

Multi-Automized Fuel Pump With User Security

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ABSTRACT: In current days fuel stations are operated manually. These fuel pumps are time consuming and require more manpower. To place fuel stations in distant area it very costly to provide excellent facility to the consumers all these problem are sorted out by the use of unmanned petrol pump which requires less time to operate and it is effective and can be installed anywhere the customer self-going to avail the services the payment is done by electronic clearing system. The simple and proper use of microcontroller and GSM technology provides a total security and atomization in distribution of fuel. It has easy operated mobile phone system and graphics user interface (GUI). It is interface with high speed fuel dispenser which is convenient for consumer to operate. In our system the password will be provided to the user via his mobile phone by the petrol pump GSM customer has to enter this password on the LCD provided by the fuel station which will help the petrol company to create authentication for user also the distribution of the fuel is not possible until it gets verified by the database. In short we provide secure system for fuel distribution. The advancement of this project can help industry financially.

Keywords: AT COMMANDS, GSM, GUI, LCD.

I. INTRODUCTION

The 21st century is aptly known as the internet age because of the increasing use of internet in the day to day activities. Examples of these applications include online banking and brokerage, cash management, tax filling, computerized petrol pump, medical field. As far as computerized petrol pump is concerned, a lot has already been done in this field. Each and every data is being inserted with the help of the computers. But as far as safety of Fuel pump is concerned we are still behind the world. Leakage of petrol or any oil leads to a blast and stealing of petrol may lead to debacle. The aim of the system is to provide an authentication to the user & control the opening or closing of the tank valve according to amount demanded. We will use GSM technology for this purpose.

The system will consist of three units:

Two units will be placed at petrol station which will take care of customers needs & also it will continuously monitor the fuel level, temperature of fuel & any accidental situation that may happen at the petrol station. The third is the data base regarding customers ids, passwords & will also take care of the account balance. The GSM module will act as a link between customer & petroleum industry. The software part of this project will help to keep record of all the things in short we are providing total security while distributing the fuel.

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A. Aim of the project

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 SQL & C++.

B. Purpose

The purpose of this planning is to establish the scope of the project in terms of the major functions, performance issues and technical constraints. The plan will provide an estimate of the size of the product, the effort required and the duration. This plan will also consider the risk encountered during the project and the strategies for dealing with them. The plan will also discuss the detailed schedule of various subtasks within the project and also the resources needed to accomplish them.

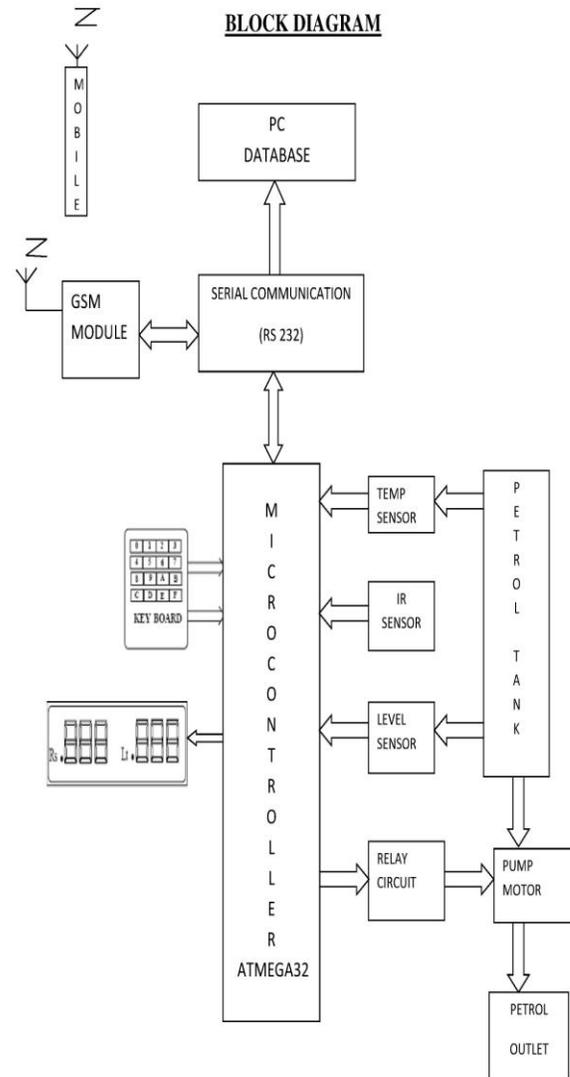
C. Brief History

In starting days the petrol pumps were distributing petrol using manpower to respective customer vehicles and was totally depends on man's loyalty who was doing this job. Nowadays industries are becoming very careful about these things and trying to centrally control all the production and distribution of products. For the secure distribution of products, industries trying to develop the new advance security system to achieve their goals. However today petrol distribution system is has some disadvantages regarding with stealing of petrol, unauthorized petrol selling & wastage of manpower etc.

