Petrol Theft Preventer

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Abstract- The discovery of automobile vehicles is the blessing to human being from engineering and science. The uses of automobile are increasing day-by-day as a transport vehicle. The majority of the transport vehicles are powered by traditional petroleum fuel such as gasoline, octane, diesel etc. The price of these transport fuels are also increasing worldwide and the high oil price becomes a factor of concern for civilization. From this point of view, advanced security system should be ensured for the fuel safety. The objective of this project is to describe the automatic prevention of fuel theft. A project has been made by suing vibration sensor, solenoid valve and Arduino board. The fuel flow path closed normally with the help of solenoid valve and alert if theft happen through alarming system which is working with the help of vibration sensor. The solenoid valve is activated by the key of the bike this ensure the fuel path open and made the fuel flow to the engine. If suppose the key ignition is locked then the fuel path also locked. Then the vibration sensor is activated whenever the key of the bike is locked. The activated vibration sensor is ready to receive the vibration. If vibration occurs then it send to the alarming system and alert the fuel theft. This entire function is controlled by the brain of the system which is the Arduino board. The brain consists of transformer, relay circuit, micro controller. Transformer is used to step up the require current to activate the solenoid valve then the relay circuit is used to control the high voltage It has been found that it is a very low cost technology and it can be implemented only for two-wheelers.

Indexed Terms- key ignition, arduino uno, transformer, solenoid valve.

I. INTRODUCTION

A two-wheeler refers to vehicles that run on two wheels. They include, bicycle, a pedal-powered two-wheeler. Motorcycle is the motor power two-wheeler, similar in construction with bicycles. But also considering that the parking of vehicles in parking the fuel theft is maximum. Considering this area we have taken this into account for our project. This is very useful at parking the vehicle. Fuel cocks are a very important part in a vehicle. The fuel cock determines the flow of fuel from the fuel tank to the Engine via the carburettor. A fuel cock avoids the flooding of the carburettor of a vehicle. It also gives a sense of how much fuel is present in the tank courtesy the Reserve option. Though the exact amount of fuel cannot be accurately determined due to the various possibility of failure. A knob is provided in the fuel cock which can be turned to "OFF" state easily so that the fuel does not flow to the engine. When the level of the fuel has dropped beyond a certain level wherein it becomes important to fill up the tank, this is because While in "ON" state, No more fuel can pass into the engine. There is fuel existing in the tank, but as no fuel flows into the engine, the vehicle tends to filling station. The knob of the fuel cock has to be turned to the "Reserve" state easily so that the remaining fuel can now pass. Such easy mechanism is positioned under the petrol tank for the person to change over the position of the knob easily through the hand. Though it has easy to operate it contain major disadvantage in the point of view of petrol theft. One just has to bring a bottle, remove the pipe from the carburettor, turn the knob to desired state and remove as much petrol as he desires. Fuel being a costly commodity surely needs protection. If fuel can be robbed so easily, these fuel cocks will need more security. A lot of companies have introduced a set of key operated fuel 2 cocks where the knob is operable by means of a key which shall have to be positioned as the knob is positioned. More the number of keys more are the chances of a person forgetting and make them uncomfortable.

II. IDEAS AND RESEARCHES

The fuel theft is currently detected by method in which, fuel float sensor with microcontroller chip, after some time we will stop vehicle, at that time the

current level of fuel is stored in micro controller memory, while fuel theft occurs then fuel level goes down and message send to owner by using GSM modem.at that time buzzer will on. From that we will come to know fuel theft was occurred. Here, in order to avoid this petrol theft, the simple tap with main or reserve option mechanism should be improved in security point of view. thus our product achieved by using main parts such as ignition key, vibration sensor, fuel tank, solenoid valve, battery, Arduino and relay.

III. ANALYSIS

From the research of our Project, Then any one accessed or try to theft the petrol it sends signal to the buzzer unit and it alert the nearby person through the powerful alarming sound that makes the thieves in trouble. Thus, it acts as a safeguard for the petrol in the tank. Hence the system achieved the purpose successfully.

