GSM BASED AUTO RATIONING SYSTEM

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***Abstract*-—— GSM based automatic ration shop is novel approach in public distribution system (PDS) useful for more efficient, accurate, and automated technique of ration distribution. Public distribution system also called rationing distribution system is one of the widely controversial issues that involve malpractices. The present ration distribution system has drawbacks like inaccurate quantity of goods, low processing speed, large waiting time, material theft in ration shop. The proposed system replaces the manual work in ration shop. The main objective of the designed system is the automation of ration shop to provide transparency. The proposed automatic ration shop for public distribution system is based on Radio Frequency Identification (RFID) technology that replaces conventional ration cards. The RFID tags are provided instead of conventional ration cards.**

Customer's database is stored in atmega which is provided by Government Authority. Customer needs to scan tag to RFID reader, and then microcontroller checks customer's details with stored to distribute material in ration shop. After successful verification, customer needs to enter type of material as well as quantity of material using keypad. After delivering proper material to consumer, the microcontroller sends the information to customer as well as PDS authorities using Global System for Mobile (GSM) technology.

***Keywords*: GSM, Atmega, Public Distribution System, RFID**

I. INTRODUCTION

India's Public Distribution System (PDS) is the largest retail system in the world. Public distribution system provides a ration card issued under an order or authority of the State Government for the purchase of essential consumer materials like rice, wheat, kerosene and oil. State Government issues distinctive ration cards like yellow ration card, saffron ration card, and white ration card depending on family annual income. The consumer material is supplied to ration card holders in the first week of every month by ration shopkeeper.

Public Distribution System is one of the widely controversial issues 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 which are present in ration shop by replacing manual work with automatic system based on RFID and GSM.. The machine begins to function only when the initial weight is attained if not the machine will not function. 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.

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II. RELATED WORK

In the first method the entire ration shop is maintained and operated by a single person. This person maintains all the records and only that person checks the stock and issues it to the customers Hence in this system the chances of malpractices are very high. There is no security while issuing the product to the customer. This can be overcome by using an RFID tag to each customer.

In the second method RFID tags are issued to the family. But these RFID tags do not have any security. Hence the possibility of a theft was very high in these systems. By using an individual password to these RFID tags and also to notify the user about his recent purchases using a GSM module.

In this paper the objectives are to scan the RFID tags and type the password and then select the commodity he wants and the desired quantity. The purchase made by the customer will be sent to him via text message. By this method the customer can also keep track of his purchases and maintain a database.

III. BLOCK DIAGRAM

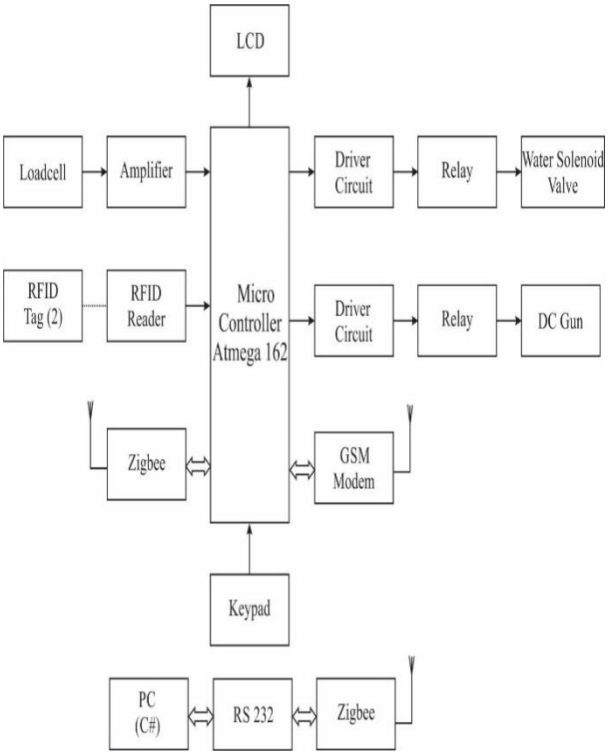

Fig 1. System block diagram

A. Atmega controller:

The ATmega162 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega162 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

FEATURES:

- High-performance, Low-power AVR® 8-bit Microcontroller
- Advanced RISC Architecture
- High Endurance Non-volatile Memory segments
- JTAG (IEEE std. 1149.1 Compliant) Interface
- Peripheral Features
- Special Microcontroller Features
- I/O and Packages
- Operating Voltages
- Speed Grades

B. GSM MODEM :

XA GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.For the purpose of this document, the term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.

A GSM modem exposes an interface that allows applications such as NowSMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform these tasks, a GSM modem must support an "extended AT command set" for sending/receiving SMS messages, as defined in the ETSI GSM 07.05 and and 3GPP TS 27.005 specifications.GSM modems can be a quick and efficient way to get started with SMS, because a special subscription to an SMS service provider is not required. In most parts of the world, GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery.

