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Fuel Pump Dispensing System

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Abstract: In the present system, petrol pump are operated manually we required more man power and it is time consuming process. So we have proposed a system in order to make easier, reliable and secure which is the fuel dispensing pump that in done automatically using GSM and RFID. This system can improve the fueling process in order to make it easier, reliable and secure. In this case unauthorized fueling is prevented by assigning a special quantity of fuel for registered vehicle depending on their type. 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.

1. Introduction

In the present growing technology in almost all the sectors traditional systems are being replaced by the advanced technologies Hence we have designed the automatic petrol bunk using RFID and GSM[1]. In case of traditional petrol pump, the driver of vehicle has to pay for fuel with cash money and may have to pay more than the dispensed fuel due to lack of small money change.

Present days, most fuel stations are manually operated which require more manpower and are time consuming. For placing fuel stations in a remote area, it is so difficult to provide the good facilities to the consumers. Mass transit companies focus to include qualities and latest technologies in their system aiming to reduce the service manpower. Introduction of technology in delivering the service has changed the delivery service design.

This includes self-service technologies like self-service fuel dispensers. This has been made possible by using computer and latest technologies [2]. Older petrol pump systems were not reliable enough. For example, in system with paper recharges, there may be use of false coupons that are very similar to the original one. Again, we do not have the actual calculations or the amount of petrol that is dispensed on daily or monthly basis neither how many paper recharge are circulating.

The main aim of this projects to provide validation to the customer and automatically regulate the startup and Stopping of the tank valve in accordance with the amount requested [3].

Aim 7 is used I our proposed system which is to controls the complete system components i.e. RFID card, relay, motor. It also provides the facility of onsite recharge. The important feature of these projects is that it eliminates human interaction and avoids the situation of black selling in absence of service man. On the completion of transaction money is withdrawals from card and the balance is shown again on the LCD display. When the balance in customers account is low, the process will not be carried out and message will be displayed as "Low balance". All the details of date time and amount of petrol will be stored in the database when the fuel is dispensed

The uncontrolled increase in the number of vehicles in Iraq in recent years has led to the congestions and long traffic jams in almost all Iraqi cities. The dispensing of fuel to this huge number of vehicles at the conventional fuel stations has caused many accumulated complication factors in Iraq.

A centralized database system is useful to allow fuel station to share same data about the vehicle and related account balance. The additional features of the system is, it provide the information regarding the fuel level to the owner. Added to that our system has smoke sensor that will detect every type of smoke in the respective area and infrared level sensor to sense the fuel level available in the tank.

One such factor is that the vehicle driver has to pay for fuel with cash money and may have to pay more than the amount of dispensed fuel due to the lack of small money change available with station operator.

Also, there is the nonexistence of rationing to the amount of fuel being dispensed to each vehicle. Another important factor is that all reports about the supplied, dispensed, and Remained quantities of fuel at the fuel stations are paper based reports and mostly, there are no reliable statistics about such amounts.

The petroleum products are one of the valuable and rare creations of the nature. The proper use and distribution is an important task to survive these products. A fuel station is a facility which sells fuel and lubricants via fuel dispensers or otherwise called browsers which themselves are used to pump gasoline, diesel,

kerosene, etc. into vehicles and to calculate the financial cost of the product thus dispensed.

Enterprises engaged in urban and suburban public transport as well as other transport enterprises, big fuel consumers, need control of fuel delivery to prevent or at least minimize the misuse of fuel. An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement. The embedded software is also called "firm ware". The desktop/laptop computer is a general purpose computer. Embedded systems do a very specific task, they cannot be programmed to do different things. Games, word processing, accounting, software development and so on. It contains Embedded systems have very limited resources, particularly You can use it for a variety of applications such as playing systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low.Some embedded systems have to operate in extreme environmental conditions such as very high temperatures and humidity.

