AUTOMATIC RATIONING SYSTEMUSING AT89C52 MICROCONTROLLER

Dipmala Trimukhe[1], Pranay Namaye[2], Vikas Pisal[3], Laxman Lendi[4], Lakhan Pawar[5]

[1]Department of Instrumentation & Control, Government College of Engineering & Research Awasri kd, Pune, Maharashtra, India.
[2][3][4][5] Final Year Students, Department of Instrumentation & Control, Government College of Engineering & Research Awasri kd,
Pune, Maharashtra, India

Abstract—*The conventional rationing system is one of the widely controversial issue that involves the illegal smuggling and corruption of goods. As we know that manual work has lots of irregularities i.e. wrong entries in shop containing wrong stock information of goods that is supplied to public, low quality and improper quantity of product is distributed to customer, and also actual stock quantity information provided by the government to the public. In this paper, we are replacing the manual work to the automatic by means of preventing the above irregularities. Here we are using AT89C52 microcontroller which has the benefit of low cost and easy to program and act as heart of this system, Load cell is for determining actual weight of the product, Smart Card used for identification and security of the account of customer and GSM module to communicate with customer. Hence it will provide the goods automatically without help of humans. By implementing this system in ration shop it will bring the transparency in rationing system by direct communication between the people and Government.*

Keywords: *AT89C52 Microcontroller, GSM module, RFID reader, Load cell, Keypad, LCD, Motor & Smart card.*

1. INTRODUCTION

Rationing System is an Indian food security system. It is established by the Government of India under Ministry of Consumer Affairs, Food, and Public Distribution and managed jointly with state Governments in India. The traditional PDS is used to distribute grocery items to India's poor who are valid ration card holders. The validity and the allocation of the ration cards are monitored by the state Governments.

One of the main problems with this system is the leakage of subsidies because of the inefficiency in the targeting of beneficiaries. These drawbacks are overcome by automation. To overcome above problems, the commodities are stored in reservoir tanks and they are measured and supplied to the user as and when required. When goods are inserted in the ration shop, it will send message to users. The user has to enter the password with valid RFID card, if it correct then enter required product and quantity using a keypad and LCD display then he gets accurate quantity of required goods. Once user takes the good then it will be again notify with help of message and maintain the record of user.

2. LITERATURE SURVEY

Rationing system is one of the widely controversial issue that involves corruption and illegal smuggling of goods. One reason of this to happen is because every job in the ration shop involves manual work and there is no specific technology involved in automating the job. Involvement of manual work calls a lots of irregularities. This irregularities or illegal activities are for example- wrong entries in stock register of shop containing wrong stock information of the products that is supplied to public, also the information regarding the actual available stock quantity in a ration shop that is provided by Government to the public.

In this system, we proposed the concept of replacing manual work in public can be installed at the ration shop with ease. In this automated system we replaced the conventional ration card by smart card in which all the details about user are provided which is used for user authentication. This prompted us to interface smart card reader (RFID based) to the microcontroller (AT89C52) and to develop such system. Using such a system, Government would have all required control or monitoring transactions of ration shop.

To involve Government in the process we proposed connecting the system at ration shop to a central database via GSM module and RFID. Hence it is possible to prevent the corruption and irregularities at ration shop. This would bring the transparency in rationing system as there is direct communication between people and Government through this.

3. PROPOSED SYSTEM

The rationing system should contain several tanks, but here we are using only two tanks. One for the grains and other is for liquid such as kerosene. Control valve/Motor is used for opening or closing and is controlled by the controller. Hence Controller is prime important for taking corrective action. For particular time period it will be get opened and after the prescribe time it will be get close. Here we are using

AT89C52 microcontroller for controlling purpose which has the benefit of low cost and easy to program.

One more part is also there which is more important is nothing but Authentication (Access). In this buyer has privacy, that no one can take their grain or kerosene illegally. Here we are providing the RFID card with private PIN number, so that security is maintained.

