DETECTION OF FUEL THEFT AND VEHICLE POSITION WITH THIRD PARTY MONITORING SOFTWARE

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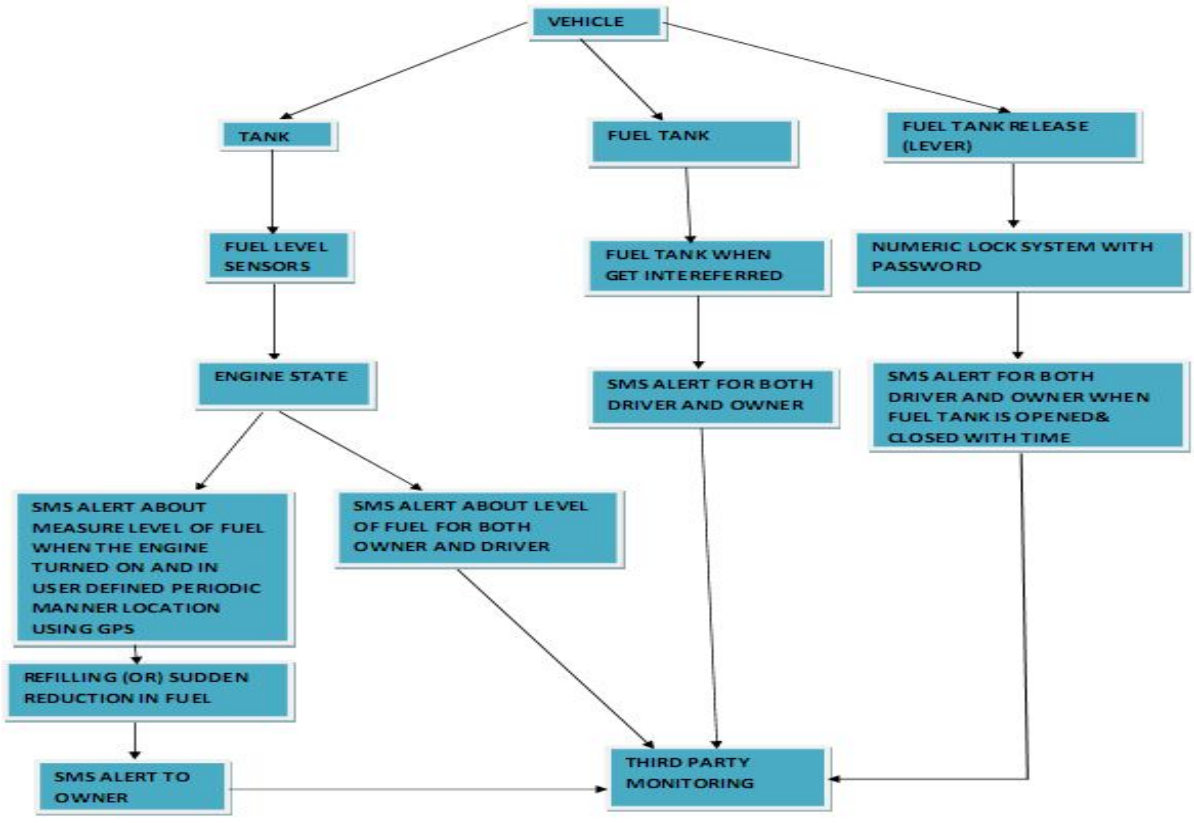
Abstract: Every aspect of day-to-day activities is affected by some type of control system. Control systems are found in abundance in all sectors of industry such as quality control of manufactured products, automatic assembly line, machine-tool control, space technology and weapon systems, computer control, transportation systems, power systems, robotics, automobile sector as well. These kind of technologic developments in automobile sector are especially on electronic gear, balance, ant slip, security systems. The other important application of them is the measurement system which has the same age with automobile history for fuel level of automobile tanks. The project examines to detect the amount of fuel that has been larcened and also to determine the position of the vehicle at a particular time. Third party monitoring software is a user interface that updates the information automatically into database which helps to retrieve the data as and when required. Third party monitoring software provides driver's information to the owner. It shows the status of the vehicle. The techniques we are going to propose minimizes the time and have an efficient output and minimizes the theft. This project helps to minimize the theft and hence to put a step ahead to an Indian economy.

