IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 3, March 2019

Automatic Fuel Filling System

Nitha C Velayudhan[1], Raseena K R[2], Rashida M H[3], Risvana M P[4], Sreemol C V[5]

Assistant Professor, Department of Computer Science, Universal Engineering College, Vallivattom, India[1]

B. Tech Student, Department of Computer Science, Universal Engineering College, Vallivattom, India[2,3,4,5]

Abstract: Nowadays petrol pump are operated manually. we required more man power and it is time consuming process. So we implemented automatic fuel filling system by using GSM and AT mega 328. This system can improve the fuelling process in order to make it easier, reliable and secure. This system aims at safe and secure fuel delivery, ensuring that the customer gets the equivalent amount of fuel for what he/she is paying, hence successfully eliminating any sorts of malpractices that might occur at a various fuel stations. In this paper, we developed an automated fuel station management system which can overcome the disadvantages of present system. The result of this methodology places cashless transactions and authenticated system . It will also help to prevent corruption at fuel stations and can help fuel stations to become faster and less time consuming. Normally in petrol bunks there is a Human to Human interaction. Our project is to overcome this phenomenon by bringing the interaction between Human and Software. By following mechanism we can avoid all the errors that a human does and also avoid the cheating activities.

Keywords: RFID, Raspberry Pi, GSM and AT mega 328

I. INTRODUCTION

In recent days the distribution of fuel is controlled manually. Even though there are a lot of automatic systems are existing but still, there are some constraints. For the safe distribution of the fuel, we are trying to develop an advanced system. In our country there so many problems in fuel distribution such as waste of time, lack of reliability in sales system, corruption in a transaction for the security of fuel station GSM technology is used to send message to authority. In this system, we use a flow sensor to sense the flow of fuel into the tank. The required quantity of fuel is typed using the keypad. The amount typed is sent to the pump system through data modem and the corresponding fuel for that price will vend to the vehicle's tank.

II. RELATED WORKS

In [1] this paper we utilizes a positioning robot arm that is allowed to move using it's search head and extendable nozzle toward the fuelling spot of the car. Distance sensor and weight sensor are used in the system to locate the actual location of the car and provide accurate fuelling position. The fuelling system consists of payment machine, arm robot fuelling mechanism and weight sensor. The fuelling system consists of payment machine, arm robot fuelling mechanism and weight sensor. In this paper, we have developed an automated fuel management system with solid state controller that can maintain the account of the Petroleum stations. Each and every transaction captured automatically through a Solid state controller and can monitor the transactions from remote place via Internet anywhere across the world. This management system also helps the fuel stations to become faster and can reduce malpractices in transactions. This system contains dispenser unit, Storage tank, Totem, Tank truck and utility equipment.

In [2] paper implements a device which can be installed in the tank of vehicle to prevent customers from getting cheated about amount of fuel. The ultrasonic range finder is mounted on the surface of the fuel tank which is programmed to send 8 pulses for a period of 10 microseconds. The time taken to receive these pulses is determined by the ultrasonic range finder. The distance of the fuel level from the ultrasonic range finder is calculated. Lcd display is interfaced with microcontroller. When the microcontroller is switched on the current value of fuel is displayed.

In [3], a biometric payment system is introduced which avoids any manual operator. It uses biometric payment system in digital transactions and eliminates cards and passwords.. When the customer want to use the service of this automated petrol system, he has to first place finger on the fingerprint scanner device. The information is then compared with the stored data and if the results match then an acknowledgment is sent to the Microcontroller which in turn is displayed on LCD screen. The system then asks to enter the amount in rupees for the equivalent fuel transfer. Once the amount is entered, the equivalent fuel transfer takes place, which is controlled by the microcontroller and at the same time the amount is also deducted from the account.

In [4] This paper proposes an automated fuel system using currency detection. Raspberry Pi as central unit to monitor currency detection unit and fuel dispensing. For currency detection, we are using digital image processing technique. currency is given by user as per his requirement. That currency will act as input to our camera which will capture its

image and store it. Then that captured image will be pre-processed by using processes like resizing, cropping and etc. then image processing is done like noise removal, edge detection, segmentation, histogram equalization, etc. in MATLAB software.