According to their color of Ration card the grains and other information is distributed monthly on buyer account and it will be get noticed by the short message service (SMS). Once the customer accessing his account and whatever the food type he/she has been collected the information is get updated and SMS will send to customer for satisfaction and for proof.
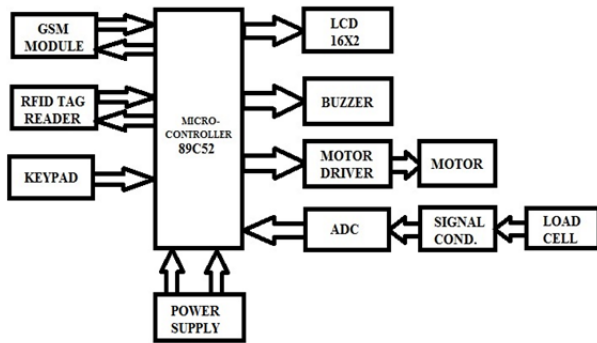

Fig 1. Block diagram of proposed system

A. Hardware Section

AT89C52 Microcontroller

The AT89C52 is a low power, high performance CMOS 8-bit microcontroller with 8Kbytes of Flash programmable and erasable read only memory(EPROM). The device is manufactured using ATMEL's high density nonvolatile memory technology & it compatible with the industry standard AT80C51 and AT80C52 instruction set and pin out.

Microcontroller which is the heart of project. It controls the overall functioning of the project. It reads the information from RFID tag reader and keypad& display information on LCD. It ON the buzzer after getting details of user from RFID card & also after each kg of material getting to user.

Power Supply

The power supply is most important for electronic circuits, which provide the required power to the AT89C52 microcontroller and other electronics devices. For this system we are using +5v power supply for keypad, buzzer, LCD, L293D. For Relay and DC motor 12V supply is required which is taken from rectifiers output.

GSM Module

GSM is the abbreviation of Global System for Mobile communication. GSM mobile communication system can be intelligently used by electronic devices which can collects some data and send it to the control place using SMS & GSM data call.

Here we are using the GSM module to send message to user when the commodities are shipped to shop and when user buy that grocery.

RFID Module

Radio Frequency Identification (RFID) card readers provide a low cost solution to read passive RFID transponders tags up to 7cm away. This RFID card reader can be used in a wide variety of commercial applications including access control, automatic identification, robotics navigation, inventory tracking, and payment system. The RFID card reader read the RFID tag in range and outputs unique identification codes of the tag at baud rate of 9600. The data from RFID reader can be interface to be read by microcontroller.

This system allows authorized person to take materials from ration shop. Here we are providing RFID card with private PIN number to each user. It helps to secure the user account from illegal usage. In RFID card, it has particular number that can help to identify the correct user when the database correctly provided at shop. If card doesn't match the PIN number then it will not able to buy that product. Then the reader sends the data to the AT89C52 microcontroller.

Load Cell

A load cell is a transducer that is used to create an electrical signal whose magnitude is directly proportional to the force being measured. The various types of load cells include hydraulic load cells, pneumatic load cells and strain gauge load cells. 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 mill volts and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer can be scaled to calculate the force applied to the transducer.

In this proposed system Load cell is used to measure the quantity of the groceries. As the amount of groceries (in kg) is given to the controller through keypad it will be continuously measuring the weight. Once it reaches its value it send signal back to the controller.
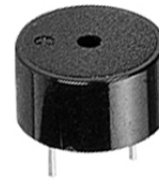
Fig 2. Load cell

Fig 4. Buzzer

DC Motor

An electromechanical energy conversion device is essentially a medium of transfer between an input side & output side. Electromechanical energy conversion occurs when there is a change in magnitude flux linking a coil associated with mechanical motion. In this system, we are providing 12V power to motor for opening and closing of valve of the tank.

LCD

LCD stands for Liquid Crystal Display. It is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly. Here we are using 16x2 LCD,a 16x2 LCD means it can display 16 characters per line and there are 2 such lines.

In this system, when user take her card on the card reader then after processing it will be shown on LCD display. Once the access is granted it shows the material remaining in the user account and it will ask to select the required quantity of grain to user. After this it will allow to ask for new user.
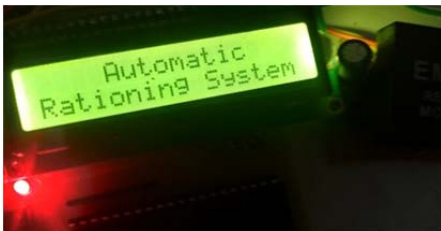

Fig 3. LCD

Buzzer

A buzzer is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. In this system we are using piezoelectric element which may be driven by an oscillating electronic circuit. In this system, when user enter incorrect PIN number then it will notify by sending signal to AT89C52 microcontroller. When buzzer receive the signal from controller it will produce sound.

B. Software Section

There are different software's available in the market for programming of the microcontroller. Out of which we have used Keil software. This software is designed for the C-language programming. Then the design of printed circuit board has been done by PROTEUS. PROTEUS software is a complete electronic design automation system for PC compatible computer.