IV. PROPOSED METHODOLOGY

A. Description
The input given to the solenoid valve which is attached with the petrol tap by the key of the vehicle. Then the solenoid open and allow the petrol flow from the tank to engine. After parked the vehicle the solenoid valve goes to OFF condition, and the vibration sensor get ON then waiting to receive the vibration because of theft. The antitheft system must be kept in the active mode with the help of a switch present in the system. If anyone by chance theft the petrol which is already in active mode, then the voltage in the circuit becomes high which gives the signal to the microcontroller.This microcontroller again sends signal to the activation of vibration sensor. Afterwards the vibration sensor receives the vibration which is made by thieves. Then it will be sent to the buzzer system and alert nearby person. This entire system is controlled by the Arduino board, and the power is given from 12V DC.
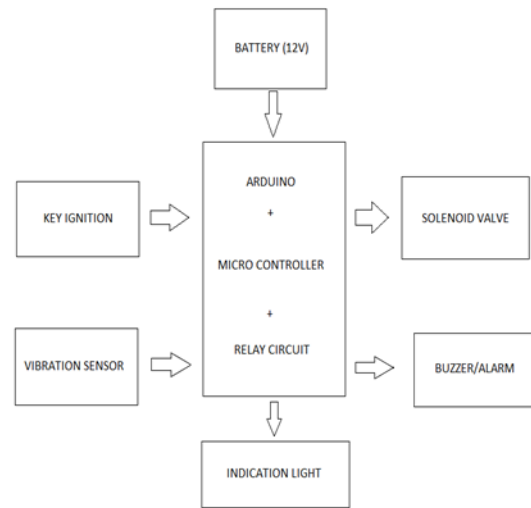
B. Block Diagram

Fig.1. Block diagram of proposed system

C. Arduino
Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package. The Uno is one of the more popular boards in the Arduino family and a great choice for beginners. We'll talk about what's on it and what it can do later in the tutorial. Believe it or not, those 10 lines of code are all you need to blink the on-board LED on your Arduino.

D. Key ignition
Since we generally initiate the motion of a vehicle commencing with the ignition, having a keyed ignition is also a basic form of security. Heavy vehicles may also use a master disconnect switch to completely and safely isolate the electrical power.

You guessed it. Cole Here see makes dozens of Master Disconnect switches, as well. In fact, when you're looking for switches for your commercial vehicle, you can't do better than Cole Hersee brand switches.

E. Vibration sensor

At present in the industry like research and development, the ability of monitoring, measuring as well as analyzing the vibration is very important. Unfortunately, the suitable techniques for making a measurement system for vibration with precise & repeatable are not always clear to researchers with the shades of test tools & analysis of vibration. There are some challenges related while measuring the vibration which includes a selection of suitable component, the configuration of the system, signal conditioning, analysis of waveform and setup. The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality.

F. Solenoid valve

The solenoid valve is controlled by an electric current through a solenoid in the case of a two-port valve the flow is switched off or in the case of a three-port valve the outflow is switched between the two outlet ports. Multiple solenoid valves can be placed together on manifold. Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used low control power and compact design. Besides the plunger-type actuator which is used most frequently, pivoted-armature actuators and rockers actuators are also used. Solenoid valves are also characterized by how they operate. A small solenoid can generate limited force. If that force is sufficient to open and close the valve, then a direct acting solenoid valve is possible. An approximate relationship between the required solenoid force F, the fluid pressure P and the orifice area A for direct acting solenoid valve is

$$F=P*A$$

Where A= orifice area

G. Relays

Relays are switches that open and close circuits electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. As relay diagrams show, when a relay contact is normally open (NO), there is an open contact when the relay is not energized. When a relay contact is Normally Closed (NC), there is a closed contact when the relay is not energized. In either case, applying electrical current to the contacts will change their state. Relays are generally used to switch smaller currents in a control circuit and do not usually control power consuming devices except for small motors and Solenoids that draw low amps. Nonetheless, relays can "control" larger voltages and amperes by having an amplifying effect because a small voltage applied to a relays coil can result in a large voltage being switched by the contacts. Protective relays can prevent equipment damage by detecting electrical abnormalities, including overcurrent, undercurrent, overloads and reverse currents. In addition, relays are also widely used to switch starting coils and heating elements.
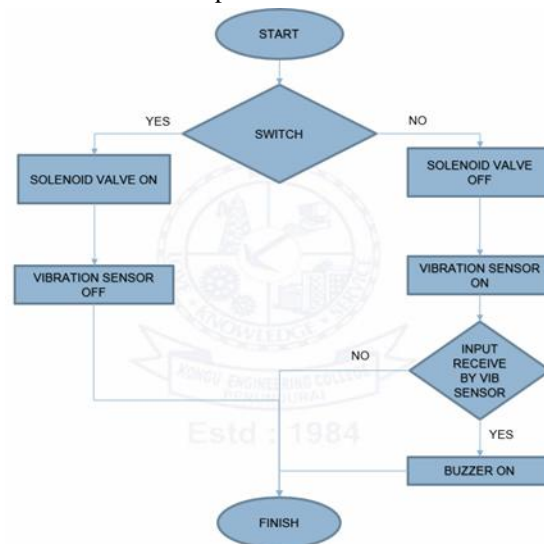
H. Flow chart for operation

