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PETROL BUNK AUTOMATION USING PREPAID CARDS AND GSM COMMUNICATION

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ABSTRACT

Automated have added to the new look of the petrol bunks. A drastic change which has taken the city by storm is the petrol machines that have invoked a new look with automated systems invading this area also now one can get updated details on the mobile using the cutting edge GSM Technology. This makes the customers know theexact quantity of petrol that has to be filled in, getting over the perennial problem of forgoing small change which most of the times the attendants at the bunks pocket for themselves. The traditional archaic pumps have now been replaced by more advanced EMP Petrol Pumps for proper filling of fuel. This not only ensures accuracy, but also saves a lot of time for customers and avoids misconceptions and arguments. To demonstrate this as a project we have developed a Micro controller based Petrol bunk automation system.

KEYWORDS: Two units will be placed at petrol station which will take care of customersneeds & also it will continuously monitor the fuel level, temperature of fuel & anyaccidental situation that may happen at the petrol station. The third is the data baseregarding customer's Ids, passwords & will also take care of the account balance. TheGSM module will act as a link between customer & petroleum industry. The softwarepart of this project will help to keep record of all the things in short we are providingtotal security while distributing the fuel. Finger print scanner will scan the fingerimpression which will be in digital code; output of finger print module is connected tocomputer.

1. INTRODUCTION

In recent days the distribution of fuel at the fuel stations were controlled by manpower to the respective customer vehicles. This distribution was totally dependent on mans loyalty who is responsible to do this job. Nowadays, there is rapid growth in advancement of industries and they are thinking more towards consumer's satisfaction. For the secure distribution of products, these industries are trying to develop a new advance security system to achieve their goals efficiently. However in today's petroldistribution system there are some disadvantages related with stealing of petrol, unauthorized petrol selling and wastage of manpower etc. The 21st century is known as the internet age as there is increase in use of internet in our day to day activities. Examples of these applications include online banking and brokerage, cashmanagement, tax filling, computerized petrol pump, medical field. But, computerizedpetrol pump is concerned, many modifications has been already done .All the relateddata of consumers are efficiently inserted with the help of computers. But, as far assafety is concerned, we are still behind. The main objective of this system is to provideauthentication to consumer and control the opening or closing of the tank

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valveaccording to amount mentioned by the consumer. We will use GSM technology for thispurpose.

LITERATURE REVIEW

Petrol-Retailing As A BusinessPetroleum (derived from Latin _Petra'-, rock and _oleum‘ -oil) has always been an inseparable part of life in our times. Anything about petroleum (be it its exports, imports, production via exploration, refining or selling, or its price fluctuation) shakes the global economy, and in recent past the world has witnessed some wars and national conflicts caused because of it (petrol). So, there is no need to say why it has become ―liquid gold‖ in true sense of the word (Dugar, 2009). (Ramanathan, 2007), confirms that the word _retailing‘ has its origin in the French verb _retailer‘ which means to cut up, and refers to one of the fundamentalretailing activities, which is to buy in larger quantities and sell them in smaller quantities.The oil industry is divided into three streams like upstream, midstream and downstream. The upstream basically covers exploration and production of crude oil & gas, midstream covers movement of materials through pipelines and downstream covers marketing of petroleum products through retail outlets (ROs). In general term selling petroleum products through outlets is known as Petro-retailing business. Petroretailing is the face of oil marketing companies and sells products/services directly to the customers (Kishore & Patel, 2012) the retail fuel industry is capital intensive and overall demand has been static for many years. In general 15% margins are very low in comparisons to other sector (HSRC, 2002). For about hundred and forty odd years, _Petrol‘ existed as an _undifferentiated commodity‘ in India. No serious efforts were made for augmenting and differentiating this _commodity‘. More importantly, only three government regulated petrol selling companies enjoying an almost _monopoly status‘, were running the business, driven by the social objectives set by the government, along with the prices of petrol (Dugar,2009). In most categories today, retailers know far more about customer behavior than in most categories today, retailers know far more about customer behavior than manufacturers do because retailers have ready access to buying pattern information through their store scanners (Barnes, 2001). Retail fuel stations can be categorized as Company Owned Company Operated (COCO), Company Owned Dealer Operated (CODO), and Dealer Owned Dealer Operated (DODO) etc. Fuel stations receive petroleum products from Oil Marketing Companies. From the storage terminals owned by OMCs, fuel grades are transported to stations, usually through tank-trucks. OMCs receive petroleum products from refining companies (Samdani&Kulshreshtha, 2011). For purposes of the fuel industry three important participants must be highlighted. These are the Fuel Suppliers (Franchisors), the Fuel Retailers (the Franchisees and Fuel Retailers) and the general public (consumers). Understanding the relationships between these various industry participants is vital for assessing the impact the Consumer Protection Act and its Regulations will play in each case. The relationship between the Franchisors and Franchisees is that of a supplier-consumer relationship, meaning that the Franchisor has certain obligations towards the Franchisee in terms of the Act and the Franchisee has rights which are granted to it by the Act.Similarly, the Franchisee (the Fuel Retailer) as supplier of the fuel to the general public has obligations towards the general public in terms of the act and the general public (as consumers) are afforded certain statutory rights to protect their interests in this relationship. Interestingly and very importantly, the Fuel Retailers find themselves in the unique position that the Consumer Protection Act impacts them on multiple fronts, firstly they are afforded the rights as a consumer in so far as one is dealing