II. THEORITICAL DETAILS & ANALYSIS

In our project customer who wants to use unmanned petrol pump will need to register his/herself to corresponding petroleum industry with an initial amount to recharge their balance. Customer demanding fuel from petroleum industry will first message to the GSM no. of nearby petrol pump. Now, our system comes into existence in three parts. The first part is the customer part, in this part customer will send his user id & amount of the petrol required in rupees & he will receive back a password now when he will reach to the petrol pump he

needs to enter his password for authentication & then the corresponding amount of petrol will be available to fill in his car. The second part is the data base, this will contain the customer's used id their accounts summary (balance) & passwords respective to the coupons for example; if a customer sends a message using format [IDuser_idPamount] like [ID101P100]this means that customer's user id is 101 & he is demanding a petrol of rupees 100. This message will be received at petrol pump GSM which in turn sends it to the data base in control cabin via microcontroller. So now microcontroller will check the user id in data base & it will send the corresponding coupon password via GSM module of petrol pump to the customer's mobile. Initially the status of the coupon is '1'. One more part which will be handled with the help of the data base is the automatic payment reduction system. Here whenever user will enter a password which he has received on his mobile phone on the LCD provided by the petrol pump with the help of keypad & if he is an authenticated user then the corresponding coupon will be used then after microcontroller will send a +12V supply to a motor which is connected to a petrol tank with the help of relay RS232 loop circuit. For a particular time corresponding to the amount of petrol requested, microcontroller will provide the supply to the motor & then it will stop after the filling of petrol in customer's vehicle the process will get over & the status of the corresponding coupon which has been used will become '0' & also data base program is designed in such a way that it will update the account balance of the corresponding user. The third & the most important part is sensor part. In this part we are more focused on the safety & preciseness in the automation of the system. At the start the LCD will display regular temperature, level of the fuel in the tank & also count. It includes three sensors, first one is the temperature sensor it will monitor the temperature of the petrol in the tank & if it exceeds a critical temperature due to any surrounding circumstances it will indicate the owner of the petrol pump before any hazardous situation happens. Second sensor is the IR sensor, it is mainly used for the purpose for avoiding the situation of the traffic at the petrol pump it will increase the count shown on the LCD as a vehicle will arrive at the petrol pump & it will keep on incrementing the count unless that owner has finished filling up the petrol in his vehicle, so in this way it will help the owner to know about the current situation at the petrol station, if at all some vehicle gets stuck in the middle of the process & rest of the vehicles stay in a queue so this IR sensor will increment the count & after exceeding the limit it will notify it to the owner via GSM message. The third sensor is the level sensor which will continuously monitor the level of the petrol in the tank, If at all the petrol level reaches to level one then it will keep on sending the message to the petrol owner about the insufficient amount of petrol in the tank till the owner of the petrol pump refills the petrol tank.



IV. EXPLORING WORKING OF THE SYSTEM

For Customer Part

1. Start
2. If registered user then Message to petrol pump GSM with user ID & amount of required petrol in rupees. Example:- ID101P100
3. If not a registered user then go to step 13.
4. Received a valid password from controlling database via petrol pump GSM on customer's mobile phone.
5. Display "Welcome to fuel pump on LCD".
6. Customer will enter his password by pressing A on keypad.
7. If valid then database will give verification to microcontroller.
8. Display "Press B".
9. After pressing 'B' Open the fuel dispenser to pour

petrol in car.

10. Then motor will start for certain period of time.
11. If invalid password then it will go to step 13.
12. Close the dispenser.
13. Stop.

V. For Database part:

1. After receiving the message from customer of the format ID101P100 microcontroller will separate the ID no. and amount of petrol n will send it to the database.
2. Database will check for authentication and registration of customer.
3. If registered then database will provide microcontroller with password of the corresponding coupon i.e,(P100's password is 12345).
4. Microcontroller will send it to the customers phone by using Petrol pump's GSM module.
5. If not registered then it will go on step 10.
6. Now customer will enter his password by pressing 'A' on LCD provided at fuel station.
7. The password will be send to the database by microcontroller & then it will check for authentication.
8. If correct password then it will display the message as press B on LCD screen.
9. Then microcontroller will switch ON the pump motor for particular time corresponding to amount by using relay switching circuit.
10. If incorrect password then it will go on step 11.
11. Stop.

VI. For Sensor part:

1. Start
2. LM35 will record temperature of petrol inside the tank and will send it microcontroller.
3. Microcontroller will display it on LCD.
4. If above 35degrees it will send the message as "critical temperature" on mobile of petrol pump owner.
5. If not then it will go ahead
6. Now IR sensor will increment the counter of microcontroller and it will display the count on LCD.
7. If above ' += ' it will send the message to the owner of petrol pump as "critical situation" otherwise it will move tp the next step.
8. Level sensor will record the level of petrol in tank of petrol pump and with help of micrpocontroller it will display it on LCD.
9. If the level < level1 then it will send the message to the owner as "petrol tank is empty. Refill it".
10. If not then repeat step 1 to 9.
11. Stop.