I. ALGORITHM

1. Start
2. Initialize Microcontroller port pins
3. Initialize LCD
4. Initialize GSM module
5. Wait for message
6. Go to scan ID after receiving message
7. Scan RFID Tag
8. Enter PIN
    a. If X=0, turn on the buzzer and go to step 7.
    b. If X=1, go to next step
9. Enter the amount of product grain in kg, kerosene in liter.
10. Press the appropriate switch to withdraw product
11. After completion, system will send message of receiving grains to user
12. Stop

4. RESULT

Automatic rationing system using AT89C52 microcontroller used for the distribution of solid and liquid materials in ration shops. Here we are providing a smart card i.e. RFID card with private PIN number for security of his account. When the shop is loaded with materials, they will notify customer with help of message. The user has to show the card on RFID card reader, the reader will read the number and according to the database stored, it will show the name of that person. If the customer enters wrong PIN number it will not allowed taking the material.

After login to account the microcontroller check whether the user has already bought the ration items belongs to this month. If not then quantity of materials will be displayed on LCD. Then user select the rationing items for purchasing and entering the amount of quantity controller will calculate the amount that he or she buy and check the available amount in RFID card. If he or she has amount to buy then microcontroller send signal to the motor driver and load cell to dispense the selected ration item. As this process is completed the controller will send signal to GSM module, to send the message to user of transaction that he or she did.
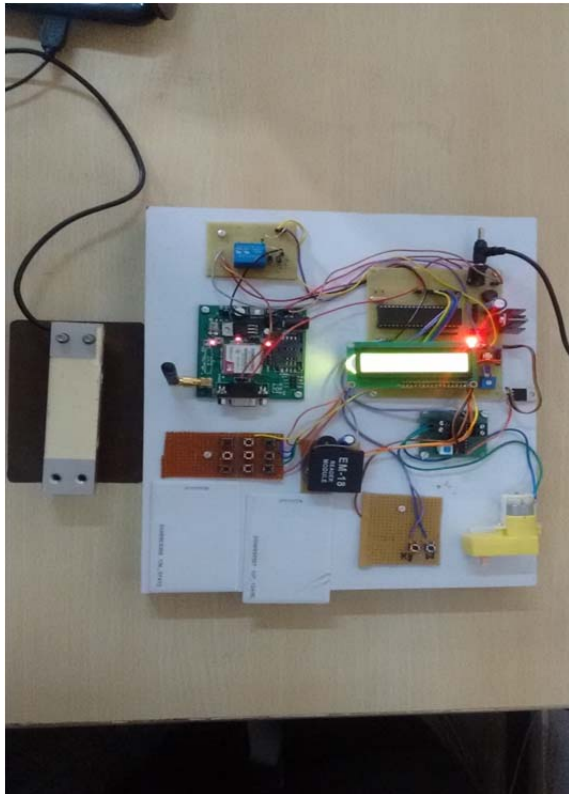

Fig 7. Motor Driver circuit & motor
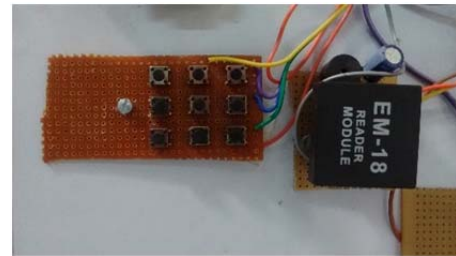
Fig 8. RFID reader with keypad

Fig 5. Ration material distribution kit

Fig 9. Message from shop to notify the customer
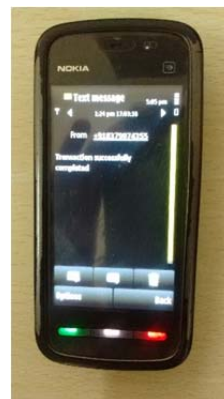
Fig 10. Message from shop that completion of transaction

Fig 6. GSM Module

5. CONCLUSION

In this paper, the automatic rationing system can provide safe, secure and efficient way of public distribution. The existing system has many drawbacks, first is that the weight of material may be inaccurate due to human mistake, second is that if the customer cannot buy the materials at end of the month, they will sale to others without any intimation to the government and customers third is that someone can access account without customer permission and so on.

This drawbacks are rectified by this system. In this system, we provided secret PIN number to each user for security of his account. After that by entering the amount of goods required it will be distributed automatically without help of humans. After receiving the materials, it will notify the people of transaction completed. This system has advantage of low cost, very accurate, and simple& it contribute low power consumption which is required for real time world.

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