Automation in Ration Distribution System

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Abstract: Now day's illegal smuggling and fraud increases in government sector in which ration department involves manual work of material like sugar, rice, oil kerosene etc. This fraud is increases due to the manual involvement and manual measurement, this fraud happen due to the wrong entries in register without the knowledge to the ration card holder because of this large amount of money of government get wasted and needy person remains needy. To avoid this fraud we have developed system by using PLC, in this system we used smart card instead of ration card and also provide smart card detector to verify correct person or family member if the detected person is correct then next step takes place and then different material name is available on touch screen we have to click on required material name this system is connected to government and user via GSM due to such system information is send to the government and also to the user and require money is taken from bank account of the user. And user information can be is linked with AADHAR card.

Keywords: PLC module, PIC microcontroller, GSM, Solenoid valve, load cell.

I. INTRODUCTION

Government provide subsidies to the ration distribution system for the bellow poverty line people but major problem with such system having insufficiency in the targeting beneficiaries and also material of ration get wasted in case of the ration card holder not came to collect ration that material is robbed by making wrong entries. To avoid such fraud we have developed an automatic ration distribution system. This system mainly consist of embedded PIC controller is interfaced with the PLC for control the overall system, float level sensor for controlling oil or kerosene, load cell for weight measurement and motorized gate valve for the delivery of the different material.

In this system firstly ration card holder is checked by showing his / her ration card if the user is correct then next step takes place, then user have to click on required material as he want like kerosene, rice, sugar etc. then that material is measured with the help on load cell and then it deliver to the user, when the material is received by the ration card holder at the same time SMS will deliver to the user and also to the government. This would bring transparency between the governments, ration card holder and ration distributer. As there direct communication between ration card holder and government.

II. SYSTEM ARCHITECTURE

The automatic system mainly consists of three interfaces touch screen, GSM and billing printer these three interfaces are interfaced with Micro controller. Embedded PIC micro controller is interfaced to the PLC and further to the government database. The ration card holder would have to swipe the smart card on the system. Smart card can be accessed by entering the password which was given to all ration card holder separately but there is chance to loss or miss use of the smart card. To overcome this system must include the finger print detector of all family member if the enter password and finger print matched then smart card can be accessed.

Consider the consumer has provision for four input material like rice, sugar, oil and kerosene. Suppose first input is given by the consumer is rice means green light indicates that the rice is coming out from the machine first then by pressing start button solenoid valve will open then product can be collected in the bag. As soon as the first input is collected then it check for the second input and same process will takes place for the next input. After this process all input information is given to the government also to consumer registered mobile number.

III. HARDWARE DESCRIPTION

A. PIC MICRO CONTROLLER

PIC microcontrollers (Programmable Interface Controllers) are electronic circuits that can be programmed to carry out a vast range of tasks. They can be programmed to be timers or to control a production line and much more. They are found in most electronic devices such as alarm systems, computer control systems, phones, in fact almost any electronic device. Many types of PIC microcontrollers exist, although the best are probably found in the GENIE range of programmable microcontrollers.

B. GSM

GSM system is the most widely used cellular technology used in the world today. GSM stands for global system for Mobile Communication. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz frequency band. GSM modem is wireless modem that works with a GSM Wireless network. After distribution of the material controller send the information about the distribution of material to the government office and consumer throw GSM Technology. This would bring transparency in public distribution system as there will be direct communication between people and government.

C. Solenoid Valve

Solenoid value: solenoid value is an electromechanically operates value. The value of controlled by an electric current through a solenoid in proposed system we are using two solenoid value for kerosene value controller circuit. The actual withdrawal of material takes place here. In this system we used 2-way, 3 way and 4-way solenoid valve. A two way solenoid valve has two port connection pressure or input port and output port. These valves are used to stop the flow of a fluid or start the flow of fluid in a piping configuration. 2-Way valve is referred to as a 2/2 valve which means the valve has two parts & two position. The position one is on & position two is off.