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with theirsrelationship with the Franchisors and secondly the Fuel Retailers are saddled with the obligations of a supplier to the general public by virtue of their position in the supply chain. This means that the Fuel Retailers will have to be aware of both the rights and obligations created by the Consumer Protection Act and the accompanying regulations (Forecourt Times, 2012).

2. BLOCK DIAGRAM

Each vehicle is fitted with a prepaid card. When a car has arrived at the gate, the RFID reader reads the card and opens the gate, only when the card is a valid card. Once entered the user will be shown the balance amount available on the card and he must select a option to dispense the fuel based on liters or rupees.

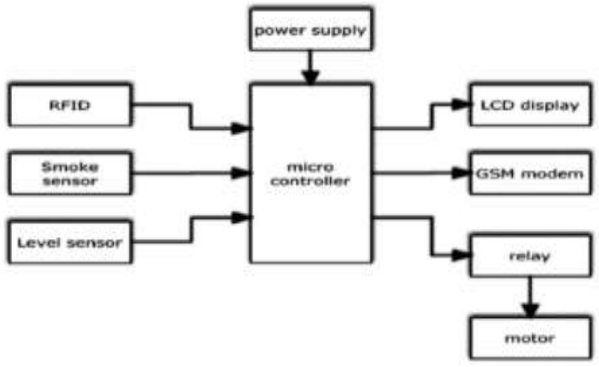

Fig 1. Block Diagram

The system should check whether the user has entered a valid data i.e., the amount should not exceed the balance available in the card. After ensuring that, a motor is actuated to dispense the fuel. Once this is done, the information such as available balance is sent to the user‘s mobile phone using GSM technology.

3. HARDWARE DESIGN

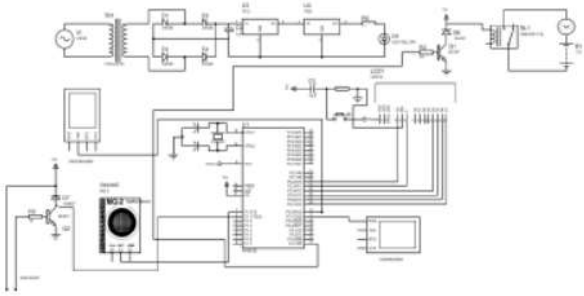

Fig2:Hardware Design

The project is implementing as an RFID-based petrol bunk. Users use RFID card: Petro Card with RFID tags including user verification codes. These cards can be recharged at the recharge points. When a user swipes the card through the RFID reader,it senses the amount entered by the user and delivers fuel to the vehicle. Therefore, the amount will be deducted automatically from the user card and the LCD display shows the amount and details of the user The microcontroller stores several cards details and compares the data given by RFID reader. When both these details match, it sends the control signals to the relay such that the motor operates to pump petrol. The system proposed states three simple uses of RFID smart cards. Among these two cards are known and the rest is unknown. When the customer comes to fill the fuel at the station, firstly he will swipe the card. If the card is authorized, RFID card reader will accept the card. Then it will ask for the pin number. If he entered pin number by the customer is correct then it will ask for the amount for the petrol to be dispensed. In such a way system works.If the customer swipes with unauthorized card, then the reader will display the error message as the card is unauthorized. In such a way the system is secured. This system does not require any high performance micro-controller such as ARM series. It is some using low cost micro-controller which indirectly reduces the cost of