A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, such as the Falcom Samba 75 used in this document. (Other manufacturers of dedicated GSM modem devices include Wavecom, Multitech and iTegno.) To begin, insert a GSM SIM card into the modem and connect it to an available USB port on your computer, GSM modem could also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. Any phone that supports the "extended AT command set" for sending/receiving SMS messages, as defined in ETSI GSM 07.05 and/or 3GPP TS 27.005, can be supported by the Now SMS & MMS Gateway. Note that not all mobile phones support this modem interface. Due to some compatibility issues that can exist with mobile phones, using a dedicated GSM modem is usually preferable to a GSM mobile phone. This is more of an issue with MMS messaging, where if you wish to be able to receive inbound MMS messages with the gateway, the modem interface on most GSM phones will only allow you to send MMS messages. This is because the mobile phone automatically processes received MMS message notifications without forwarding them via the modem interface.

Fig.2 GSM modem

C. ZIGBEE :

The mission of the ZigBee Working Group is to bring about the existence of a broad range of interoperable consumer devices by establishing open industry specifications for unlicensed, untethered peripheral, control and entertainment devices requiring the lowest cost and lowest power consumption communications between compliant devices anywhere in and around the home.The ZigBee specification is a combination of HomeRF Lite and the 802.15.4 specification. The spec operates in the 2.4GHz (ISM) radio band - the same band as 802.11b standard, Bluetooth, microwaves and some other devices. It is capable of connecting 255 devices per network. The specification supports data transmission rates of up to 250 Kbps at a range of up to 30 meters. ZigBee's technology is slower than 802.11b (11 Mbps) and Bluetooth (1 Mbps) but it consumes significantly less power.

1. **The ZigBee coordinator node:** There is one, and only one, ZigBee coordinator in each network to act as the router to other networks, and can be likened to the root of a (network) tree. It is designed to store information about the network.

2. The full function device FFD: The FFD is an intermediary router transmitting data from other devices. It needs lesser memory than the ZigBee coordinator node, and entails lesser manufacturing costs. It can operate in all topologies and can act as a coordinator.

3. The reduced function device RFD: This device is just capable of talking in the network; it cannot relay data from other devices. Requiring even less memory, (no flash, very little ROM and RAM), an

RFD will thus be cheaper than an FFD. This device talks only to a network coordinator and can be implemented very simply in star topology.

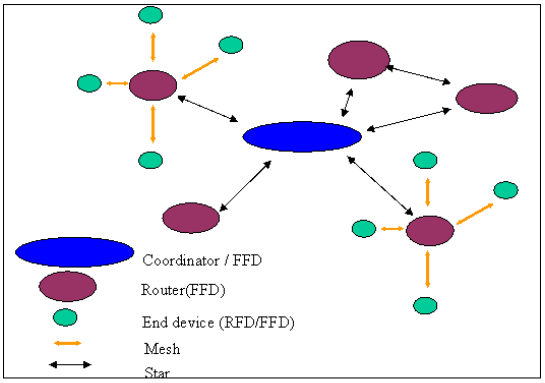

Fig 3.ZigBee Network Model [ZigBee: 'Wireless Control That Simply Works']

D. LOAD CELL

Load cell is a transducer that is used to convert a force into electrical signal. This conversion is indirect and happens in two stages. Through a mechanical arrangement, the force being sensed deforms a strain gauge. The strain gauge converts the deformation to electrical signals. A load cell usually consists of four strain gauges in a Wheatstone bridge configuration. Load cells of one strain gauge (quarter bridge) or two strain gauges (half bridge) are also available. The electrical signal output is typically in the order of a few millivolts and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer is plugged into an algorithm to calculate the force applied to the transducer.

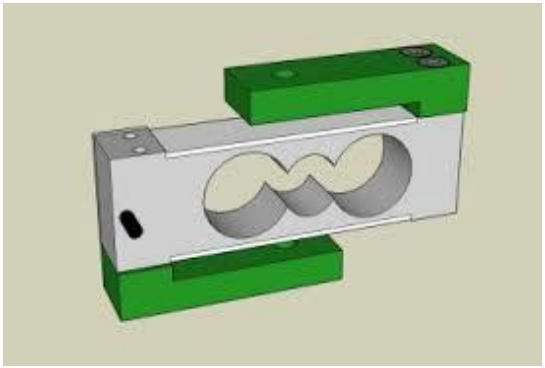

Fig 4. load cell

F.DRIVER CIRCUIT

In electronics, a driver is an electrical circuit or other electronic component used to control another circuit or other component, such as a high-power transistor. The term is used, for example, for a specialized computer chip that controls the high-power transistors in AC-to-DC voltage converters. An amplifier can also be considered the driver for loudspeakers, or a constant voltage circuit that keeps an attached component operating within a broad range of input voltages.

