

RFID BASED UNMANNED PETROL PUMP

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering degree in
Electronics and Communication Engineering

By

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of B.PRANITHA(38130029), R.Dharani(38130179) who carried out the project entitled "RFID BASED UNMANNED PETROL PUMP" under our supervision August,2021 to May,2022.

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ABSTRACT

As a component of this task, to be built a vehicle siphon framework for use in distant regions. With the assistance of a savvy siphon, individuals never again need to enter the body to disperse the oil. This siphon works with IOT, so the siphon proprietor can handle the station overall. In the event that the business needs to top off the bicycle, it first actually takes a look at the cost toward the station. Then at that point, need to pick the closest station, pay for the oil, and afterward go there to achieve this objective. The siphon control center will get a SMS to this oil siphon. From that point onward, the motor will turn over with flawless timing and the client will get the oil. With this smart petrol pumps there were no need to put physical person for distribution of petrol. This petrol pumps works with the IOT connectivity so that owner of Petrol pump will have overall control of this petrol station. When user needs fill the petrol in bike firstly, user checks for pricing online in that specific portal designed for this petrol station. Then user will select the nearby stations and pay for petrol amount after that user needs to go there for filling purpose. In the console of pump, user will received via SMS in this petrol pump console. After that pump motor starts for appropriate time and user will get the petrol.

A fuel dispensing system based on RFID technology. The system can improve the fueling process in order to make much easier, secure and reliable. This system 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 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.

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CHAPTER -1 INTRODUCTION

This chapter deals with history of fuels, oils, and CNG gas, petrol pumps.

Energy could be a very important issue within the present. At present, the machine is an element of parcel of the lifestyle. Moreover, most of the machines area unit counting on energy or fuel so as to control the fashionable life depends on energy and most of the energy is returning from rock oil or natural resources. Most of the countries within the world haven't offered rock oil or different natural resources.

These need some bit of gas mine that isn't adequate for an extended time most developing countries government imports an oversized quantity of rock oil in per annum and sells them at fewer costs than the international market the government of Bangladesh provides an oversized quantity of grant in rock oil sector per annum. the government of Bangladesh spends a serious share of its budget providing direct subsidies for fossil fuels and electricity, the prices of that have been escalating chop-chop in recent years. In 2012, the government reports it spent BDT eighty one.4 billion (US\$ 944 million) in direct expenditure on energy subsidies.

In 2014 the finance ministry has sanctioned BDT one,253 core in favor of the Bangladesh rock oil Corporation as grant payments for marketing rock oil product within the domestic market at costs under its prices. A well observance is important during this sector the concept is to develop such a system that may monitor each group action of each fuel station (e.g. fuel or CNG pump).

The central goal of this analysis is to change the fuel station in order that the transactions may be maintained just. Generally the fuel dispensaries calculate the quantity of fuel and the corresponding prices of a group action the info is collected of each group action from the fuel clinic by mistreatment laptop interfacing. One have developed a management system which might maintain the account of the fuel station and print a receipt mechanically when each group action. As a result, the workers of the fuel stations cannot hide any group action to the owner of the fuel station. This conjointly helps to scale back the time of the shoppers.

In this study implements a system that may monitor all the fuel stations transactions connected via web the government will monitor all the fuel stations transactions with efficiency the foremost serious issue during this gift reality is energy. Today, vehicles became piece of day-after-day existence. Moreover, most vehicles burn gas or fuel to run. Current life depends on energy, and a good deal of energy comes from oil or traditional assets. Most nations on the world do not have oil or different traditional assets.

It contain modest quantities of rock oil gas and area unit deficient for quite an whereas several rising nations import immense amounts of oil per annum and sell it at low prices on worldwide business sectors. The Bangladeshi government burns through giant chunk of modification on the oil space systematically. The Bangladeshi government burns through the overwhelming majority of its outlay arrange on direct appropriations for fuel and power, and prices have up forcefully as recently. In 2012, the general public authority unconcealed outlay \$ eighty one.4 billion (\$ 944 million) on direct energy sponsorships.

The thought is to foster a framework that may handle all fuel activities (for instance, oil or CNG). The principle motivation behind this study is to alter the activity of the station to proceed with its usually expected activity. For the foremost half, a gas center works out what proportion fuel and therefore the expenses connected with its activity information gathered on-line from all allowing exercises. A fuel the manager framework has been set bent keep a fuel record and print solicitations when each activity. Therefore, corner store laborers cannot conceal each one of their exercises from the station owner. This diminishes shopper time. This study executes a framework that may screen all oil things related to the web the general public authority will screen the exhibition, all things thought-about.

CHAPTER-2

LITERATURE SURVEY

This chapter deals with different survey paper's which is related to automated petrol pump.

Sylvanius F. Bowser (1885) proposed that drawn water from a well by using a wooden plunger S.F.Bowser 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. 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 these can pour directly into vehicle tank by using funnels. The funnels were design properly so that it should not damage the engine or vehicle. 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 user have to add some new features to 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.

Aniket H Jadhav, et.al.,(2014) says that the stations are right now utilized physically. Fuel siphons are tedious and work escalated. Introducing a service station in a far off region is extravagant, and to give clients the best gear, these issues should be addressed utilizing a driverless gas siphon, which invests in some opportunity to work and can be introduced anyplace only for purchasers. Get installment administrations

made through the waste framework. The simple and right utilization of microcontrollers and GSM innovation guarantees total security and atomization in fuel dispersion. It has a simple to-utilize portable working framework (GUI).

Mayur Gawade, et.al.,(2015) concluded that, the primary objective of the venture is to make a framework in view of RFID innovation to naturally extricate how much oil provided to the client's card. Water supply frameworks are normal in day-to-day routines in different places, for example, workplaces, transport stations, trains and siphons. Here user will show you an advanced method for providing fuel with a paid card utilizing RFID innovation. The venture intends to plan pre-loaded cards and oil move frameworks utilizing RFID innovation. Fuel is currently utilized manually. Oil siphoning is tedious and requires human exertion. Introducing gas in far off regions is over the top expensive to give the best gear to its clients. These issues are addressed by utilizing a driverless siphon that can be introduced and worked anyplace with brief period and activity.

Peter Adole, Joseph M. Mother, et.al.,(2018) According to them a ton of energy is squandered in light of the fact that individuals at school or in the workplace turn on the fans and the lights and leave them. In every one's venture, user are acquainting another way with save energy and give every understudy a grounds card, and each time authors enter the class, then read their number and the number increments, and afterward the last number abatements each time authors leaves school. As well as counting, a sensor has been introduced in the school to figure out where an individual is sitting. On the off chance that the estimation is advocated and will save energy by lighting the lights and fans face to face and afterward switching off the remainder of the gear.

Fawzi M. Al-Naima et.al.,(2015) contend that the significant changes that have occurred in the city are the motor that has made another picture and the working framework. Presently you can get exceptional data on your cell phone utilizing the most recent GSM innovation. This permits clients to more readily comprehend how much fuel user need to fill, and to dispense with age issues, frequently down to their own assumptions. More seasoned siphons have been supplanted by cutting edge EMP siphons to further develop eco-friendliness.

CHAPTER-3

EXISTING SYSTEM

This chapter deals with existing system of petrol pump, aim and scope of project, block diagram, software required.

In existing system almost all petrol pumps have a controlling unit to perform the tasks like managing the electrical pump, drive the display, measure the flow & accordingly turn OFF the electrical pump. But still a person is required to collect the money and there is a possibility of human error.