In [5], this paper an Automation in Petrol Bunk using RFID and GSM technology, Which uses an Arduino Uno controller, GSM and RFID technology. This system increases the fuelling process and it prevents unauthorized fuelling by providing RFID card to the customers and it is rechargeable. Here, system equipped with a RFID card reader which reads the available amount in the card. It is capable of automatically deducing the cost of petrol dispensed from user RFID card. This system uses AT89C52 microcontroller and it uses a unique dispensing system which operates with prepaid card using RFID technology.

In [6], this paper 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 .In this 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 database, this will contain customer's id, account details and password. One more part which will be handled with the help of the database is the automatic payment reduction system.

In [7], this paper petrol pump is controlled automatically .it uses Arduino that 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.

In [8] it uses RFID technology for identifying individual user details in that card .The information present in a RFID based Petro Card is read by the RFID reader .This paper uses Biotelemetry system to authenticate the individual user with their Petro Card .The Biotelemetry here used as a fingerprint sensor .The Drunk and Drive Accidents are reduced by using the alcohol sensor in Petrol bunks .The alcohol sensor senses the alcohol concentration in the blood by breathing .It involves three steps ,The First step is to authenticate the licence holder by using biotelemetry identification.

In [9], the customers having the RFID card. The reader circuit generates majestic signal to read the majestic number. When customer shows this card on the reader and given the corresponding signal to microcontroller and 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 litres.

In [10] this system two units will be placed at petrol station which will take care of customer's needs & monitor the fuel level, temperature of fuel & any accidental situation that may happen at the petrol station. The third is the data base regarding customer's 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 keep record of all the things. Fingerprint scanner will scan the finger impression is connected to computer. The scanned thumb impression is compared with the database stored in PC. Cash deduction will be done and user will get details on his/her registered mobile number.

In [11], system is to avoid all corruptions and prevent more time consuming at fuel stations. This system consists of RFID READER at Filling Station and all the vehicles must be provided with RFID TAGS. When the RFID READER senses the RFID TAG that holds the customer id, it sends the id to the centralized server, verifies the ID and opens.

Design and implementation of load cell based fuel measurement measures the accurate level of fuel adding while fuel filling process. There is a large variety of methods for measuring fuel level, ranging from those using mechanical floats and capacitive and optical sensors to ultrasound methods .here we decided to use ultrasonic technique for petrol level measurement as it is an on–contact type measurement method.

In [12], it give some sense of the dynamics and control problems posed by fuel-filled space robotic system with a flexible manipulator. Based on Lagrange equation method, describing the elastic deflection by the assumed mode method and adopting equivalent mechanical model instead of liquid sloshing under the condition of low-gravity, the dynamics model of space robotic system is derived. The inverse dynamics control algorithm combined with PD control method was performed to solve the trajectory tracking problem.

In [13], the automatic fuelling system includes movable fuel dispenser having search head and extendible nozzle, robot including extendible positioning arm attached to dispenser for moving the dispenser, and fuelling-position-locating and robot-programming means suspended from roof for controlling the operation of robot. Positioning data for robot is provided by data spots inconspicuously attached inside the windshield of car. These spots are made of a light reflective material that reflects the light back toward its source. The number and pattern in which spots are arranged serve as the means of providing a data signal indicating where robot should move fuel dispenser for fuelling the car. In this system, it had unveiled a 75,000 euro (56,296 pounds) car-fuelling robot working by registering the car on arrival at the filling station and matching it to a database of fuel cap designs and fuel types, named Tank Pit stop. A robotic arm fitted with multiple sensors extended from a regular gas pump, carefully opened the car's filler door, unscrewed the cap, picked up

the fuel nozzle and directed it towards the tank container, much as a human arm can do but completed job more efficiently and safely.

In [14], when the key is inserted in the key hole the top slot sensor detects the key and triggers the microcontroller. A password will be entered as finger print. If the entered password is incorrect an alert message is sent to the police and the owner about the illegal access of his car. With the help of GPS the exact location of his car. The electronic fuel pump controller of the vehicle will be locked. So the fuel can't enter to the engine and the vehicle can't start and move.