The following circuit will allow you to drive a 12V relay using logic voltage (an input of 4V or greater will trip the relay). The circuit has its own 12V power supply making it self contained but the power supply portion can be left out if an external supply will be used. The circuit shows an output from the power supply that can be used to power other devices but it should be noted that the supply is unregulated and not particulary powerful with the parts stated. The 12V DC output is suitable for powering a few LEDs or low voltage lights but should not be used to power other electronic boards or motors.

IV. ALGORITHM

- The customer will be given an individual RFID tag and these RFID tags will have an individual password which only the user will know.
- At first the system will check the initial amount of quantity present in the shop and only after the quantity has been verified the machine will begin to operate.
- At the shop, the customer will place his RFID tag over the RFID reader.
- After this step the customer will have to enter his password into the system in order for the machine to operate.
- After the password verification, the user will enter the commodity he wants and the quantity in the keypad.
- After this the machine will begin to operate. Two separate outlets are given , one for solid commodities and one for liquid commodities.
- The solid commodities are given out with the help of the DC gun and liquid is given out through the water solenoid valve.

- With the help of a GSM module attached to the system, a text message of the quantity of the purchased commodity is sent to the user.

- By this method the entire ration shop is operated automatically hence there is no chance of any theft or malpractice.

From the proposed system all the functions made in the ration shop can be made fully automated with the help of a RFID tags. The RFID tags are used to identify the customer and the customer can purchase his required commodity from the ration shop.

By selecting the commodity he wants and the quantity the machine will automatically process the commodity weather it is a solid or liquid. The solid are given out via a DC while the liquids are given out via a water solenoid valve.

Also this system will only begin to operate only if the initial have been fully filled up by the store hence there is no chance of malpractice can occur in this system and also the current stock present will also be displayed after every transaction so the customers will know if any stock goes missing.

Hence this a fully automated system which does not require any human interference and also chances of malpractice or theft in this system is very less.

V. FLOWCHART

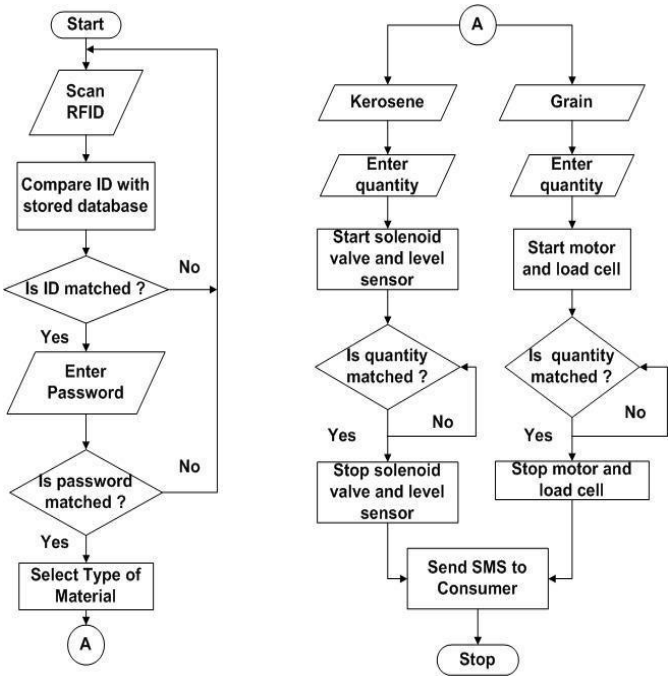

Fig 5: Schematic work process

VI. RESULT

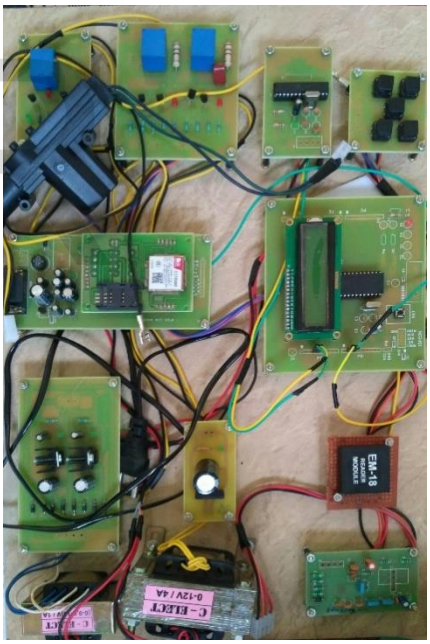

Fig 6: Hardware setup

VII. CONCLUSION

The conventional system has drawbacks like malpractices, low processing speed, long waiting time at ration shop to get material and material theft in ration shop without any acknowledgement to 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 kerosene or grain material.

Ration card is replaced by RFID and information is sent to consumer using GSM module. The proposed system creates the transparency in public distribution system as the work

becomes automatic. With the help of this system, it is possible to make public distribution system efficient and free from malpractices. The proposed system has advantages like it is helpful to prevent malpractices at ration shop, maintain data properly, reduces paper work, time saving approach and cost effective.

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