Various petroleum industries are becoming very careful about manufacturing & distribution of their products. New technology addresses these requirements, providing the foundation to allow cooperative interaction to be developed. Thus the unmanned petrol pump using gsm is an example of new technology which will be providing the base for security of product distribution & data keeping using database. As the project is PC controlled, the project will be connected to one of the PC ports & programming languages like ARDUINO IDE.

The related work presents a fuel dispensing system based on smart card technology. The system can improve the fueling process in order to make it much easier, secure and reliable. It prevents unauthorized fueling by assigning a specified amount of fuel for registered vehicles, depending on their types, within a specific period of time so that each vehicle will get a sufficient amount of fuel. It also provides efficient statistics about the various quantities of fuel at the stations. The system was implemented at the Oil Products Distribution Company, The Distribution of Baghdad. It uses smart card reader with its passive tags. It has a software application, built using VB.Net, for registration of customers, updating their accounts and charging them for the designated amount of fuel.

In this system, all drivers have a smart card called just like a petro card. This card can be recharged by some recharge points. The petrol pump is equipped with a smart card reader/write. At the Petrol Pump, the driver swaps the card and the smart card reader reads the amount in the card and will display it on the LCD. The driver then enters the quantity of petrol that has to be filled using a keypad. The corresponding amount is calculated & deducted from his petro card. The electrical pump is then turned ON according to the entered amount, fills the tank and automatically turns OFF The hardware part of this system consists of a microcontroller, card relay, LCD and other basic electronic components, and it is attached to conventional fuel dispensers in order to make them work under the smart card technology. The system uses a centralized database to allow fuel stations to share the same data about vehicles and related balance. Additional features of this system include a website and a phone application, which allow customers to login to their accounts**.**

2. Literature Survey

In the year 1883, Sylvanias F. Bowser invented an idea drawn water from a well by using a wooden plunger. Around 1885, he used this idea in case of petrol pump and became founder of S.F.Bowser Pump Company. At start the unit was very small consisting of storage barrel, the plunger, a hand lever and an upright faucet lever. This station got huge success and very soon it became a "filling station"[1]KUL. In the year 1890, he started to pump gasoline along with the kerosene and in this way the first gas pump was invented. The company S.F.Bowser continues the refining, improvement. This "filling station" was sold to general stores in the year 1893.Before 1893, the motorist used to fill the vehicle tanks by using "drum and measure" method. The gasoline was stored in big steel drum and kept at height above the ground. The cans would be feed by using gravity and they these cans pour directly into vehicle tank by using funnels. The funnels were design properly so that it should not damage the engine or vehicle [2]BIHERA .This process was quit lengthy, improper and dangerous. After inventing "filling station pump" this process become updated and people started to used "filling station" to dispense the kerosene, petrol. When some other oil company issued mapped Gulf was the only one company that issued the map. After this various innovations made and the modern petrol pump are developed which are treading now a day. Apart from this we have added some new features into the existing system such as smoke detection, automatic payment using Smart card, indication of fuel level etc. Hence this

system is more efficient than the existing once.

Draw Backs: This process was quite lengthy, improper and dangerous. Some new features that are in the existing system such as smoke detection, automatic payment using Smart card, indication of fuel level etc. were not included. Hence this system is more not efficient than the existing once.

SAAID[**3]**Each year, the number of stolen vehicle is on the Rise. Usually, to prevent theft, a physical type countermeasure is used such as padlock, disk break lock and other more which is a preventive action but it is not enough safe. The objective of this study is to create a controllable system that can display the location of a vehicle using Global position System (GPS) to pin point the location and Global System for Mobile (GSM) as a mean for communicating with the vehicle for ease of finding after a theft attempt. The hardware and program development is done by research and trial and error as the controller do not interact with both module at the same time, after successfully programming both module, it is Combined into a single program with addition of interrupt program. The experiment is done in three set of tests so that the system accuracy can be determine when stationary and in motion On vehicle, output controlling is the test to determine if the controller can be made into anti- theft system. The result of the test concludes that the system can provide standard GPS coordinate when requested via Short Message Service (SMS).The system can also be used to control an actuator

Draw Backs: Microcontroller used in [3] is a 8- bit which serves less than other 16-bit, 32-bit microcontrollers. QIANA[4]Based on the principle of the intelligent vehicle monitoring system using GPS/GSM, this paper analyzed the key technologies of the system such as GIS, wireless positioning and communication. Details about the design and implementation of the system are discussed in this paper. Such system provides practical measures to resolve problems like vehicle hijacking and theft in traffic control and management. In addition, this system also offers certain references in monitoring civil vehicles and providing cogent evidence for vehicle theft cases.