In [15], the PIC microcontrollers place a major role. When the consumer shows the prepaid card on the RFID reader. The respective details are shown on the LCD display. In the prepaid card, if the balance is low, the alarm is actuated to denote the invalid card. If the card is valid, the microcontroller moves to the next operation. In this process we are using three relays r1, r2 and r3. For arm movement and fuel dispensing two motors are used. Relay r1 is used for downward movement of arm. Relay r2 is used for upward movement of arm. Relay r3 is used for fuel dispensing.

In [16], it is possible to operate all the time without help of manpower, In this project there will be a centralized server having the database of the customer like Customer Name,CardNo, After paying the cash the balance can be increased and depending upon the use of the card for purchase of petrol the balance will be deducted.

In [17], the proposed design consists of Keypad of switches to enter in petrol/diesel filling mode, to enter customer id and required petrol quantity. The customer purchase prepaid voucher card of different amounts. On petrol pump at key station he press a code '*' to enter in petrol/diesel entry mode and then enter his customer id. When the customer id matched it response with the balance available in that id and asks to enter required quantity in litres.

In [18], 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. It provides an authentication to the user & control the opening or closing of the tank valve according to the amount demanded. We will use GSM technology for this purpose. Automatic petrol pump provides the feature of instant recharge. The smartcard is added to an account which has a specific amount of money and it is necessary to have a smart card for this service. Only by the help of smartcard, a customer can access this service. It is a type of self-service system. After dispensing, an exact amount of balance is deducted from the smart card with a receipt date and time.

In [19], our project has some of the most countable features like: -Automatic: To automatic transmission petrol can be filled into the tank without human interface. Manual: Manual operation permits the user to make use of a prepaid card. To use smart prepaid card. RF transmitter and receiver are used to interface pump and bike module. First it will sense the petrol existed. Level of the petrol is displayed on LCD.

In [20], this paper deals with automation of fuel station retail outlet; this system will give the sales and stock report to the owner for every hour. With the help of a software technology we create the web application that make view of values of temperature, density, moisture and light level of lamp status and also download the report of sales. This thesis makes us to the fuel retail outlet owners to make a service easier and to take a look at current status of stock easily with in his place. This application the users agency owners check the past sales record, stock of the fuel and sales of that day.

In [21], the paper proposes an automated system for fuel pump which aims at safe and secure fuel delivery, ensuring that the customer gets the equivalent amount of fuel for what he or she has paid. It uses Raspberry Pi for this purpose. System will consist of three units, two of which will be placed at fuel station which will take care of customers' needs & also, will continuously monitor reset signal ensuring the end customer receives appropriate amount of fuel, and the other is the camera surveillance at the fuel station. The third unit is the database regarding back up of data on cloud storage.

In [22], the paper presents a fuel dispensing system based on RFID technology. The system can improve the fuelling process in order to make it much easier, secure and reliable. It uses ELA816B RFID 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. 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 RFID technology. The system uses a centralized database to allow fuel stations to share the same data about vehicles and related balance.

In [23], the system consists of a digital display for the exact volume of fuel inlet in the fuel tank.LCD16x2 is connected to Micro controller to display the level of fuel and gear. For sending a message of fuel thefting we have used GSM Modem. Buzzer is used for alert. Initially limit switch is used to turn ON ignition. After ignition LCD will display current value of fuel level and Gear level. By pressing start switch vehicle will start and it consume some amount of fuel present in the fuel tank.

III. SYSTEM OVERVIEW

The system contains two units:

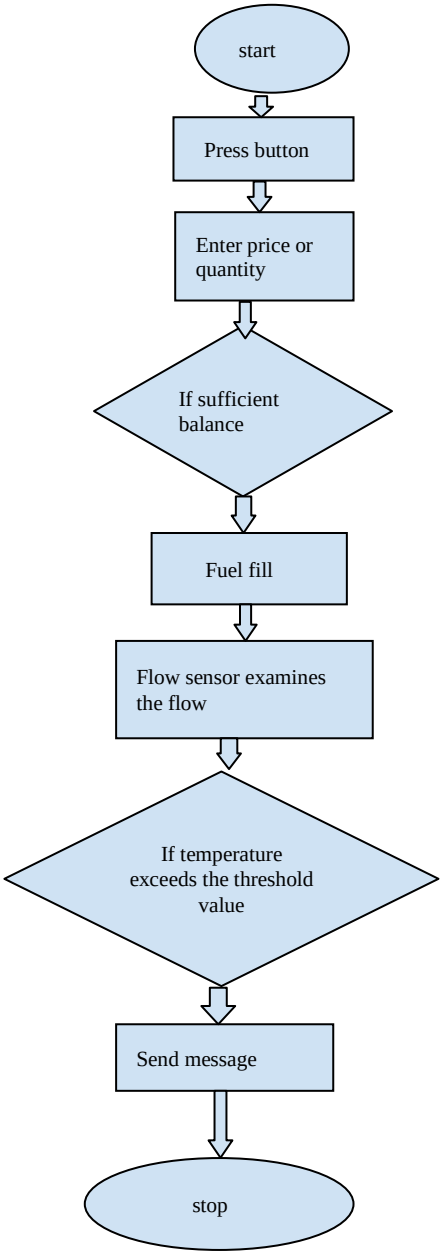
- Vehicle Unit
- Pump Unit

The whole system works with At mega 328.The vehicle unit consists of a button when we press the button there establish a connection between two units with the help of data modems at both units and the vehicle's account will be

IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 8, Issue 3, March 2019

verified. The updated price of the fuel will be displayed on the LCD screen provided in the pump. Customers can either enter the price of the fuel needed or quantity of the fuel in the LCD screen provided in the vehicle unit. If the value entered by the customer is the quantity of the fuel the machine will automatically convert the quantity to the corresponding price and it will check whether the account is having sufficient balance. If the account is having sufficient balance the amount corresponding to that fuel will be deducted and the process of pumping the fuel starts, otherwise the "LOW BALANCE" message will be displayed on the LCD screen. The vehicle part contains a flow sensor it will measure the rate of fuel flow through it. It consists of a plastic valve body, flow rotor and Hall Effect sensor. It used at the inlet end to detect the amount of flow. When fuel flows through the sensor, a magnetic rotor will rotate and the rate of rotation will vary with the rate of flow. The Hall Effect sensor will then output a pulse width signal and connect it to the microcontroller. Thus we can monitor the quantity of fuel pumped in your Vehicle. The temperature sensor in the pump unit will detect the variations in the temperature of the fuel. If the temperature exceeds the threshold value an emergency message will be sent to the authority through GSM to avoid hazardous situations.

Flow Chart



IJARCCE
ISSN (Online) 2278-1021
ISSN (Print) 2319-5940
International Journal of Advanced Research in Computer and Communication Engineering
Vol. 8, Issue 3, March 2019