Fig 1.Solenoid Valve

D. Load cell

The following diagram shows Wheat stone's bridge is configured with load cell. The resistance worked as T1 & T2 represent strain gauges that are placed in tension when load is applied to the cell. The resistance marked C1 & C2 represent strain gauges which are placed in compression when load is applied. The positive & negative load are referred to as the (+EXC) & (- EXC) leads. The power is applied to the load cell from the weight through these leads. The most common excitation voltage is 10 VDC & 15 VDC depending upon the indicators & load cells used. The signal obtained from load cell is sent to the signal
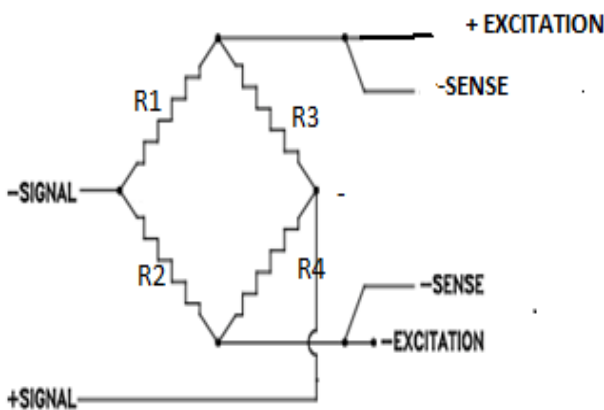

Fig 2.Wheatstone's bridge

input of the weight indicator to be processed & represented as a weight value on the indicator display. The +out & -out leads are referred to as +signal and –signal leads.

E. Keypad

In this system 4x4 matrix keypad is used. It is serially connected with PIC microcontroller. After sowing the smart card by authenticated person, if material is available then with the help of keypad he / she can select the material quantity.
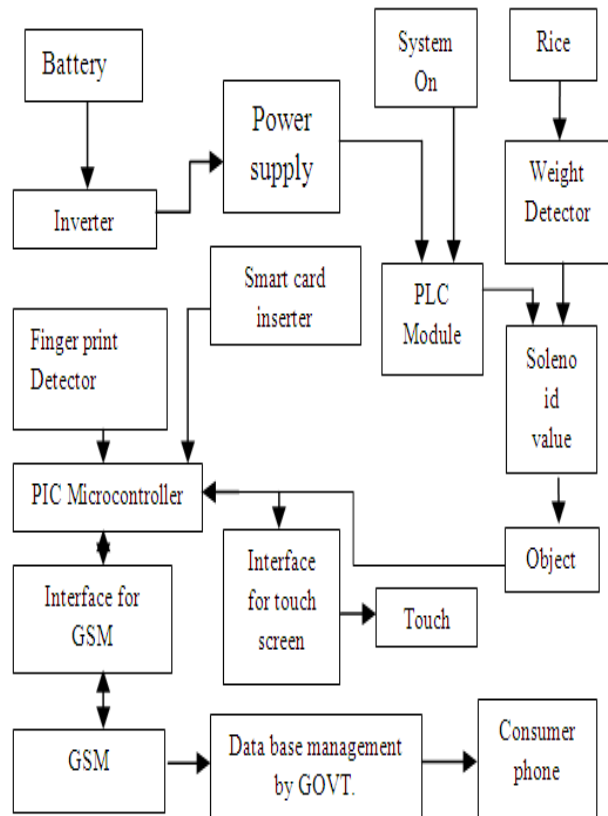

Fig 3.Block Diagram of proposed hardware system

F. Buzzer

It consists of piezo crystal between two conductors. When a potential is applied across their crystals, they push on one conductor& pull on the others this push & pull action, results in a sound wave if the inserted smart card is invalid then us will send signal to the buzzers& it will produce some noisy sound.

IV. SOFTWARE DESCRIPTION

The design of our printed circuit board has been done using EAGLE. EAGLE software is a complete electronic design automation system for pc compatible computer. It includes schematic & PCB module. The micro vision IDR from Mumbai combines project management, make facilities, source code editing program debugging & complete simulation in one powerful environment.