Draw Backs: System included in uses a GSM which serves as a mediator between outside world and system, its output is in form of frequency, there is need of Dual-tone multi- frequency decoder for converting frequencies into voltage levels of zeroes and one.

AHNED[5]This paper proposes a methodology for tracking Systems based on the global positioning system and radio communications to determine the current location of moving objects, such as a vehicle, and sends this information to a remote monitor center The designed system consists of two units, which are the vehicle unit and the monitor unit. When theft of vehicle is detected, the monitor unit sends packet that automatically turns off the vehicle Engine, which provides real time control. The data at monitor unit are stored in a file and can be retrieved as requested for route browsing on a Google map. A graphical user interface application is developed using Visual Basic with embedded Google map to retrieve and display vehicle current position. The proposed embedded system can be considered a successful one as it is small size, low power consumption, and implemented on a single chip microcontroller with low cost.

Draw Backs: Many researchers have proposed many anti-theft systems. This system is an integration of more modern technologies S BAGCHI[6]Proposes a sub-band non-uniform Discrete Fourier Transform. The algorithm is based on the fact that the DTMF tone frequencies are low (The highest frequency is 1633 Hz.) compared to the sampling frequency (Sampling rate at telephone channels is 8 KHz). Thus after sub-band decomposition (Filtering the signal in a high-pass and low-pass section and applying a decimation by a factor of 2.

Advantage: The low frequency part will include all the DTMF tones and the high frequency part can be omitted. This reduces the number of samples which will be used by the Goertzel Algorithm by a factor of two and, thereby, reduces the computational load. **Draw Backs**: The Draw Backs' of this algorithm are that the sub-band decomposition itself needs some computation and delay, and the down sampling procedure might cause some interference JOURNAT[7]This paper is developed by Atmega- 2560 microcontroller for Anti-Theft Control System for Automobiles, Arduino mega-2560 Development Board and relay switching circuit to design an electronic fuel pump controller for pumping fuel to the engine of vehicle .The main objective of this is for automobiles that tries to prevent the theft of a vehicle. We present a novel anti-theft control system for automobiles that tries to prevent the theft of a vehicle. This system makes use of an embedded chip that has an opt slot sensor or, which senses the key during insertion. This is followed by the system present in the car asking the user to enter a unique password through Fingerprint Scanner.

S.DAR[8]The password consists of a finger print. If the user fails to enter the correct password, a text message is sent to the Owner and the location tracked using a GPS module. The message is also sent to the owner about the

unauthorized usage. Further the fuel injector of the car is deactivated so that the user cannot start the car by any means. This technique helps in taking fast steps towards an attempt to steal the design is robust and simple.

Advantage: The major advantage of this system is that the whole work can be made with a meagre amount of investment and can be used in any automobiles and thus bringing in less sophisticated and simple technology.

Draw Backs: Hence a modest attempt is made to bring in a high stand effective vehicle theft control system

3. Present System Manual Control:

In this, the control and automation are done by Manual Operation.

Drawback: Human Errors subsequently affects the quality of end product.

Hard Wired Logic Control: In this, Contractors and Relays together with timer and counters were used in achieving desired level of Automation. Bulky and complex wiring, Involves lot of rework to implement changes in control logic, Work can be started only when it is fully defined which leads to longer project time.

Electronics Control With
LOGIC GATES: In this, Contractors and Relays together with tillers and counters were replaced with logic gates and electronics timer in control circuit**.**

Advantage: Reduced spare requirement, energy saving, less maintenance and hence greater reliability.