Block Diagram

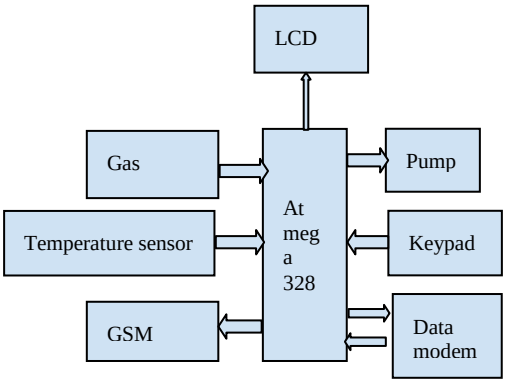


Fig 1.Pump unit of the system

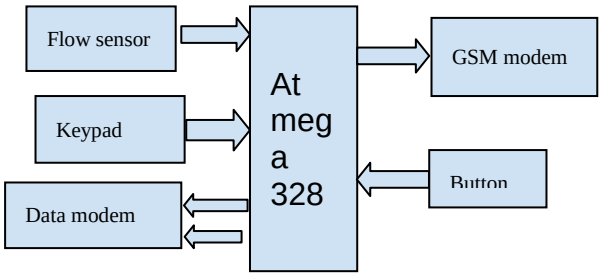
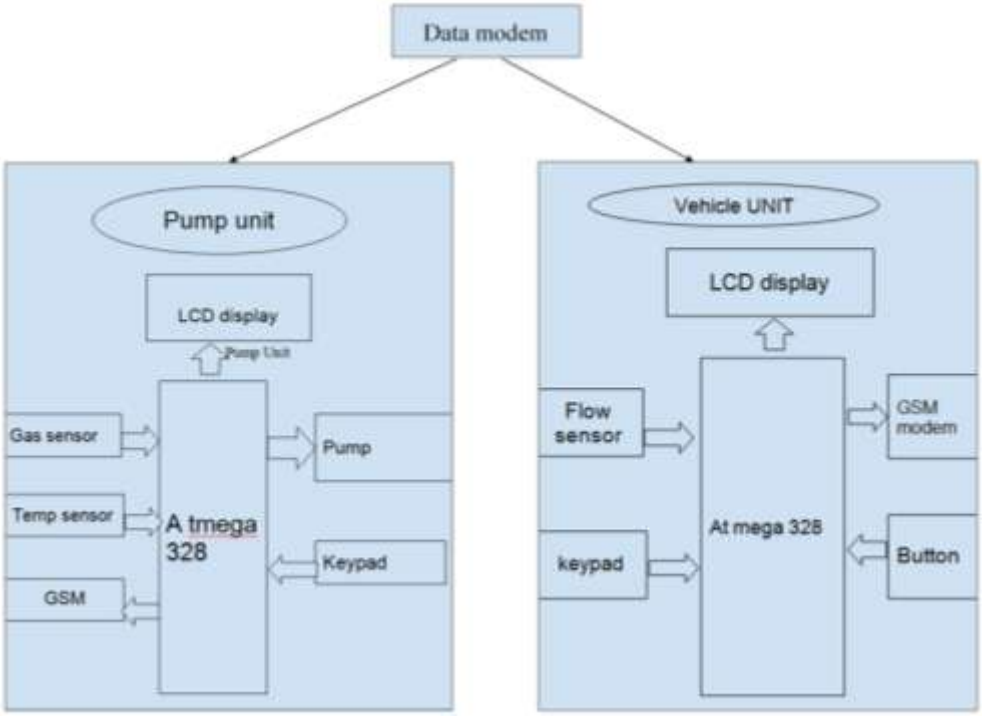


Fig 2.Vehicle unit of the system

IV. SYSTEM ARCHITECTURE



At mega 328(Arduino)

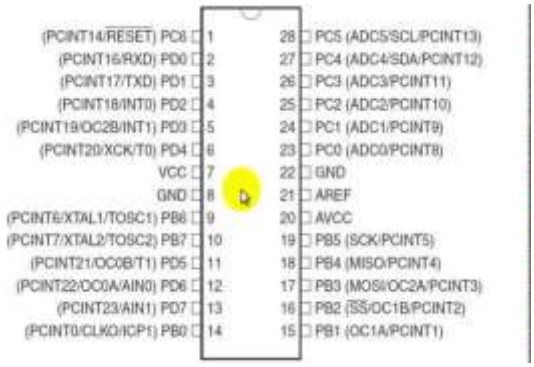


Fig. pinout diagram of At mega 328

The Arduino is a sophisticated computer that can be programmed to sense and control the physical world around us.it can be used as dedicated computer for system.it can take input from variety of sensors connected to its input pins. It can process information locally and can send data to another computer.

Temperature Sensor: Temperature sensor measures the temperature of the fuel. In this system the temperature sensor is installed at the pump unit. LM35 temperature sensor is used in our system When-ever the temperature exceeds the threshold value message will be send to the authority.
Flow sensor: Flow sensor will measure the rate of flow. Here we are using magnetic flow sensor to measure the rate of flow and confirm the fuel for our price vent to our tank
Gas sensor: Gas sensor will detect the leakage of gases.mq3 gas sensor is used at the pump unit. If any leakage occurs in the pump a message will be send to the authority through GSM.
Keypad: It is the device for display.4*4 keypad is used. +5 and +3 power supply is used. It works in 1/16 duty cycle.
Pump Motor: It is used for pumping the fuel. It has 12V motor and tough thermoplastic body. The total size is D27*75mm.
GSM modem: A GSM is a specialized type of modem operates over a subscription to the mobile operator just like a mobile phone. When-ever any leakage in the gas or increase in temperature alert message will send to the authority through this GSM modem.
Data Modem: Data modem is used for wireless data transmission. Here connection between pump unit and vehicle unit is established using data modem.