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the total system. The system accepts the authorized RFID card. The system operates by the microcontroller receiving value from the keypad which represents customer request. And customers get the accurate amount of the fuel.

4. SYSTEM DESIGN AND IMPLEMENTATION

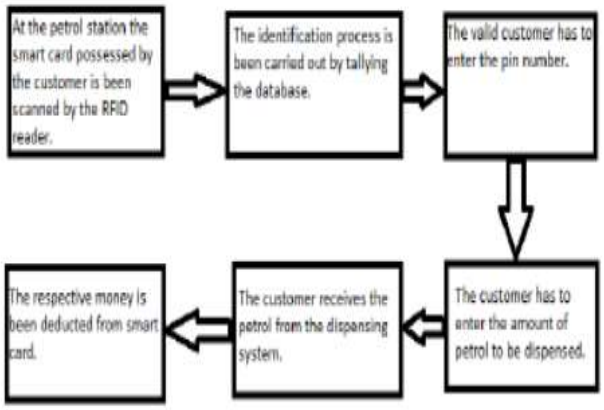

Fig3:SystemImplementation

The system proposed states three simple uses of RFID smart cards. Among these two cards are known and the rest is unknown. When the customer comes to fill the fuel at the station, firstly he will swipe the card. If the card is authorized, RFID card reader will accept the card. Then it will ask for the pin number. If he entered pin number by the customer is correct then it will ask for the amount for the petrol to be dispensed. In such a way system works.

5. SOFTWARE IMPLEMENTATION

Embedded system means some combination of computer hardware and programmable software which is specially designed for particular task like displaying message on LCD. If you are still wondering about an embedded system, just take a look at these circuit applications using At89s51 microcontroller. You can call these applications embedded systems as it involves hardware (AT89s51 microcontroller) and software (the code written in assembly language).Some real life examples of embedded systems may involve ticketing machines, vending machines, temperature controlling unit in air conditioners etc. Microcontrollers are nothing without a program in it . One of the important part in making an embedded system is loading the software /program we develop into the microcontroller. Usually it is called ―burning software‖ into the controller. Before ―burning a program‖ into a controller, we just do certain prerequisite operations with the program. This includes writing the program in assembly language or C language in text editor like note pad, compiling the program in a complier and finally generating hex code from complied program. Earlier people used different software /applications for all these three tasks.Writing was done in a text editor note pad/word pad ,compiling was done using a separate software(probably a dedicated complier for a particular controller like at89s51),converting the assembly code to hex code was done using the another software etc. It takes lot of time and work to do all these separately, especially when the task involves lots of error debugging and reworking on the source code . Kiel micro vision is free software solves many of the pain points for an embedded program developer. This software is an integrated development environment (IDE), which interested a text editor to write programs,a compiler and it will convert your source code to hex files too.

RESULT

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Fig 4.Result

Authorized, User convenient.Less time consumption.Fuel theft prevention. Auto updated. It is also possible to implement the same system for milk processing industries.In water distribution in summer. It is possible to keep record of distributed products in market which is commercially most important for industries.

FUTURE SCOPE

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 is front of India. It is possible to keep control on water distribution in particular area. The rationing products like vegetables oil as well as kerosene and its sub products may be securely distributed to the customer 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.

CONCLUSION

RFID system is a versatile technology. This system is used in many application and real time application. In our application, RFID system dispenses the accurate amount of fuel which reduces the misuse of the fuel. And it also reduces the man power. And if the customer tries to swipe with the unauthorized card, the RFID system rejects the card. In this way the system is so secured. To obtain best performance the RFID readers and Tags must be in good quality.

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