AUTOMATION PETROL BUNK MANAGEMENT USING PREPAID CARDS AND GSM COMMUNICATION

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ABSTRACT- **Today almost all petrol pumps have a microcontroller to control the electrical pump, drive the display, measure the quantity and accordingly turn off the electrical pump. But still a person is required to collect the money. Our project is designed to eliminate this human interaction so that there is no need of workers to fill the petrol. In this system, all drivers have a smart card called RFID card which can be recharged by some points. The petrol pump is equipped with a smart card reader which reads the amount in the card and will display it on the LCD. The electrical pump is then turned on according to the amount filled in the keypad, fills the tank and automatically turns off. It is combined with GSM module, used to send sms message to the user. Added to that, this system has smoke sensor to detect any smoke in the area and infra red level sensor to sense the fuel level available in the tank. Hence this project made the automated petrol bunk system with no boundation and reduced manpower.**

*KEYWORDS-* **Smartcard Reader, GSM Module, PIC Microcontroller, Smoke and Level Sensor.**

I.INTRODUCTION

Automation petrol bunk management is a microcontroller based project which controls the whole assembly i.e. smart card, relay, motor. It also provides onsite recharge facility. The main attraction of this project is that it eliminates human interaction and avoids the situation of black selling when there is no serviceman. In this, microcontroller acts as a master device while smart card acts as slave device. On completion of transaction, money is deducted from card and the updated balance is shown again. In case of low balance, transaction cannot complete and respective message is cannot complete. Every time fuel is dispensed, a bill giving details of the date, time and quantity of the petrol will be generated automatically. In this manner many ideas have been proposed to discover AUTOMATION PETROL BUNK MANAGEMENT which is easy to install.

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II.SYSTEM DESCRIPTION

In this project, the customer having the RFID card. The card is nothing; magnetic member is embedded in the card. The reader circuit generates majestic signal to read the majestic number. When customer shows this card on the reader, the reader reads that majestic number and given the corresponding signal to microcontroller. In microcontroller, we have already programmed. So it checks the number whether it is an authorized card or not and the corresponding information is displayed on the LCD display. The keypad is used to enter the quantity of petrol. In microcontroller we already set time for liters. When you entered the designed quantity on the keypad the microcontroller activates the relay driver for that particular time period. The driver circuit is used to turn ON, turn OFF the relays. Relay output is directly connected to petrol pump. So it pumps the petrol as per our designed quantity entered in the keypad. The petrol quantity and their corresponding cost are displayed on the LCD display. It is equipped with GSM module to deliver the information such as available balance is sent to the user's mobile phone. Added to that, it uses smoke sensor to detect fire in the area and infra red level sensor to sense the fuel level available in the tank. If the smoke sensor detects any fire in the area, the buzzer will actuates to alarm the surroundings.
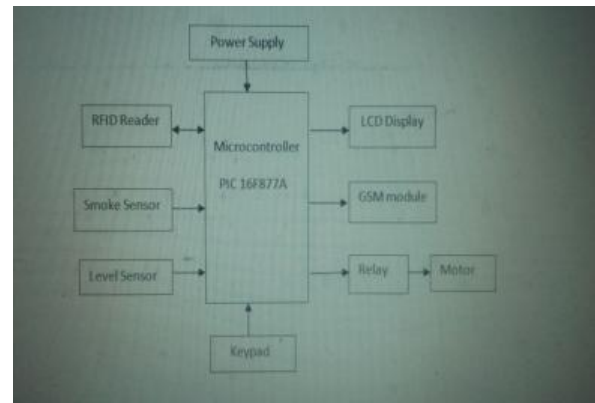
(a) Block diagram of Automation Petrol Bunk System using prepaid cards and GSM communication.

III.SOFTWARE SPECIFICATION

The software tools are required for designing, compiling and debugging.

A.MPLAB for PIC

MPLAB is a software program that runs in PC to provide a development environment for embedded systems. The capabilities of MPLAB IDE vary according to which device is selected. We will add two files for the project, a template file and a linker's script. Add some code to the template file to toggle an I/O bit. These codes can run in PIC microcontroller.

IV.HARDWARE SPECIFICATION

The following are the hardware requirements for this process monitoring system.

A.PIC 16F877A

It is a high performance RISC CPU. Its operating speed is DC-20MHz clock input, 8K bytes flash program memory, 368 byte

RAM data memory, 256 byte EEPROM data memory, in-circuit serial programming, interrupt capability up to 10 sources, two 8- bit timer/counter, one 16 bit timer/counter, 10 bit analog to digital converter, universal synchronous asynchronous receiver, 33 I/O pins with individual direction control.

B.SIM 900

It has Quad-Band 850/ 900/ 1800/ 1900 MHz, GPRS multi-slot class 10/8, GPRS mobile station class B, Dimensions: 24* 24 * 3 mm, Weight: 3.4g, Control via AT commands (GSM07.07 ,07.05 and SIMCOM enhanced AT(Commands), SIM application toolkit, Supply voltage range 3.4 ... 4.5 V, Low power consumption, Operation temperature:-30 °C to +80 °.