3.1. AIM

3.1.1. RFID BASED AUTOMATED PETROL PUMP:

The main aim of the project is to design a system which is capable of automatically deducting the amount of petrol dispensed from user card based on RFID technology. Liquid dispensing systems are quite commonly found in daily life in different places like offices, Bus stands, Railway stations, Petrol pumps. Here it's going to present modern era petrol dispensing system which is meant to be operated with prepaid card using RFID technology. The project mainly aims in designing a prepaid card for petrol bunk system and also petrol dispensing system using RFID technology. In current days the petrol stations are operated manually. These petrol pumps are time consuming and require more man power. To place petrol stations in distant area is very costly to provide excellent facility to the consumers. All these problems are sorted out by the use of unmanned power pump which requires less time to operate and it is effective and can be installed anywhere.

3.1.2. PETROL BUNK AUTOMATIONWITH PREPAID CARDS AND GSM COMMUNICATION:

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 g this area also now one can get updated details on the

mobile using the cutting edge GSM Technology. This makes the customers know the exact 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.

3.1.3. SELF OPERATED PETROL PUMP:

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 the distribution of fuel. It has easy operated mobile phone system and graphics user interface (GUI).

3.1.4. ADVANTAGES:

- Voids misconceptions and arguments.
- Easy access and save time in the petrol bunk.
- Ensures accuracy.
- It reduces the time as well as man power.
- GSM system used in this project provides quick data communication over long distance also.
- It requires very less power supply i.e., from 5Vs to 12V only which is easily available.

3.2. SCOPE OF THE PROJECT

- This project is going to built automated petrol pumps systems for remote areas. With this smart petrol pumps there were no need to put physical person for distribution of

petrol.

- This petrol pumps works with the IOT connectivity so that owner of Petrol pump will have overall control of this petrol station.
- When user needs fill the petrol in bike firstly, user checks for pricing online in that specific portal designed for this petrol station.
- Then user will select the nearby stations and pay for petrol amount after that he needs to go there for filling purpose.
- In the console of pump, user will receive via SMS in this petrol pump console.
- After that pump motor starts for appropriate time and user will get the petrol.

3.3. BLOCK DIAGRAM:

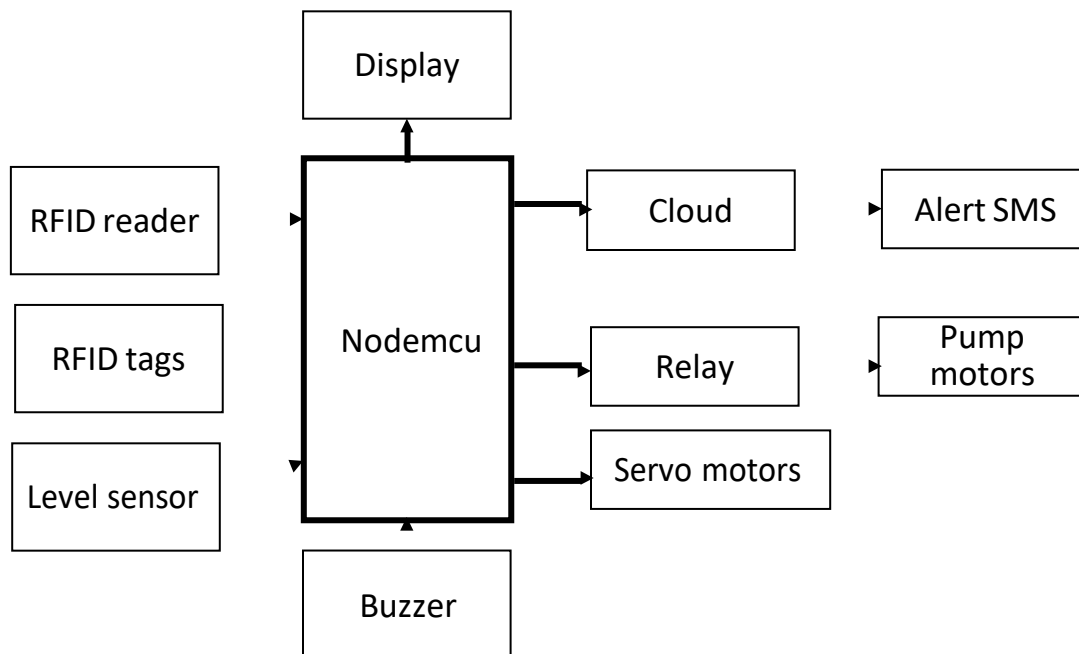


FIG.3.1: block diagram of RFID based unmanned petrol pump

3.4. SOFTWARE REQUIRED:

- Arduino IDE
- Embedded c
- Ubidots explorer application

3.4.1. ARDUINO:

Arduino is a tool for making computers that can sense and control more of the physical world than your desktop computer. It's an open-source physical computing platform based on a simple microcontroller board, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs.

Arduino projects can be stand-alone, or can be communicates with software running on your computer (e.g. Flash, Processing, Max MSP). The boards can be assembled by hand or purchased preassembled; the open-source IDE can be downloaded for free. The arduino programming language is an implementation of Wiring, a similar physical computing platform, which is based on the Processing multimedia programming environment. There are many other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, Net media's BX-24, Phi gets, MIT's Handy board, and many others offer similar functionality. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package.

Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems:

- Inexpensive - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than \$50
- Cross-platform - The Arduino software runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.
- Simple, clear programming environment - The Arduino programming environment is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with the look and feel of Arduino

- Open source and extensible software- The Arduino software and is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based.

3.4.2. EMBEDDED SYSTEMS

3.4.2.1 Overview of embedded systems:

An embedded system is a special-purpose computer system designed to perform one or a few dedicated functions, often with real-time computing constraints. It is usually embedded as part of a complete device including hardware and mechanical parts. In contrast, a general-purpose computer, such as a personal computer, can do many different tasks depending on programming. Embedded systems have become very important today as that control many of the common devices use.

Since the embedded system is dedicated to specific tasks, design engineers can optimize it, reducing the size and cost of the product, or increasing the reliability and performance. Some embedded systems are mass-produced, benefiting from economies of scale. Physically embedded systems range from portable devices such as digital watches and MP3 players, to large stationary installations like traffic lights, factory controllers, or the systems controlling nuclear power plants. Complexity varies from low, with a single microcontroller chip, to very high with multiple units, peripherals and networks mounted inside a large chassis or enclosure.

In general, embedded system is not an exactly defined term, as many systems have some element of programmability. For example, Handheld computers share some elements with embedded systems such as the operating systems and microprocessors which power them but are not truly embedded systems, because that allows different applications to be loaded and peripherals to be connected.

Embedded systems provide several functions

- Monitor the environment; embedded systems read data from input sensors. This data is then processed and the results displayed in some format to a user or users.
- Control the environment; embedded systems generate and transmit commands for actuators.
- Transform the information; embedded systems transform the data collected in some meaningful way, such as data compression/decompression.

Although interaction with the external world via sensors and actuators is an important aspect of embedded systems, these systems also provide functionality specific to their applications. Embedded systems typically execute applications such as control laws, finite state machines, and signal processing algorithms. These systems must also detect and react to faults in both the internal computing environment as well as the surrounding electromechanical systems. There are many categories of embedded systems, from communication devices to home appliances to control systems. Examples include:

- Communication devices--e.g.: modems, cellular phones
- Home Appliances-- e.g.: CD player, VCR, microwave oven
- Control Systems--e.g.: Automobile anti-lock braking systems, robotics, satellite control

3.4.2.2. Block diagram of an embedded systems:

An embedded system usually contains an embedded processor. Many appliances that have a digital interface microwaves, VCRs, cars utilize embedded systems. Some embedded systems include an operating system. Others are very specialized resulting in the entire logic being implemented as a single program. These systems are embedded into some device for some specific purpose other than to provide general purpose computing. A typical embedded system is shown in the Fig.3.2.