Fig.2. Block diagram for solenoid operation

I. Program for Arduino

```
#define key 2
#define vibration 4
# Variable declaration section
#define relay 6
#define buzzer 12
void setup()
{
pinMode(key, INPUT);
# Setup section
  pinMode (vibration, INPUT);
(here we declare key, vibration as input
  pinMode (relay, OUTPUT);
 and relay and buzzer as output)
  pinMode(buzzer, OUTPUT);
  digitalWrite(relay,HIGH);
  digitalWrite(buzzer,HIGH);
  }
void loop()
{
# Loop section
  int a = digitalRead(key);
(Turn the key OFF then the vibration sensor
  Intb=digitalRead (vibration);
are ON ie., ready to receive input)
  If(a== LOW && b== HIGH)
  {
   digitalWrite(relay,LOW);
   digitalWrite(buzzer,HIGH);
# if result positive then buzzer activated
}
if(a== LOW && b== LOW)
  {
# If both OFF then buzzer can't activate
digitalWrite(relay,LOW);
digitalWrite(buzzer,LOW);
  }
  if(a== HIGH && b== HIGH)
  {
        digitalWrite(relay,HIGH);
# If both are high then buzzer is OFF
        digitalWrite(buzzer,LOW);
  }
  if(a== HIGH && b== LOW)
  {
        digitalWrite(relay,HIGH);
        # If key is ON then the buzzer can activate
        digitalWrite(buzzer,LOW);
  delay(10000);
```
```
  }
```

The above program is coded in the Arduino board for the desired operations. For example the timing at which the buzzer activates and stops, the vibration value analysed and the buzzer activates, the vibration sensor is in off condition at solenoid valve is in open condition.

V.   RESULTS

The controller used in the proposed methodology is Arduino UNO. The result of the methodology is shown below.
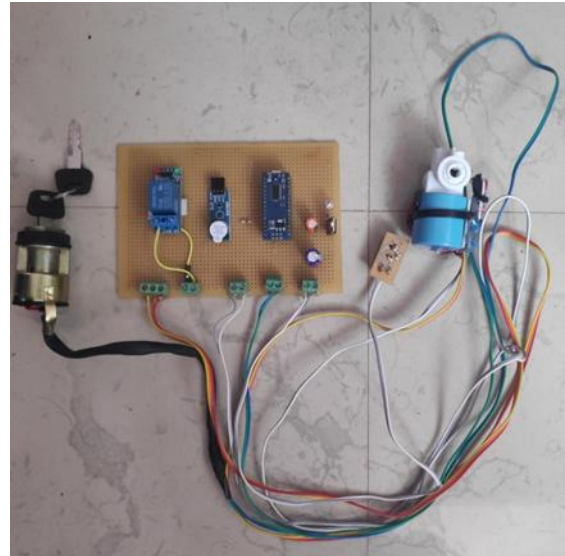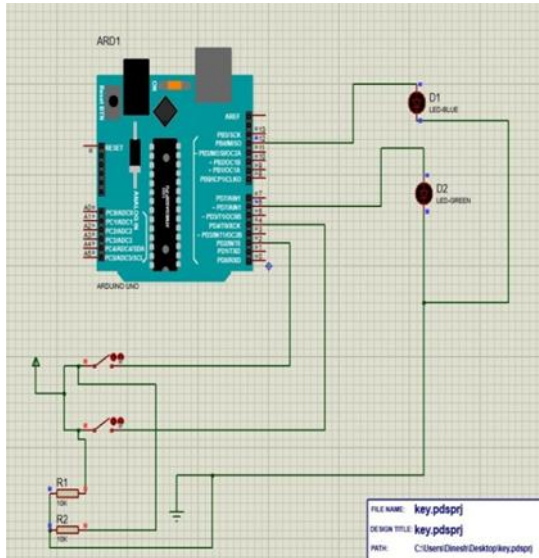