V. RESULT

Petrol pump with our technology can be possible to operate all the time without manpower. Our system provides a corruption free efficient fuel pumping system.

VI. CONCLUSION

Comparing to other technologies this is most relevant and useful in the current society. As the rate of fuel increasing day by day this project is very efficient and useful to current society. We are implementing a system to reduce corruption. In this we are dealing with a secure and fast transaction. The rate of fuel updated daily so they cannot be cheated. Users are able to know how much fuel is pumped. In case any chance of explosion, message are sent to authority. So this project is expected to be an efficient automatic fuel filling system.

REFERENCES

[1]. Behera Susanta K.Prof. Farida Asraf Ali "Automobile Fuel Pump Control System Using Embedded System", International Journal of Computer Technology & Electronic Engineering Volume 3 Issue 2, April 2013
[2]. Aniket H Jadhav, Ranjan S Pawar, Priyanka M Pathare, Kishori D Pawar, Prafulla Patil "Multi- Automized Fuel Pump With User Security", International Journal of Scientific & Technology Research Volume 3, issue 5, May 2014
[3]. Ali Newaz Bahar, Naazrul Islam, Shougat Hossain, Rahul Amin Sujon "A New Automation Approach for Fuel Station Management System" ,Nevsehir Bilim ve Teknology Dergisi Clit 2015.
[4]. Fawzi Al Naima and Mohammad M Hassan "Design and Implementation of RFID based fuel Dispensing system", International Journal of Computing & Network Technology, sept 2015
[5]. Kulkarni Amruta M. and Taware Sachin S. – Embedded security system using RFID and GSM module (International Journal of Computer Technology and Electronic Engineering)
[6]. Centralized automation of petrol bunk management and safety using RFID and GSM technology, SahanaS.Rao, V.Siddeshwara Prasad, Dept. of Electronics and Instrumentation, Siddaganga Institute of Technology, Tumakuru, June 2017
[7]. IoT based retail automation of fuel station and alert system Naveen Kumar,KumaresanP and BabuSundaresanY, School of Information Technology and Engineering, VIT University,2017.
[8]. Automation in Petrol Bunk using RFID and GSM, MsPriyanka, A.Gaikwad, MsShubhangi, S.Wanare, MsPallavi S.Sonone, MsPratibha K. Bahekar, Prof.I.Y.Sheikh,Dept. of Electronics and Telecommunication Engineering PankajLaddhad Institute of Technology& Management Studies, Buldana.
[9]. Automated Fuel Station, Prof.A.R.Kaushik, Kori Preeti OmprakashKedaremonika Gautam,OSR-JECE,2017.
[10]. Automatic Fuel Filling with toll plaza by Amit Kurup, Arjun Shukla, VivekUpadhyayaProf.ShwethaChawhan,BE EXTC Department, Issue7-ICEMTEMarch 2017
[11]. Wavekar Asrar A, Patel Tosif N, Pathan saddam I, Pawar H P, "RFID based Automated Petrol Pump" , IJSRD - International Journal for Scientific Research and Development, Vol. 4, Issue 01, 2016.
[12]. Maheshwari Vidhi Amarnath1, Nathwani Nikita Bipin2, Shah Neha Ajit3, Yedge Priyanka Babaso, "Resource Planning System for Petrol Station (Petro-Hash)", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 3, Issue 2, February 2014.
[13]. C. R. Dongarsane, Pooja Dalavi, Sunaina Golandag , Snehal Powar, "Self-Operated Petrol Pump", International Journal of Advance Research, Ideas and Innovations in Technology, Volume3, Issue2. 5.
[14]. Muhammd ali mazidi, Rolin D.Mckinlay, Danny Causey, "PIC Micro-controller and Embedded Systems", Pearson Education 2009. 6.
[15]. Mayur Gawade, Sandesh Gawde, Sonal Kanade "A Review Paper on Automated Fuel Pump Security System", International Journal on Recent and Innovation Trends in Computing and Communication, Volume: 3 Issue: 11. 7.
[16]. Aishwarya Jadhav, Lajari Patil, Leena Patil, A. D. Sonawane, "Smart Automatic Petrol Pump System", International Journal for Science Technology and Management, Vol.No.6, Issue No.04, April 2017.