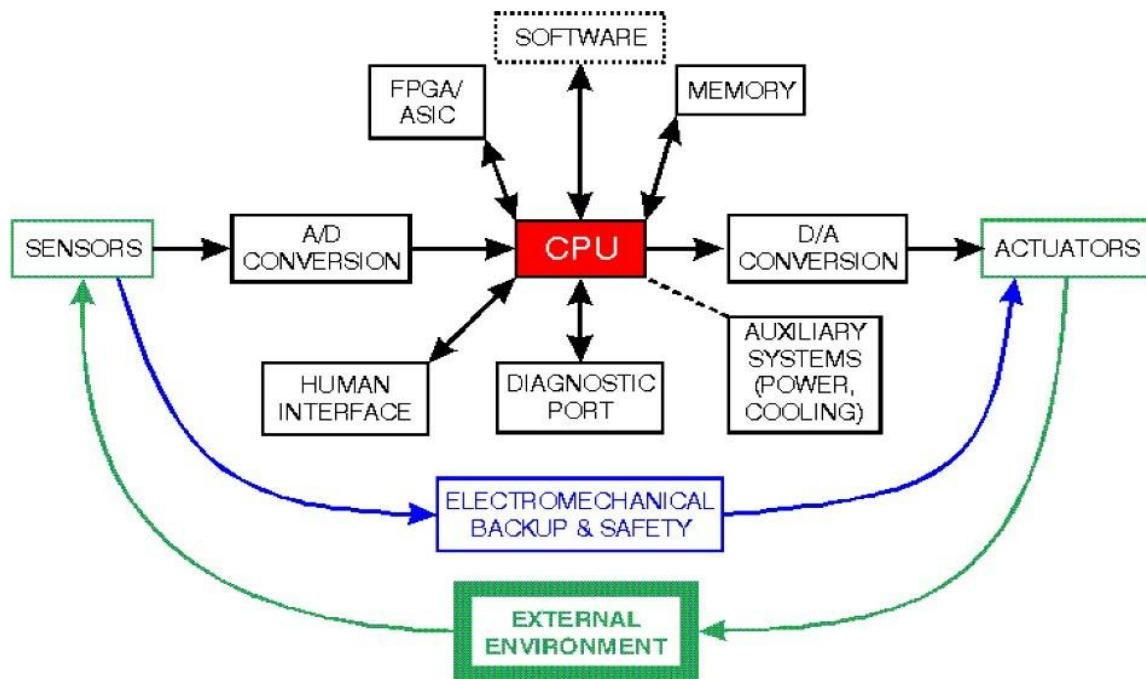


Fig .3.2: Block diagram of a typical embedded systems

3.4.2.3. Characteristics of embedded systems:

Embedded systems are characterized by a unique set of characteristics. Each of these characteristics imposed a specific set of design constraints on embedded systems designers. The challenge to designing embedded systems is to conform to the specific set of constraints for the application.

3.4.2.4. Applications of Specific Systems:

Embedded systems are not general-purpose computers. Embedded system designs are optimized for a specific application. Many of the job characteristics are known before the hardware is designed. This allows the designer to focus on the specific design constraints of a well-defined application. As such, there is limited user re-programmability. Some embedded systems, however, require the flexibility of re-programmability. Programmable DSPs are common for such applications.

3.5. REACTIVE SYSTEMS:

As mentioned earlier, a typical embedded systems model responds to the environment via sensors and control the environment using actuators. This requires embedded systems to run at the speed of the environment. This characteristic of embedded system is called “reactive”. Reactive computation means that the system (primarily the software component) executes in response to external events. External events can be either periodic or a-periodic. Periodic events make it easier to schedule processing to guarantee performance. A-periodic events are harder to schedule. The maximum event arrival rate must be estimated in order to accommodate worst case situations.

Most embedded systems have a significant reactive component. One of the biggest challenges for embedded system designers is performing an accurate worst case design analysis on systems with statistical performance characteristics (e.g., cache memory on a DSP or other embedded processor). Real time system operation means that the correctness of a computation depends, in part, on the time at which it is delivered. Systems with this requirement must often design to worst case performance. But accurately predicting the worst case may be difficult on complicated architectures. This often leads to overly pessimistic estimates erring on the side of caution. Many embedded systems have a significant requirement for real time operation in order to meet external I/O and control stability requirements. Many real-time systems are also reactive systems.

3.6. DISTRIBUTED SYSTEMS:

A common characteristic of an embedded system is one that consists of communicating processes executing on several CPUs or ASICs which are connected by communication links. The reason for this is economy. Economical 4 8-bit microcontrollers may be cheaper than a 32-bitprocessors. Even after adding the cost of the communication links, this approach may be preferable. In this approach, multiple processors are usually required to handle multiple time-critical tasks. Devices under control of embedded

systems may also be physically distributed.

3.7. HETEROGENEOUS ARCHITECTURE:

Embedded systems often are composed of heterogeneous architectures. This may contain different processors in the same system solution. This may also be mixed signal systems. The combination of I/O interfaces, local and remote memories, and sensors and actuators makes embedded system design truly unique. Embedded systems also have tight design constraints, and heterogeneity provides better design flexibility.

3.8. UBIDOTS CLOUD:

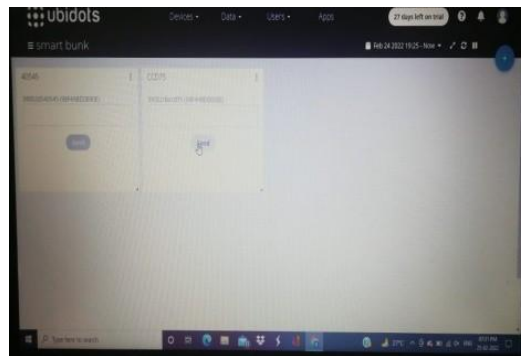


FIG.3.3: Ubidots cloud

Ubidots is an Internet of Things (IoT) Development Platform that empowers engineers and System Integrators to build IoT applications that turn sensor data into actionable insights. The technology stack puts together backend and frontend ingredients to accelerate IoT innovation. Equipped with device friendly APIs (accessed over HTTP, MQTT, TCP or UDP protocols), Ubidots provides a simple and secure connection for sending and retrieving data to and from cloud service in real-time Explorer. Ubidots gives decision makers the exact information needed for critical decisions in real-time, regardless of where the users are. Today, data at your fingertips is the norm and Ubidots agrees. Access your applications from any Android device and stay informed when on the go. Ubidots cloud in fig. 3.3.

CHAPTER-4

PROPOSED SYSTEM

This chapter deals with proposed system, hardware required and output connections.

In this proposed system, the consumer having the postpaid card with unique number. When the consumer show the card on the RFID reader, the reader read the corresponding number and give the corresponding signal to the microcontroller. In microcontroller already programmed.

So it checks the number whether it is correct or not and display the information like balance amount available on the card. The keypad is used to enter the quantity of petrol. In microcontroller which already set time for liters. When enter the desired quantity on the keypad, microcontroller activates the relay driver for particular time period.

It also checks whether the user has entered a valid data i.e., the amount should not exceed the balance available in the card. If the balance is not available the alarm is actuated. The driver circuit is used to turn ON, turn OFF the relays. Relay output is directly connected to petrol pump. A movable arm is attached to the petrol tank. The arm carry's the fuel pump. At the end of the fuel pump has gasoline sensor.