Fig .3. Working model

A. Simulation model

Fig.3. Supply of Both Switch OFF

1. The above simulation is done in the proteus software, Arduino, two resistors, two capacitors, two LED and two switches were used. Two resistors in the value of 10 kΩ were used to limit the given 12 V DC current. Thereby we can control the damage of the components. 2 capacitors were used in colour of blue and orange of 10 μF and 100 μF respectively. It can store the energy in Arduino and conditioning the given power source. The LED D1 and D2 in the colour of blue and green respectively which indicate and ensure the activation of vibration sensor and solenoid valve respectively. This LED is for the purpose of understanding in the simulation. Switch 1 and 2 are the key and vibration sensor activation input respectively.
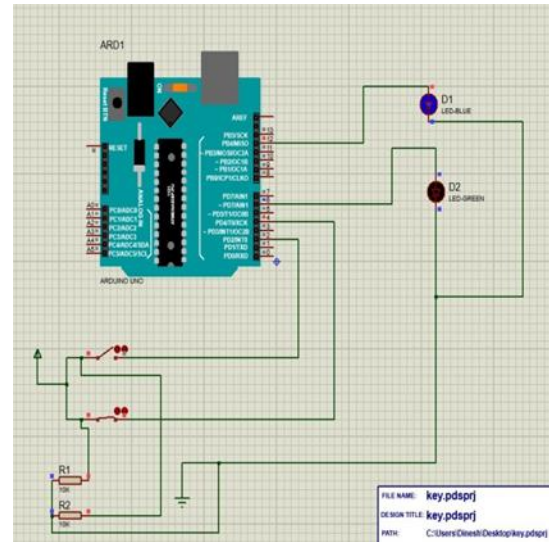

Fig.4. Supply to Vibration Sensor ON

2. Now the input for vibration sensor activation was given by pressing the switch 2. So the current was fed into the LED 1. Then BLUE colour will turn ON. This indicate that the vibration sensor activated now to receive the vibration signal from the thieves. At this time, there is no input was given to the key. Hence the green colour LED is in turn OFF condition that indicate the solenoid valve is in OFF condition. This lead the petroldoes not come out from the petrol tank.
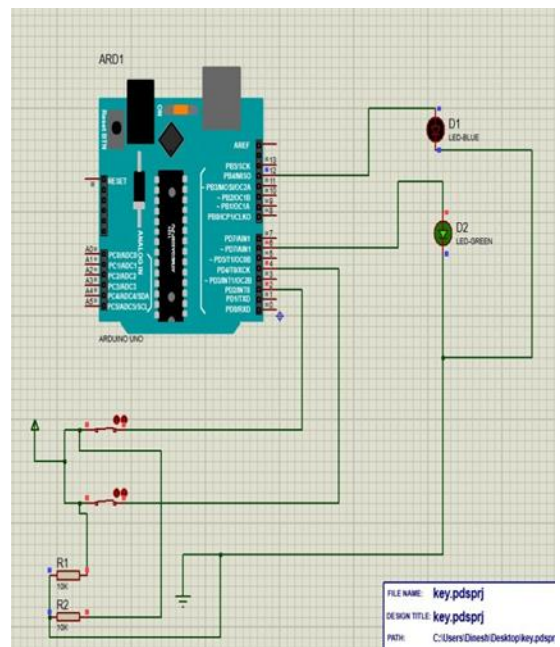

Fig.5. Supply of Both Switch ON

3. Now the input for sole noid activation was given by pressing the switch 1. So, the current was fed into the LED 2. Then GREEN colour will turn ON. This indicate that the solenoid valve activated now to all the petrol from the petrol tank to the engine. This type of input can only give by means of bike key alone this mechanism ensures the security of the system at this time, there is no output from the vibration sensor though the input for activation of vibration sensor was given. Hence the BLUE colour LED is in turn OFF condition that indicate the vibration sensor is in OFF condition. This avoid the unnecessary alarming during riding. The function is similar to the NAND gate. This was achieved by using the Arduino programme in the micro controller. Thus, there is no output to the activation of vibration sensor when both the input was in ON condition.

B. Simulation result

INPUT		OUTPUT		
KEY	VIBRATION INPUT	SOLENOID VALVE	VIBRATION SENSOR	BUZZER
ACTIVE	YES/NO	ACTIVE	INACTIVE	INACTIVE
INACTIVE	YES/NO	INACTIVE	ACTIVE/INACTIVE	ACTIVE/INACTIVE

VI. CONCLUSION

Whenever, the owner kept the vehicle in parking place. Then anyone accessed or try to theft the petrol, it sends signal to the buzzer unit and it alert the nearby person through the powerful alarming sound that makes the thieves in trouble. Thus, it acts as a safeguard for the petrol in the tank. Hence the system achieved the purpose successfully.

VII. FUTURE WORK

For future work,Reduction of size of the solenoid valve to integrate in to the petrol tank is the most important aspect of the design modifications. Even we can control the flow of the petrol from the tank itself by adjusting the plunger of the solenoid valve with the help of accelerator. In Future we can manufacture a tank which has inbuilt solenoid valve. In future it can able to integrate with IoT system and control through a separate app.

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