I. RESEARCH METHODOLOGY

1. Ultrasonic Fuel level sensor- Obtain level of fuel in fuel tank.
   a. The sensing unit uses a piezoelectric transducer in it. It uses the ultrasonic waves to calculate the height of the fuel in tank. Based on height we can calculate the amount of fuel [1].
2. Numeric Lock- It is fixed with the fuel opening lever for authentication purpose.
   a. Only the driver can open and close the fuel tank. When the driver opens and closes the fuel tank it sends SMS to the driver and the owner in time.
3. Third Party Monitoring Software- That provides notifications about fuel theft.

a. Whenever the fuel is larcened, the sensor will store the information in database and from where it provides the notification based upon calculations.



II. FUEL LEVEL SENSOR SYSTEM

Ultrasonic transducers are acoustic structural transducers which electrical signals in different frequencies convert to
Sound waves and spread the signals in air**.** The ultrasonic fuel level sensor is used to determine the level of fuel in fuel tank. The ultrasonic transducer is attached to the bottom of the fuel tank. This allows the ultrasonic waves cause vibration. The piezoelectric ones are generally used for the determined frequencies, the capacitive ones have a wide range frequency area. Sound waves spread 343.5m/s speed at 20 °C the magnitude of the sound wave striking to any block reflects backward by decreasing from this block**.** It can easily be calculated the distance with the following wave theory equation using the signals produced by ultrasonic sound source between going and reflecting time measurement.

$$x=c * t / 2 \qquad [1]$$

Where c is relative sound speed to environment temperature, t is total time of going and reflecting ones form the source, **x** is the distance between the source and the block reflecting wave.

GPS (Global Positioning System)

The GPS system is used to trace the position of the vehicle. The GPS system is fixed to the bottom of the fuel tank. GPS tracker is used to convert the GPS coordinates information into digital. The control box is used to transmit the fuel level information and GPS coordinates in analog form. The Modem is used to convert the fuel level information into digital. Depending on the engine state the fuel level information is sent to the owner through an SMS [2].

III. NUMERIC LOCK SYSTEM

Numeric lock system is provided for fuel tank opening lever with password authentication and SMS alert. The microcontroller is designed to implement this process. The function of microcontroller is to send a signal when the password is entered correctly. This signal is sent to the relay circuit. When the signal is received, the relay just releases the lever which in turns opens the fuel tank. For closing the fuel tank the same process will be done when the correct password is entered. The password is confidential that is authenticated only by the owner and the driver. Once if the fuel tank is opened by the driver or by someone else an alert is sent to owner through an SMS including the opening time and closing time. The driver also gets an SMS alert when any third party tries to open the fuel tank through numeric lock. In case of change in driver, reset password option is available to change the existing password. This reset password setting is only handled by the owner.

IV. FUEL TANK INTERFERENCE

To avoid fuel theft a motion sensor is fixed on the outer surface of the fuel tank. It is fixed with material called special glue. It does not produce any harmful rays. The transmitter is attached to one end of the fuel tank and the receiver is kept at the other end. Fuel tank interference can be detected by the ultrasonic waves that are transmitted from the motion sensor. The variations in length of the ultrasonic waves are used to detect the moving objects. In case of any interrupt made an SMS alert is send to the owner and the driver. The interference time is saved in the database.

V. THIRD PARTY MONITORING SOFTWARE

The third party monitoring software will perform fuel theft calculation, and Manhattan distance calculation. The level of fuel in fuel tank, the interference, opening and closing timing of fuel tank and the GPS coordinates are periodically recorded in the database. If any change occurs in the prevailing scheme a notification is provided to the owner.

- Here taking in the account of the level of fuel in fuel tank, the opening and closing timing of fuel tank it performs the fuel theft calculation.
- Using the formula

$\cos\varphi = [\cos(latA) \times \cos(latB) \times \cos(lonB - lonA)] + [\sin(latA) \times \sin(latB)]$.

So φ = in degrees.
= in radians.
D = R x (φ in radians)
= in Kilometres [3].
The manhattan distance was calculated.

CONCLUSION

The Proposed scheme will help us to solve the fuel theft problem and the vehicle theft problem. Our scheme will provide periodic details about fuel level and vehicle position. Hence the larceners will not be able to theft the fuel or vehicle by any chance and it provide the complete protection.

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