When it senses the smell of the fuel it activates the relay and automatically fuel will dispense into the vehicle. Once this is done, the information such as available balance, date, time, quantity of purchase is sent to the user`s mobile using the GSM technology.

4.1. HARDWARE REQUIRED:

- RFID card and EM-18 RFID reader.
- Piezo buzzer.
- Liquid crystal display (LCD).
- Fuel dispensing system (consists of SPDT relay switch and pump motor).

- Servo motors
- Level sensor (i.e., FC-28 soil moisture sensor).
- Node MCU ESP8266 Wi-Fi module

4.2. POWER SUPPLY:

All electronic circuits work only in low DC voltage, so user needs a power supply unit to provide the appropriate voltage supply for their proper functioning. This unit consists of transformer, rectifier, filter & regulator. AC voltage of typically 230volts rms is connected to a transformer. The transformer voltage drops to the level of the desired AC voltage. A diode rectifier that provides the full wave rectified voltage that is initially filtered by a simple capacitor filter to produce a DC voltage. This resulting DC voltage usually has some ripple or AC voltage variation. A regulator circuit can use this DC input to provide DC voltage that not only has much less ripple voltage but also remains the same DC value even the DC voltage varies or the load connected to the output DC voltage changes.

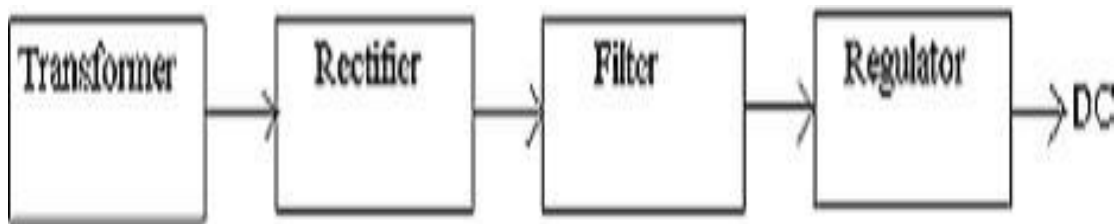


Fig .4.1: General Block diagram of Power Supply Unit

4.2.1. TRANSFORMER:

A transformer is a static piece of which electric power in one circuit is transformed into electric power of same frequency in another circuit. It can raise or lower the voltage in the circuit, but with a corresponding decrease or increase in current. It works with the principle of mutual induction. In this project user is using a step down transformer to providing a necessary supply for the electronic circuits as shown in the fig 4.1. Here user uses step down a 230volts ac into 12volts ac.

4.2.2. RECTIFIER:

A dc level obtained from a sinusoidal input can be improved 100% using a process called full wave rectification. Here in this project for full wave rectification so used bridge rectifier. From the basic bridge configuration that two diodes (say D2 & D3) are conducting while the other two diodes (D1 & D4) are in off state during the period $t = 0$ to $T/2$. Accordingly for the negative cycle of the input the conducting diodes are D1 & D4. Thus the polarity across the load is the same. In the bridge rectifier the diodes may be of variable types like 1N4001, 1N4003, 1N4004, 1N4005, 1N4007 etc... can be used. But here user use 1N4007, because it can withstand up to 1000v is shown in the fig.4.1.

4.2.3. FILTERS:

In order to obtain a dc voltage of 0 Hz, then have to use a low pass filter. So that a capacitive filter circuit is used where a capacitor is connected at the rectifier output & a dc is obtained across it. The filtered waveform is essentially a dc voltage with negligible ripples & it is ultimately fed to the load in fig.4.1.

4.2.4. REGULATORS:

The output voltage from the capacitor is more filtered & finally regulated. The voltage regulator is a device, which maintains the output voltage constant irrespective of the change in supply variations, load variations & temperature changes. Fixed voltage regulator namely LM7805. The IC LM7805 is a +5v regulator which is used for microcontroller in the fig. 4.1.

4.2.4.1. FEATURES AND DESCRIPTION OF REGULATORS:

- Output Current up to 1A
- Output Voltages of 5, 6, 8, 9, 10, 12, 15, 18, 24V
- Thermal Overload Protection
- Short Circuit Protection

- Output Transistor Safe Operating Area Protection

4.3. Node MCU:

Node MCU is an open source IOT platform. It includes firmware which runs on the ESP8266 Wi-Fi SOC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the LUA scripting language. It is based on the ELUA project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjson and SPIFFS.

4.3.1. INTRODUCTION OF NODEMCU:

Node MCU is an open source LUA based firmware developed for ESP8266 WI-FI chip. By exploring functionality with ESP8266 chip, Node MCU firmware comes with ESP8266 Development board/kit i.e. fig.4.2. Node MCU Development board. Since Node MCU is open source platform, their hardware design is open for edit/modify/build.



FIG .4.2: Node MCU Development Board/kit v0.9 (Version1)

Node MCU Dev Kit/board consist of ESP8266 WI-FI enabled chip. The ESP8266 is a low-cost Wi-Fi chip developed by Espress if Systems with TCP/IP protocol. For more information about ESP8266, you can refer ESP8266 Wi-Fi Module.

There is Version2 (V2) available for Node MCU Dev Kit i.e.fig.4.3 Node MCU Development Board v1.0 (Version2), which usually comes in black coloured PCB. For more information about Node MCU Boards available in market refer Node MCU Development Boards. Node MCU Dev Kit has Arduino like analog (i.e. A0) and Digital (D0-D8) pins on its board. It supports serial communication protocols i.e. UART, SPI, I2C etc.

Using such serial protocols can connect it with serial devices like I2C enabled LCD display, Magnetometer HMC5883, MPU-6050 Gyro meter + Accelerometer, RTC chips, GPS modules, touch screen displays, SD cards etc. Node MCU Development board is featured with Wi-Fi capability, analog pin, digital pins and serial communication protocols.



FIG. 4.3: Node MCU Development Board/kit v1.0 (Version2)

To get start with using Node MCU for IOT applications first need to know about how to write/download Node MCU firmware in Node MCU Development Boards. And before that where this Node MCU firmware will get as per user requirement.

There is online Node MCU custom builds available using which can easily get custom Node MCU firmware as per user requirement. To know more about how to build custom Node MCU firmware online and download it refer Getting started with Node MCU. After setting up ESP8266 with Node-MCU firmware, let's see the IDE (Integrated Development Environment) required for development of Node MCU.

4.3.2. NODE MCU WITH ESPIORER IDE:

LUA scripts are generally used to code the Node MCU. LUA is an open source, lightweight, embeddable scripting language built on top of C programming language. For more information about how to write LUA script for Node MCU refer gets started with Node MCU using ESPlorer IDE.

4.3.3. NODEMCU WITH ARDUINO IDE:

Here is another way of developing Node MCU with a well-known IDE i.e. Arduino IDE. This can also develop applications on NodeMCU using Arduino development environment. This makes easy for Arduino developers than learning new language and IDE for Node MCU. For more information about how to write Arduino sketch for Node MCU refer gets started with Node MCU using Arduino IDE.

4.3.4. DIFFERENCES IN USING ESPIORER AND ARDUINO IDE:

Well, there is a programming language difference can say while developing application for Node MCU using ESPlorer IDE and Arduino IDE. User need to code in C\C++ programming language if user is using Arduino IDE for developing Node MCU applications and LUA language if user is using ESPlorer IDE.

Basically, Node MCU is LUA Interpreter, so it can understand LUA script easily. When write LUA scripts for Node MCU and send/upload it to Node MCU, this will get executes sequentially. It will not build binary firmware file of code for Node MCU to write. It will send LUA scripts to NodeMCU to get execute.