VII. INTERFACING

Basic requirements for interfacing:

1. Power supply 12V , 5V.
2. GSM module with activated SIM card.
3. DB9 connector for GSM & PC connection

with our system.

4. Ultrasonic for level sensing.
5. LM 35 temperature sensor.
6. IR sensor module.
7. SQL Database and embedded C languages.
8. LCD screen with suitable resolution & keypad.
9. Relay switching circuit
10. DC Motor of 12V.
11. Program burning circuitry
12. AVR Studio and Sinaprog software.
13. Real term software and SQL Server management studio.

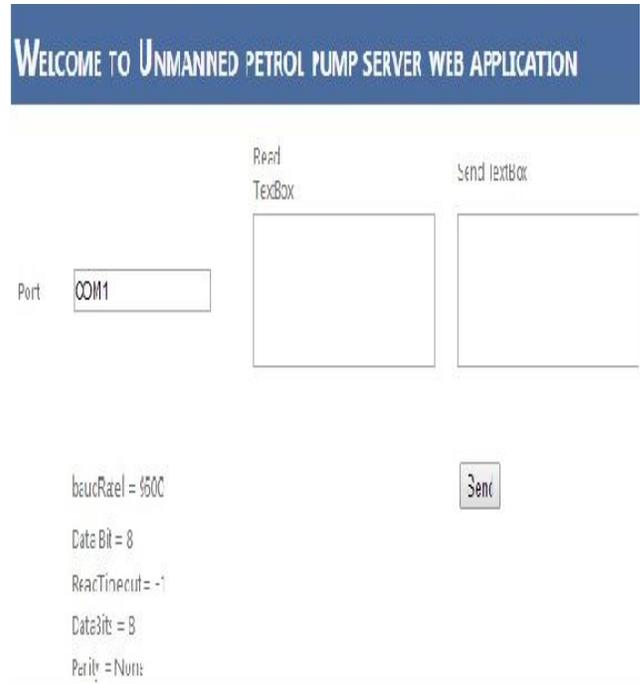


FIG 1. SQL USER INTERFACE

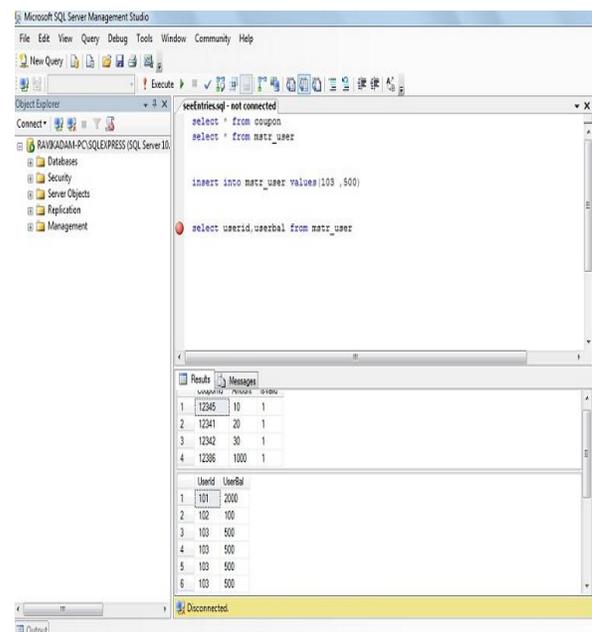


FIG 2. CUSTOMER DATABASE

IX. ADVANTAGES AND LIMITATIONS

A. Advantages

1. GSM system used in our project provides quick data communication over long distance also.
2. SQL Server Database helps us to provide the maximum security to authenticate the user and it's on long term basis.
3. It requires very less power supply i.e from 5V to 12V only which is easily available.
4. Also as it provides the central control on petrol distribution, thus there is no question of stilling or to change the record of distributed fuel.
5. Easy to handle for customer since only the password provided to him/her need to type on keypad and remaining work takes place automatically.
6. Sensing part helps owner to keep an eye over petrol pump and be alert.

B. Limitations

This system may suffer at remote area where there is problem with GSM range. Also the attack from hackers may create problem but using high standard of encryption and availing GSM transceiver widely, one may overcome these limitations.

X. APPLICATIONS AND FUTURE SCOPE

1. In petroleum products distribution our system looks for the control on product thefts which is the most serious problem for the manufacturing industries and reduction in manpower required.
2. It is also possible to implement the same system for milk processing industries while distributing the milk and its products to the market.
3. 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.
4. 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.
5. Also it is possible to keep record of the distributed products in market which is commercially most important for industries.

XI. CONCLUSION

In the world of electronics it is important to develop the new technology to make secure the distribution of fuel and keeping record of the same fuel with authorization of user. Our project is one idea which can change the face of today's manual system of distribution and data keeping. The total central access of all these activities provide the correct approach toward security and economical need of the industries since industry itself can control

distribution as well as keep the record of the same fuel from thousands of miles seated in office. In short, this project probably can be implemented for the use of other tasks other than petrol distribution, on large scale to achieve various goals of industries.

XII. REFERENCES

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