Drawback: Implementation of changes in the control logic as well as reducing project lead-time was not possible.

PROGRAMMABLE LOGIC CONTROL:
In **this, instead of achieving desired control and automation through physical wiring of control devices, it achieving through program say software**

Advantage:-Energy Saving, Reduced Space, Modular replacement, Easy troubleshooting, Error Diagnostics programmer.

Drawback:-Expensive, It requires Third parties license, Bulky to carry, Expert person required. Above processes are used for automation from several decades as there technologies were developed. As each of them having some Drawback to overcome them we are replacing them with other technology.

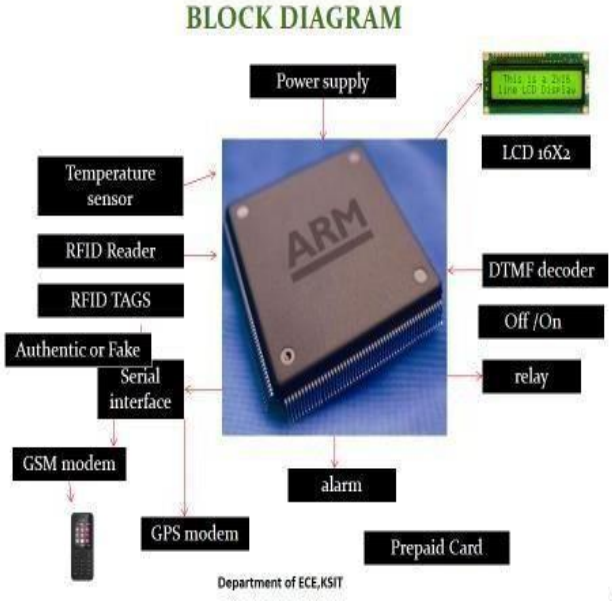
4. Proposed System

[2] 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.

OBJECTIVES: The system consists of two main parts: 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 ability. 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.

5. System Design

Fig. gives the overall system design of automation in Fuel bunk, which consists of following hardware.
1] GSM and GPS
2] RFID Reader & Tag
3] ARM 7
4] Sensors
5] LCD Display
6] Keypad
7] DTMF



User can recharge these card at recharge points. When customer scratches the card through RFID reader, he will get his amount details on LCD screen then he has to enter the amount of petrol which has to fill up in rupees [6]. Hence the amount will be deducted automatically from the user card and the amount Details of customer will be displayed on the LCD screen again. The proposed system consists of four samples of RFID card. Out of which 3 cards are registered and rest are unregistered. RFID card reader will accept the card if it is authorized i.e. registered.

Then it will ask for amount for the petrol to be dispensed. In this way the system will work when customer will swipe the unauthorized card i.e. unregistered card then reader will display the error message as the card is unauthorized. In these ways we have secured the system.

The hardware part of the system consist of ARM 7,DTMF,RFID, GSM, LCD, relay, keypad and other electronic components.

A centralized database system is useful to allow fuel station to share same data about the vehicle and related account balance. The additional features of the system is, it provide the information regarding the fuel level to the owner. Added to that our system has smoke sensor that will detect every type of smoke in the respective area and infrared level sensor to sense the fuel level available in the tank.

These project mainly categories into two parts:
1. Customer part
2. Database system

In the first part the customer will enters into the petrol pump. We have used automatic gate system by using servo motor and PIR sensor. PIR sensor will detect the human being and open the gate automatically by using servo motor. Then customer will use smart card including user verification code.

6. Conclusion

Survey on different fuel pump dispensing systems with respect to the following reference papers concludes the fact about the RFID system which is a versatile technology. It supports various real time applications. As in our proposed system it is used to dispense the accurate amount of fuel which reduces the thefting of fuel. In addition to this it eliminates man power Also it aids secure transactions with respect to

pavements for the betterment of the customer service by rejecting the unauthorized cards. It is good to use RFID readers and tags of good quality to obtain the best results with high performance. Hence the proposed system is lot more automotive compared to the present fuel dispensing systems and is able to provide the best customer service.

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