In Arduino IDE when write and compile code, ESP8266 tool chain in background creates binary firmware file of code written. And when upload it to Node MCU then it will flash all Node MCU firmware with newly generated binary firmware code. In fact, it writes the complete firmware.

That's the reason why Node MCU not accept further LUA scripts/code after it is getting flashed by Arduino IDE. After getting flashed by Arduino sketch/code it will be no more

LUA interpreter and got error if user try's to upload LUA scripts. To again start with LUA script, then need to flash it with Node MCU firmware. Since Arduino IDE compiles and upload/writes complete firmware, it takes more time than ESPlorer IDE.

4.4. IOT:

IOT has various developments to address the issues of various enterprises, organizations and social orders the overall development of IOT, which comprises of five parts, which are examined in the accompanying areas.

4.4.1 BACKGROUND:

The Future Internet goal is to provide an infrastructure to have an immediate access to information about the physical world and its objects. Physical objects can be applicable to different application domains, such as e-health, warehouse management, etc. Each application domain may have different types of physical devices. Each physical device can have its own specifications, which is required to use in order to interact with it. To achieve the future Internet goal, a layered vision is required that can facilitate data access. Internet of Things (IOT) is a vision that aims to integrate the virtual world of information to the real world of devices through a layered architecture.

The term “Internet of Things” consists of two words, namely Internet and Things. Internet refers to the global network infrastructure with scalable, configurable capabilities based on interoperable and standard communication protocols. Things are physical objects or devices, or virtual objects, devices or information, which have identities, physical attributes and virtual personalities, and use intelligent interfaces. For instance, a virtual object can represent an abstract unit of sensor nodes that contains metadata to identify and discover its corresponding sensor nodes. Therefore, IOT refers to the things that can provide information from the physical environment through the Internet.

Middleware is as an interface between the hardware layer and the application layer, which is responsible for interacting with devices and information management. The role of a middleware is to present a unified programming model to interact with devices. A middleware is in charge of masking the heterogeneity and distribution problems that user face when interacting with devices.

4.4.2. Access Gateway layer:

It is a gadget that comprises of an implicit framework, a RFID tag, a sensor organization and all the other things that shows various arrangements. This gadget can perform many errands, including information assortment, information handling, and backing for correspondence from the framework or the climate.

4.4.3. Middleware layer:

This page manages data handling and is liable for distributing and buying into the administrations given by Goods, the most common way of sending messages, and settling cross-line interchanges.

4.4.4. Application layer:

This page has significant undertakings, for example, gathering information got from equipment, separating, looking for data, and checking how to utilize the hardware.

This level is liable for giving an assortment of client administrations. These administrations are presented on various applications by clients of the IOT framework through the focal application. Buyer administrations can be utilized in an assortment of ways as shown in the fig.4.4.

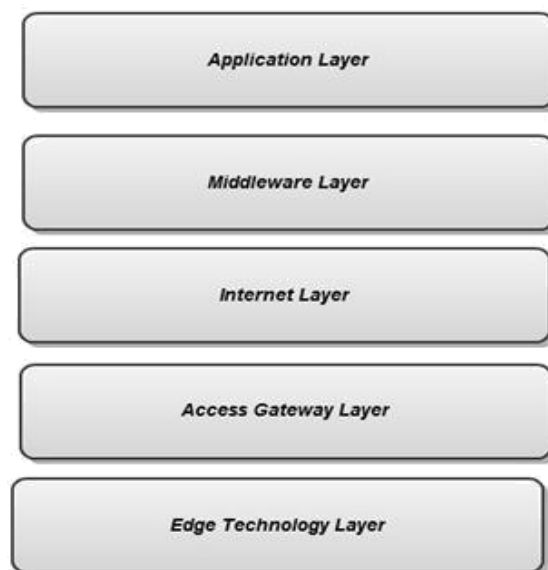


Fig.4.4: Structure of the Internet of Things (IOT) information base.

4.4.5. Challenges:

IOT-based systems can be used for different purposes and areas, so that, to face different challenges. In this section, explained some of the challenges that need to be considered in research activities:

(a) Edge technology:

At the hardware level, more research efforts are required to develop the technology of embedded devices, sensors, actuators and (passive and active) identification, since an IOT-based system must be able to gather sufficient information about the real world by employing a large variety of devices and environments. Thus, there more work is still required to connect heterogeneous devices and deploy them in IOT applications, and to provide support for new devices.

(b) Networking technologies:

In IOT, things are connected through different kinds of networks, i.e. mobile, wired and wireless network. These networks support bi-directional communication at different levels among the real world objects, applications and services that are employed by the IOT applications. This highly distributed structure should provide interconnection with low energy consumption, while distributed data can cause privacy issues.

(c) Middleware system:

In IOT, heterogeneous devices and networks. This heterogeneity can potentially increase with new technologies. To facilitate the use of these devices by IOT applications, user should shield their heterogeneity. Therefore, users need to develop a secure, scalable and semantically enriched service-oriented middleware to cope with the heterogeneity of devices.

(d) Platform services:

This supports a superior management of all involved devices in an integrated way, ensuring scalability, high availability, and the safe and secure execution of the requested functionality from devices.

In continue, one should focus on the middleware challenges, because user looking for the functionalities that a middleware can provide for the application layer in the IOT-based systems in fig.4.5.

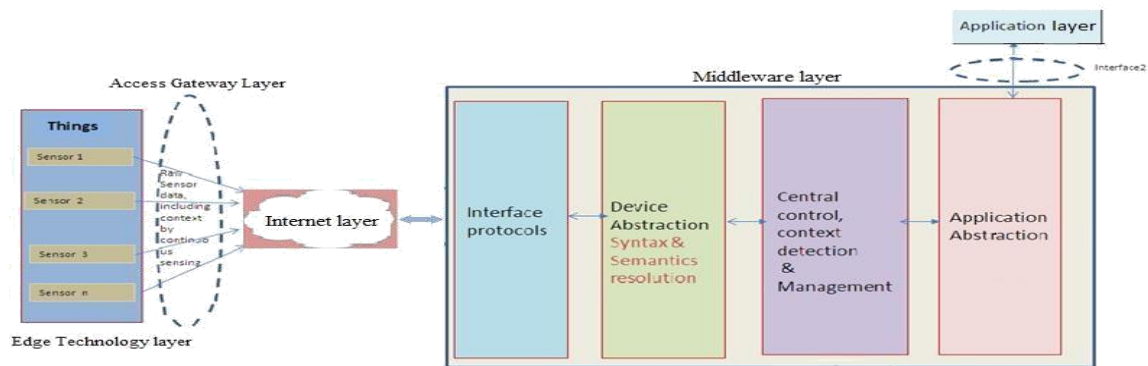


FIG.4.5: Functional components of a middleware for IOT-based systems

4.5. FLAME SENSORS:

A flame detector is a sensor designed to detect and respond to the presence of a flame or fire, allowing flame detection. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system. When used in applications such as industrial furnaces, their role is to provide confirmation that the furnace is working properly; in these cases that take no direct action beyond notifying the operator or control system. A flame detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the flame.

Specifications:

- Operating Voltage: 3.3V to 5V DC
- Operating Current: 15ma
- Output Digital - 0V to 5V, Adjustable trigger level from preset

- Output Analog - 0V to 5V based on infrared radiation from fire flame falling on the sensor
- LEDs indicating output and power
- PCB Size: 3.2cm x 1.4cm
- LM393 based design

4.6. LCD:

A liquid crystal display or LCD draws its definition from its name itself. It is combination of two states of matter, the solid and the liquid. LCD uses a liquid crystal to produce a visible image. Liquid crystal displays are super-thin technology display screen that are generally used in laptop computer screen, TVs, cell phones and portable video games. LCD's technologies allow displays to be much thinner when compared to cathode ray tube (CRT) technology is shown in the fig.4.6.