V.HARDWARE DESCRIPTION

A.PIC 16F877A

A PIC microcontroller is a single integrated circuit small enough to fit in the palm of a hand. 'Traditional' microprocessor circuits contain four or five separate integrated circuits - the microprocessor (CPU) itself, an EPROM program memory chip, some RAM memory and an input/output interface. With PIC microcontrollers all these functions are included within one single package, making them cost effective and easy to use. PIC microcontrollers can be used as the 'brain' to control a large variety of products. In order to control devices, it is necessary to interface (or 'connect') them to the PIC microcontroller. This section will help to enable those with limited electronics.

PIC 16F877A Microcontroller

B.RFID Reader

RFID Reader is powered via a development system where it is connected to. The presence of the power supply is indicated by a LED marked power. When the RFID reader is turned on, a 125 KHz voltage is supplied on its antenna. As a result, the antenna starts emitting an electromagnetic field necessary for reading the RFID identification card. Christo Ananth et al. [2] discussed about a system, GSM based AMR has low infrastructure cost and it reduces man power. The system is fully automatic, hence the probability of error is reduced. The data is highly secured and it not only solve the problem of traditional meter reading system but also provides additional features such as power disconnection, reconnection and the concept of power management. The database stores the current month and also all the previous month data for the future use. Hence the system saves a lot amount of time and energy. Due to the power fluctuations, there might be a damage in the home appliances. Hence to avoid such damages and to protect the appliances, the voltage controlling method can be implemented.Then it is sent to the microcontroller for further processing.
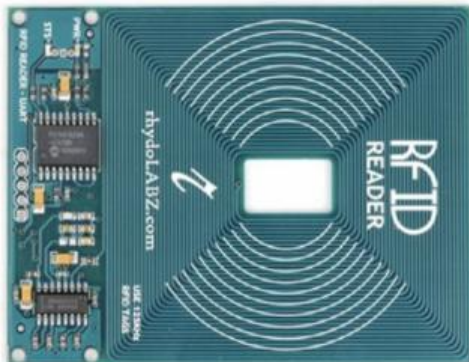
RFID Reader

C.SIM 900

The SIM900 is a complete quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, data and fax in a small form factor and with low power consumption. With a tiny configuration of 24mm×24mm×3mm. SIM900 can fit almost all the space requirements in our M2M application, especially for slim and compact demand of design.

GSM Module

D.LCD Display

The liquid-crystal display has the distinct advantage of having low power consumption than the LED. It is typically of the order of microwatts for the display in comparison to the some order of mill watts for LEDs. Low power consumption requirement has made it compatible with MOS integrated logic circuit. Its other advantages are its low cost, and good contrast. The main drawbacks of LCDs are additional requirement of light source, a limited temperature range of operation (between 0 and 60° C), low reliability, short operating life, poor visibility in low ambient lighting, slow speed and the need for an ac drive.

E.Keypad

Keypads are a part of HMI or Human Machine Interface and play really important role in a small embedded system where human interaction or human input is needed .A keypad is a set of buttons arranged in a block or "pad".

F.Relay and Driver circuit

Relay and driver circuit is a simple transistor switching driver using NPN transistor. Since the relay consume more power than a microcontroller, driver is essential.

G.Smoke Sensor

Photoelectric smoke detection is generally more responsive to fires that begin with a long period of smoldering (called smoldering fires)." "Photoelectric alarms react slower to rapidly growing fires than ionization alarms, but laboratory and field tests have shown that photoelectric smoke alarms provide adequate warning for all types of fires and have been

shown to be far less likely to be deactivated by occupants". Although optical alarms are highly effective at detecting smoldering fires and do provide adequate protection from flaming fires.

H. Level Sensor

Level sensors detect the level of substances that flow, including liquids, slurries, granular materials, and powders. Fluids and fluidized solids flow to become essentially level in their containers (or other physical boundaries) because of gravity whereas most bulk solids pile at an angle of repose to a peak. The substance to be measured can be inside a container or can be in its natural form (e.g., a river or a lake). The level measurement can be either continuous or point values. Continuous level sensors measure level within a specified range and determine the exact amount of substance in a certain place, while point-level sensors only indicate whether the substance is above or below the sensing point. Generally the latter detect levels that are excessively high or low.

I. Alarm

Electronic alarm systems are made up of three component parts designed to detect, determine and deter criminal activity or other threatening situations. An alarm system can detect an event such as an invasion, fire, gas leak or environmental changes; determine if the event poses a threat; and then send a notification about the event.

VI. FUTURE WORK

This technology can be enhanced to implement the same system for milk processing industries while distributing the milk and its products to the market. In day to day life we can see that water distribution in summer is also one of the problems in front of India. So it is possible to keep control on water distribution in particular area. The rationing products like vegetable oil as well as kerosene and its sub products may be securely distributed to the customers using the same system we proposed. Also it is possible to keep record of the distributed products in market which is commercially most important for industries.

VII. REFERENCES

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