.1. Embedded C Programming-

Embedded C is most popular programming language in software field for developing electronic gadgets. Each processor used in electronic system is associated with embedded software.

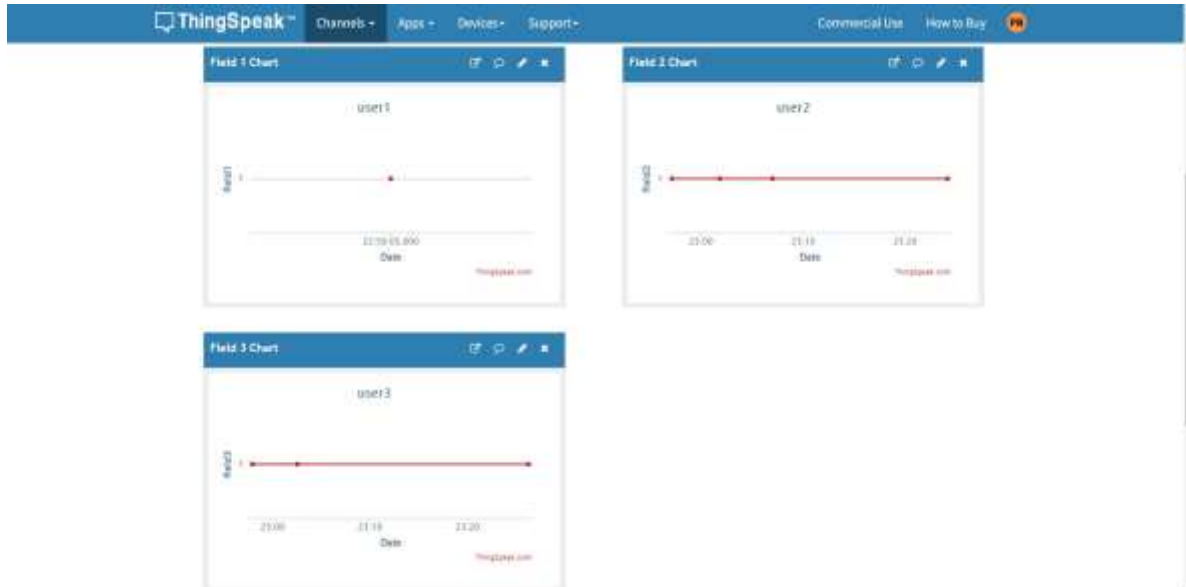
Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C.

3.2. ThingSpeak

ThingSpeak is an IoT analytics platform service that allows you to aggregate, visualize, and analyze live data streams in the cloud. You can send data to ThingSpeak™ from your devices, create instant visualizations of live data, and send alerts using web services like Twitter® and Twilio®.

4. RESULT

4.1 RFID Scanning Data of Different Users on serve:



4.2 Excel data of user entry and selection entry

	A1	Font	Alignment				
	created_at						
	A	B	C	D	E	F	G
	created_at	entry_id	field1	field2	field3		
1	2023-04-2	1	1				
2	2023-04-2	2		1			
3	2023-04-2	3			1		
4	2023-04-2	4		1			
5	2023-04-2	5			1		
6	2023-04-2	6		1			
7	2023-04-2	7		1			
8	2023-04-2	8			1		
9	2023-04-2						
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

4.3 Text messages to User



5. CONCLUSIONS

The traditional conventional system has drawbacks like malpractices, low processing speed, long waiting period time at ration shop to get material to overcome above problems, automatic ration shop played important role. The automatic ration shop involved RFID and GSM *technology* to distribute the kerosene or grain material. The proposed system brings the transparency in public distribution system as the work becomes automatic. It is possible to make public distribution system efficient and free from malpractices with the help of this system. The proposed system has advantages like prevent malpractices at ration shop, maintain data properly, reduces paper work, time saving approach and cost effective

6. ACKNOWLEDGEMENT

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