Liquid crystal display is composed of several layers which include two polarized panel filters and electrodes. LCD technology is used for displaying the image in notebook or some other electronic devices like mini computers. Light is projected from a lens on a layer of liquid crystal. This combination of coloured light with the gray scale image of the crystal (formed as electric current flows through the crystal) forms the coloured image. This image is then displayed on the screen.

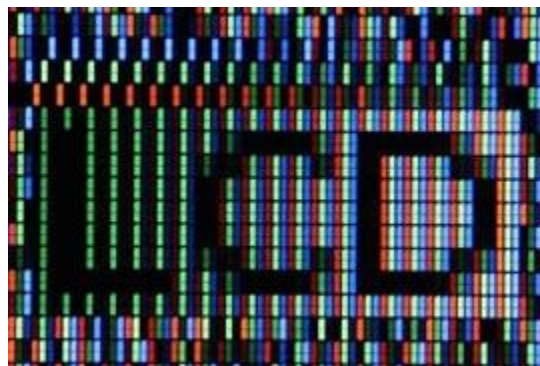


FIG.4.6: An LCD

An LCD is either made up of an active matrix display grid or a passive display grid. Most of the Smartphone's with LCD display technology uses active matrix display, but some of the older displays still make use of the passive display grid designs. Most of the electronic devices mainly depend on liquid crystal display technology for their display. The liquid has a unique advantage of having low power consumption than the LED or cathode ray tube. Liquid crystal display screen works on the principle of blocking light rather than emitting light. LCD's requires backlight as this do not emits light by them. Always use devices which are made up of LCD's displays which are replacing the use of cathode ray tube. Cathode ray tube draws more power compared to LCD's and are also heavier and bigger.

4.6.1. CONSTRUCTION OF LCD:

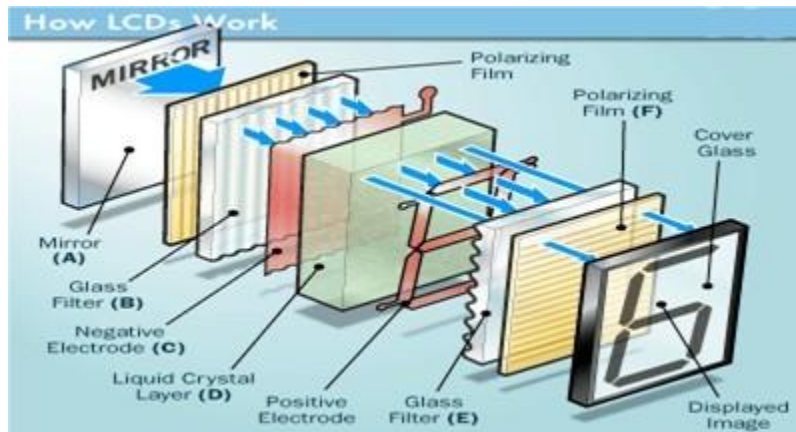


FIG.4.7: LCD Layered Diagram

Simple facts that should be considered while making an LCD:

1. The basic structure of LCD should be controlled by changing the applied current.
2. Must use a polarized light.
3. Liquid crystal should be able to control both of the operation to transmit or can also be able to change the polarized light.

As mentioned above that needs to take two polarized glass pieces filter in the making of the liquid crystal. The glass which does not have a polarized film on the surface of it must be rubbed with a special polymer which will create microscopic grooves on the

surface of the polarized glass filter. The grooves must be in the same direction of the polarized film. Now one has to add a coating of pneumatic liquid phase crystal on one of the polarized filter of the polarized glass. The microscopic channel cause the first layer molecule to align with filter orientation. When the right angle appears at the first layer piece, one should add a second piece of glass with the polarized film. The first filter will be naturally polarized as the light strikes it at the starting stage in fig.4.7.

Thus the light travels through each layer and guided on the next with the help of molecule. The molecule tends to change its plane of vibration of the light in order to match their angle. When the light reaches to the far end of the liquid crystal substance, it vibrates at the same angle as that of the final layer of the molecule vibrates. The light is allowed to enter into the device only if the second layer of the polarized glass matches with the final layer of the molecule.

4.6.2. WORKING OF LCD:

The principle behind the LCD's is that when an electrical current is applied to the liquid crystal molecule, the molecule tends to untwist. This causes the angle of light which is passing through the molecule of the polarized glass and also cause a change in the angle of the top polarizing filter. As a result a little light is allowed to pass the polarized glass through a particular area of the LCD. Thus that particular area will become dark compared to other. The LCD works on the principle of blocking light. While constructing the LCD's, a reflected mirror is arranged at the back. An electrode plane is made of indium-tin oxide which is kept on top and a polarized glass with a polarizing film is also added on the bottom of the device. The complete region of the LCD has to be enclosed by a common electrode and above it should be the liquid crystal matter.

Next comes to the second piece of glass with an electrode in the form of the rectangle on the bottom and, on top, another polarizing film. It must be considered that both the pieces are kept at right angles. When there is no current, the light passes through the front of the LCD it will be reflected by the mirror and bounced back. As the electrode is connected to a battery the current from it will cause the liquid crystals between the common-plane electrode and the electrode shaped like a rectangle to untwist. Thus the light is blocked from passing through. That particular rectangular area appears blank.

4.6.3. Advantages of an LCD's:

- LCD's consumes less amount of power compared to CRT and LED
- LCD's are consist of some microwatts for display in comparison to some mill watts for LED's
- LCDs are of low cost
- Provides excellent contrast
- LCD's are thinner and lighter when compared to cathode ray tube and LED

4.6.4. Disadvantages of an LCD's:

- Require additional light sources
- Range of temperature is limited for operation
- Low reliability
- Speed is very low
- LCD's need an AC drive

4.6.5. Applications of Liquid Crystal Display:

Liquid crystal technology has major applications in the field of science and engineering as well on electronic devices.

- Liquid crystal thermometer
- Optical imaging
- The liquid crystal display technique is also applicable in visualization of the radio frequency waves in the waveguide and Used in the medical applications.

4.7. RFID:

Radio frequency identification (RFID) is a form of wireless communication that uses radio waves to identify and track objects is shown in fig.4.8. RFID takes the bar-coding concept and digitizes it for the modern world providing the ability to:

- Uniquely identify an individual item beyond just its product type

- Identify items without direct line-of-sight
- Identify many items (up to 1,000s) simultaneously
- Identify items within a vicinity of between a few cms to several meters

An RFID system has readers and tags that communicate with each other by radio. RFID tags are so small and require so little power that doesn't even need a battery to store information and exchange data with readers. This makes it easy and cheap to apply tags to all kinds of things that people would like to identify or track.



FIG. 4.8: RFID SYSTEM

4.7.1 Essential RFID arrangements include:

1. Labels

- Search for a chip or a typical organization (IC).
- Radio wire images

2. Peruser

- Peruser radio wire
- Peruser the executives and the product utilized

In the essential RFID framework, the logo is related with all that should be observed. Marks are made of a little chip associated with the radio wire, now and again called a round plan (IC), and can be introduced for an assortment of purposes, including

hanging names, names, and defenders describe various resources. The chip contains a store of electronic products (EPC) and other data that can be changed, which RFID perusers can peruse and control anyplace.