V. FLOW CHART
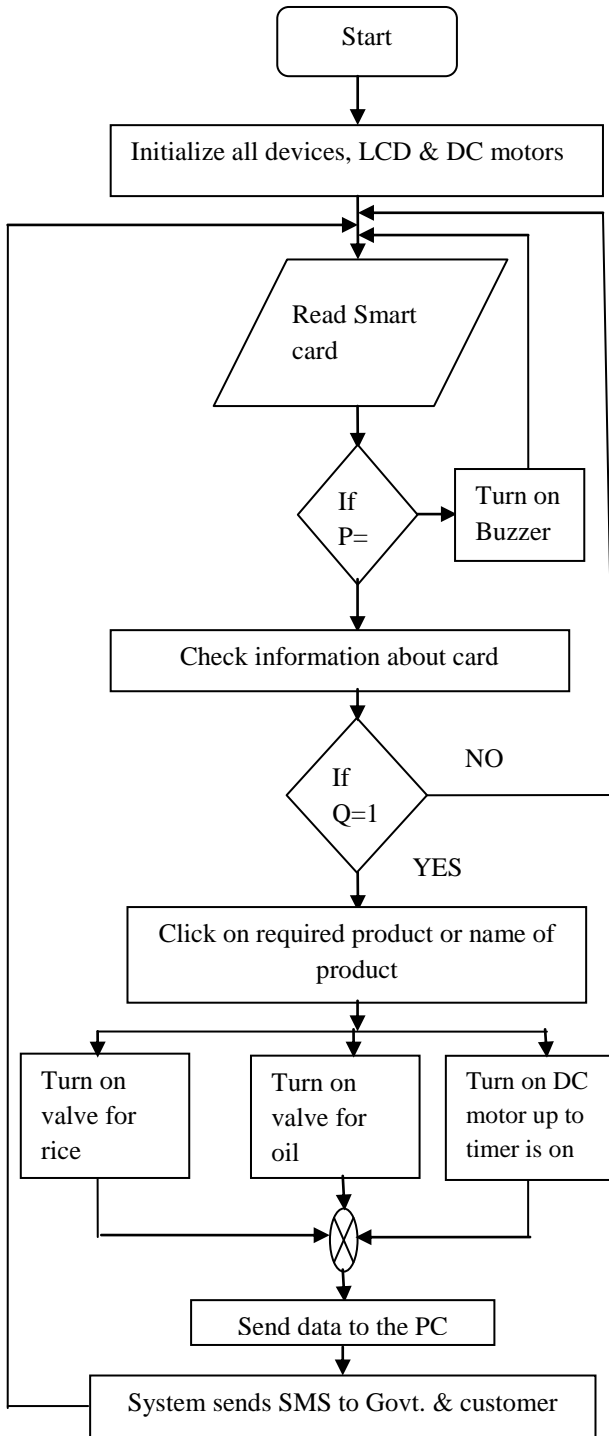
P= Validity of card
Q= availability of material

Algorithm
1. START
2. Initialize all devices LCD, DC motor.
3. Show smart card
4. Check the validity of the card & status P indicate validity of card.
A) If P= 0, turn on buzzer & go to step 3
B) If P= 1, go to the next step.

5. Check the information about the card& state Q indicate availability of the material.
A) If Q= 0 go to step 3
B) If Q= 1 go to the next step
6. Check for keyboard input.
7. Enter the amount of product grain in 1 kg oil in liter & kerosene in litre.
8. Turn on respective valve accordingly to the amount entered.
A) Turn on the valve for the oil.
B) Turn on the valve for kerosene.
C) Turn DC motor on up to the timer is on.
9. Send data to the PC.
10. System will send SMS to government & consumer.
Go to step 3.

VI. APPLICATIONS

1. This proposed system can provide safe, secure, efficient & corruption free public distribution system.
2. This system is beneficial to the government & also for needy ration card holder.
3. This type of system can be used for milk dispensing in agriculture also.
4. This system is reliable & flexible.

VII. CONCLUSION

This proposed system provides safe, secure & efficient public distribution system. By using this system ration shop can be automated. It solves the problem of manual work in public distribution system & provides benefit to the government by sending current stock information to the government database via GSM & reduces manpower.

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