A RFID peruser is a gadget associated with an organization (fixed or convenient gadget) that communicates power, data, and guidelines to a location utilizing a wire. The RFID peruser goes about as a passageway to the RFID tag, making the data accessible for business use.

4.7.2. RFID Applications:



FIG.4.9: RFID applications

RFID can help:

- Automate inventory and asset-tracking in healthcare, manufacturing, retail, and business sectors.
- Identify the source of products, enabling intelligent recall of defective or dangerous items, such as tainted foods, defective toys, and expired or compromised medication.
- Prevent use of counterfeit products in the supply chain.
- Improve shopping experience for consumers, with fewer out-of-stock items and easier returns.
- Provide visibility into the supply chain, yielding a more efficient distribution channel and reduced business costs.
- Decrease business revenue lost to theft or inaccurate accounting of goods.
- Improve civilian security through better cargo monitoring at ports.
- Wirelessly lock, unlock and configure electronic devices.
- Enable access control of certain areas or devices.

Whatever the application, RFID has the potential to increase efficiency of operations, improves asset visibility and traceability, decrease reliance on manual processes, reduce operations costs, and provide useful data for business analytics as shown in the fig.4.9.

Tag

- Tag chips or integrated circuits (ICs)
- Tag antennas

Reader

- Reader antenna
- Reader control & application software

In a basic RFID system, tags are attached to all items that are to be tracked. These tags are made from a tiny tag-chip, sometimes called an integrated circuit (IC), that's connected to an antenna that can be built into many different kinds of tags including apparel hang tags, labels, and security tags, as well as a wide variety of industrial asset tags. The tag chip contains memory which stores the product's electronic product code (EPC) and other variable information so that it can be read and tracked by RFID readers anywhere. An RFID reader is a network connected device (fixed or mobile) with an antenna that sends power as well as data and commands to the tags. The RFID reader acts like an access point for RFID tagged items so that the tags' data can be made available to business applications.

4.8. RFID Tags:



FIG.4.10: Different types of RFID tags

An RFID tag is comprised of an integrated circuit (called an IC or chip) attached to an antenna that has been printed, etched, stamped or vapour-deposited onto a mount which is often a paper substrate or Poly-Ethylene Therephtalate (PET). The chip and antenna combo, called an inlay, is then converted or sandwiched between a printed label and its adhesive backing or inserted into a more durable structure in fig.4.10.

4.9. RFID Readers:



FIG.4.11: Different types of RFID readers

An RFID reader, also known as an interrogator, is a device that provides the connection between the tag data and the enterprise system software that needs the information. The reader communicates with tags that are within its field of operation, performing any number of tasks including simple continuous inventorying, filtering (searching for tags that meet certain criteria), writing (or encoding) to selected tags as shown in fig. 4.11.

The reader uses an attached antenna to capture data from tags. It then passes the data to a computer for processing. Just like RFID tags, there are many different sizes and types of RFID readers. Readers can be affixed in a stationary position in a store or factory, or integrated into a mobile device such as a portable, handheld scanner. Readers can also be embedded in electronic equipment or devices, and in vehicles.

4.10. RELAY:

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and these are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can

use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical is shown in the fig.4.12. The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.



FIG.4.12: Relay

Relays are usually SPDT or DPDT but this can have many more sets of switch contacts, for example relays with 4 sets of changeover contacts are readily available. Most relays are designed for PCB mounting but you can solder wires directly to the pins providing you take care to avoid melting the plastic case of the relay. The animated picture shows a working relay with its coil and switch contacts. You can see a lever on the left being attracted by magnetism when the coil is switched on. This lever moves the switch contacts. There is one set of contacts (SPDT) in the foreground and another behind them, making the relay DPDT.

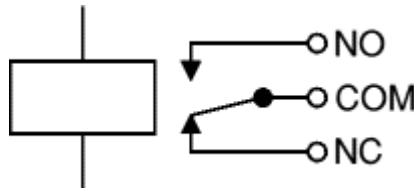


FIG.4.13: Relay-switch

The relay's switch in fig.4.13 connections are usually labeled COM, NC and NO:

- **COM** = Common, always connect to this it is the moving part of the switch.
- **NC** = Normally Closed, COM is connected to this when the relay coil is **off**.
- **NO** = Normally Open, COM is connected to this when the relay coil is **on**.

4.11. SERVO MOTORS:

A servomechanism, or servo, is an automatic device that uses error-sensing negative feedback to correct the performance of a mechanism. The term correctly applies only to systems where the feedback or error-correction signals help control mechanical position or other parameters. For example, the car's cruise control uses closed loop feedback, which classifies it as a servomechanism.

4.12. RC SERVOS:

Rc servos are hobbyist remote control devices servos typically employed in radio-controlled models, where this are used to provide actuation for various mechanical systems. Due to their affordability, reliability, and simplicity of control by microprocessors, RC servos are often used in small-scale robotics applications.

RC servos are composed of an electric motor mechanically linked to a potentiometer. A standard RC receiver sends Pulse-width modulation (PWM) signals to the servo. The electronics inside the servo translate the width of the pulse into a position. When the servo is commanded to rotate, the motor is powered until the potentiometer reaches the value corresponding to the commanded position.

RC servos use a three-pin 0.1" spacing jack (female) which mates to standard 0.025" square pins (which should be gold-plated, incidentally). The most common order is Signal, +voltage, ground. The standard voltage is 6VDC, however 4.8V and 12V has also been seen for a few servos. The control signal is a digital PWM signal with a 50Hz frame rate. Within each 20ms timeframe, an active-high digital pulse controls the position. The pulse nominally ranges from 1.0ms to 2.0ms with 1.5ms always being center of range. Pulse widths outside this range can be used for "over travel" -moving the servo beyond its normal range. This PWM signal is sometimes (incorrectly) called Pulse Position Modulation (PPM).

The servo is controlled by three wires: ground, power, and control. The servo will move based on the pulses sent over the control wire, which set the angle of the actuator arm. The servo expects a pulse every 20 ms in order to gain correct information about the angle. The width of the servo pulse dictates the range of the servo's angular motion. A servo pulse of 1.5 ms width will typically set the servo to its "neutral" position or 45°, a pulse of 1.25 ms could set it to 0° and a pulse of 1.75 ms to 90°. The physical limits and timings of the servo hardware varies between brands and models, but a general servo's angular motion will travel somewhere in the range of 90° - 120° and the neutral position is almost always at 1.5 ms. This is the "standard pulse servo mode" used by all hobby analog servos is shown in fig.4.14.

RC servos are usually powered by the receiver which in turn is powered by battery packs or an Electronic speed controller (ESC) with an integrated or a separate Battery eliminator circuit (BEC). Common battery packs are either Ni-Cd, NiMH or lithium-ion polymer battery (Li-Po) type. Voltage ratings vary, but most receivers are operated at 5 V or 6 V.

1. Electric motor position feedback
2. Potentiometer
3. Reduction gear
4. Actuator arm

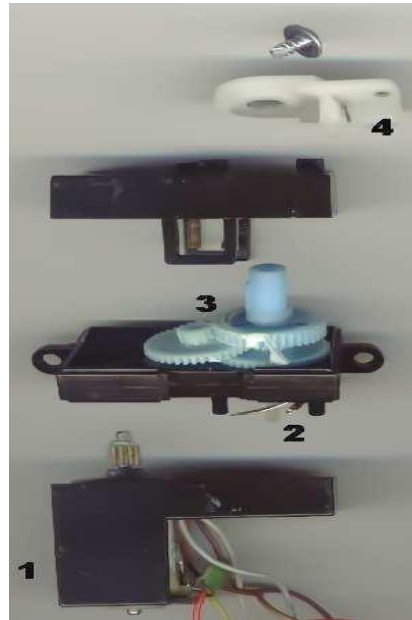


FIG.4.14: Small R/C servo mechanism

CHAPTER-5

RESULTS AND DISCUSSIONS

This chapter deals with discussions how the project is done, output connections and the results of the project.

5.1. RESULTS:

First of all the petrol pump with our technology can be 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, Card No, 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. When RFID card or tag comes in the range of RFID reader, the RFID reader reads the ID number of the RFID card and sends to the Arduino Mega 2560 microcontroller. Where we are already stored the ID numbers of the RFID cards in the microcontroller. The microcontroller verifies whether this RFID card is authorized or not. If RFID card is authorized than microcontroller displays RFID card is authorized on the LCD screen, otherwise it displays RFID card is unauthorized and initiates the buzzer. If RFID card is authorized than microcontroller gives the access to the customer to enter the amount of the petrol using keypad and it is displayed on the LCD screen. Then microcontroller checks whether the available balance of the RFID card is more than the entered amount.

If it is more than microcontroller turns ON the pump motor through relay switch for a particular time period and then pump motor automatically turns OFF. After completion of petrol filling process, the information of the petrol dispensed amount and remaining balance of the RFID card is send to the costumer mobile phone using · GSM module (i.e., SIM800) and also sends to the web server using Wi-Fi module (i.e., NodeMCU ESP8266). In web server we are maintaining the petrol dispensed amount of the costumers and this web server access is secured by a password and that password is only known to the petrol companies. Suppose if available balance is less than the

entered amount than microcontroller tells the customer to recharge the RFID card Here, RFID card works as a prepaid card and it is recharged at the petrol station itself. Also here, we are using Level sensor to sense the level of the fuel in the tank and the buzzer is activated, if the fuel level is low.

Whenever user place the RFID tags close the RFID peruser, and then gather the grain provided through the ubidots and start to fill it with oil with a full firearm. At the point when the cash runs out, the gun will presently not be full. Consequently, the Petrol Pump brilliant undertaking was a triumph. Here for the sample user used ubidots software for transferring money. When the level sensor showed petrol level in vehicle the user can pay amount for petrol via inbuilt software before the user reaches the filling station. After reaching to filling station the user will place the RFID tag near RFID reader. Then the reader reads the amount transferred by user to the account then equal quantity of fuel filled in the vehicle by the petrol gun. Here there is no use of staff the user can fill petrol smartly.

5.2. DISCUSSIONS:

This project is to build smart petrol bunk without man power. For the sample the user build model project to implement. To implement the project the user collected the hardware parts i.e. Node MCU ESP8266 Wi-Fi module, servomotor, battery and battery caps, RFID reader, level sensors, relay, Piezo buzzer, Liquid crystal display (LCD), wires, microcontroller, Passive RFID card and EM-18 RFID reader, Fuel dispensing system (consists of SPDT relay switch and pump motor), one breadboard. The user uses software tools like ubidots explorer, arduino ide. The language uses for code is embedded C. And one card board sheet to fix all the components.

Write the code in embedded C and compiles in arduino ide software. Then the code insert to microcontroller by USB cable. For transferring the data user uses ubidots explorer, sign in to ubidots software and create one folder by the RFID card number so it will be easy to transfer the data to the specific card.

Now coming to hardware connections fix the all components to card board sheet so that no movement occurs while taking output. Take breadboard then fix Nodemcu and buzzer. By using wires connect microcontroller to breadboard. Here all the connections

made to breadboard only. Now connect servomotor to buzzer and microcontroller. A battery is connected to servomotor using battery caps. Fuel dispensing system (consists of SPDT relay switch and pump motor) connects to breadboard. LCD display also connects to breadboard contains both nodemcu and buzzer. Connect level sensor to microcontroller placed on breadboard.

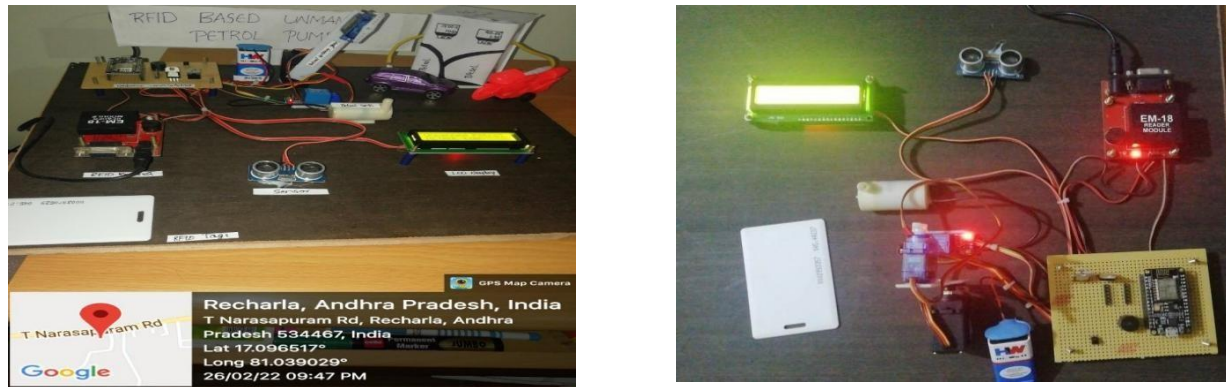


FIG. 5.1: Output connections

To pass the power supply to microcontroller user uses the adaptor wire. Connect wire to microcontroller and once check all the connections which are made before. Now open the ubidots explorer. Switch on the power supply then user can see the LCD displaying RFID petrol pump. Then take the RFID card and place near the microcontroller then the buzzer make sound, if not check the position while placing the card. After placing the card user can see the amount (number) available in the card. If the LCD display shows zero (0) then user cannot see the movement of gun. Then by using ubidots explorer user can transfer the data like transferring the money to the card. Again place the card near microcontroller the buzzer makes sound and user can see the amount (data) transferred using ubidots. Then the servomotor gun moves by making sound like petrol is pumping into vehicles. Now the data in the card becomes to zero (0) again then the gun movement stops. Here user designed ubidots only to transfer data up to 100 not beyond that. If user wants to transfer user need to pay extra charges to ubidots. If user wants to run the project again user need to repeat the same process mention above. Thus the RFID based unmanned petrol pump is done.

CHAPTER-6

CONCLUSIONS AND FUTURE SCOPE

This chapter deals with conclusions and future scope of the RFID based unmanned petrol pump.

6.1. CONCLUSION:

Thus, user can utilize RFID innovation to refill without the assistance of staff. Thus, one's cash is all around spent without being burglarized by laborers. There won't be any traffic jams and time delay at petrol stations. The automated petrol pumps can fill without man power smartly. Thus automated petrol pumps systems for remote areas. With this smart petrol pumps there is no need to put physical person for distribution of petrol. This petrol pumps works with the IOT connectivity so that owner of Petrol pump will have overall control of this petrol station.

When user needs fill the petrol in bike firstly, user checks for pricing online in that specific portal designed for this petrol station. Then user will select the nearby stations and pay for petrol amount after that he needs to go there for filling purpose. In the console of pump, user will receive via SMS in this petrol pump console. After that pump motor starts for appropriate time and user will get the petrol.

6.2. FUTURE SCOPE:

- In future user can develop alarms when someone is smoking, without causing fire accidents.
- And also automated alarms when the fire accident occurs.
- Some sensors to show the level of petrol in the bunk.
- Alert alarms when someone tries to fill petrol without balance in the RFID tag.

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