

Detection of fuel leakage in vehicles using IoT

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Abstract— Nowadays so many accidents were happening due to the unawareness of the fuel leakage from the car. This issue can be minimized using the model “Detection of Fuel leakage In Vehicles”. The main purpose of model is to minimize the car accidents by detecting fuel leakage in car and sends “alert” message to the driver and make them alert before accidents happens. Thereby the accidents can be reduced and many lives can be saved. Here sensors are embedded at the fuel flow parts and fuel leakages are detected. Once the leakage is detected and alert message will be sent to the driver

Key words: Internet of things, sensors, embedding sensors in fuel tank, fuel level detection, mobile devices

I. INTRODUCTION

In today’s life, technology plays a major role in our daily activities. The world is moving towards the automation. In other words, the work for human became easier and simple. Even in the field of transport, the technology has shown it’s impact. We have taken many steps for the development of technology. For example: In car we have embedded software. The software performs the task that is assigned to it. Works like checking fuel level, pressure of the tier etc. Embedded systems has become a fashion of this century the technology is improved to the greater extent. Still there are some situations that make accidents in vehicles like fuel leakage; brake failure etc.,. The accidents which were happening due the fuel leakage was unknown to the driver. The proposed system is used to detect the fuel level and sends the message automatically to the driver if any leakage is found. Such a way the accidents may be reduced.

II. INTERNET OF THINGS

The physical devices which are used by people for their daily need is integrated with sensors and make them to communicate and exchange their information through or with the help of internet. [6]

A. History:

Kevin ashton is the one who cofounded the Auto-ID centre at Massachusetts Institute of Technology(MIT) was the first person to explain the concept of IoT in his paper . He is the one who coined the name “Internet of things” .It is also called Internet of objects.[4]

Ex:

1) Traffic jam:

Using IoT, they detect the traffic and send information to the control room then traffic will be cleared.

2) Automatic light on and off

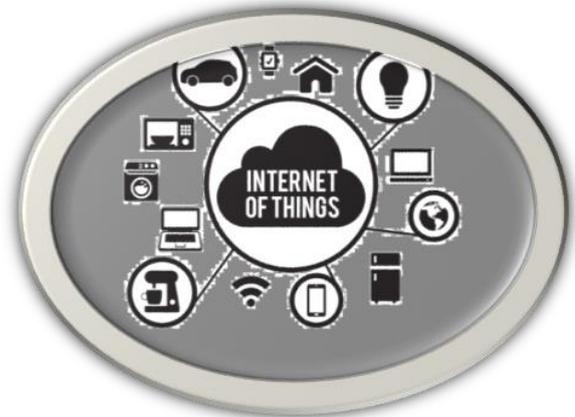
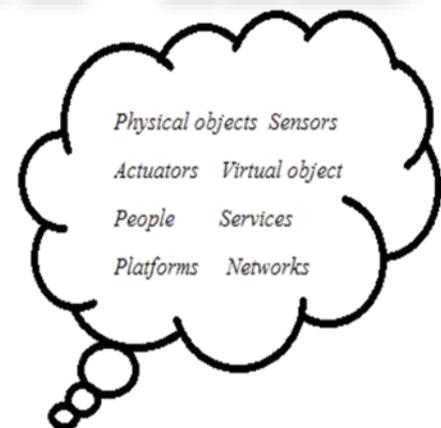


Fig. 1: Internet Of Things [5]

B. Components:

The major things in IoT are

- Physical object
- Sensors
- Actuators
- Virtual object
- People
- Services
- Platforms
- Networks



INTERNET OF THINGS

Fig. 2: Components of Iot

III. LITERATURE SURVEY

A. Accident Avoidance and detection on Highways:

According to Bhumkar and Deotare, they used ARM7 and some real-time sensors like gas and software interface with GPS and google maps and designed a system. Their design is used to control the speed of vehicle under driver fatigue. The

aim of their design is also to avoid the accidents on road. The design is to reduce accidents on highways based on passenger activity, monitoring, behaviour analysis. They even referred immobilizer which is also used to avoid fire accidents similar to fire accidents happened due to fuel leakage. They have send the messages to the user but not any information based on fuel leakage or detection. The system which they proposed only avoids the accidents, which are happening only due to the person activity. [1]

B. Tire pressure Monitoring system and fuel leakage Detection:

A design by Loya Chandraeshkumar and Joshi Pranav explains the detection of the tire pressure and displaying messages to the driver who is driving car. By their survey, they said that 70% of the accidents happened due to the tire break. In their design they used gas sensor that is used to detect gas leakage at the tiers. They had concentrated much on the accidents that occurred due to tier gas leakage that is detected by the system(TPMS).But they doesn't concentrate much on the fuel part.[2]

C. Detection of fuel theft in heavy vehicles:

According to senthil Raja and Dr.Geetha, automation is necessary to handle things. The main aim of them is to save the users from theft of the vehicles and they also covered the areas of fuel theft, fuel leakage, premature dry out and improper consumption in engine. The model proposed by senthil checks the level of the fuel and verifies the fuel theft in all perspective ways and sends the messages to the driver. The main aim is to inform the user about the theft of fuel and unauthorised access to their vehicles. They explained about the existing system which includes that the fuel level will be sensed and sent as message to the user. They have inserted a lock for the fuel tank as only the owner and the driver can open it. They used a third party software to send the message to the driver. They used GPS and weight sensor. The weight sensor is used to calculate the level of the fuel dynamically. [3]

IV. WORKING

In the existing system the information of fuel level will be sent only if there any movements of the fuel theft. In the proposed system it sends the message only if there is a leakage in the fuel tank. It warns the driver only if there is leakage. It makes the user to be at level of ease and warns before any accidents due to the leakage.

A. Architecture:

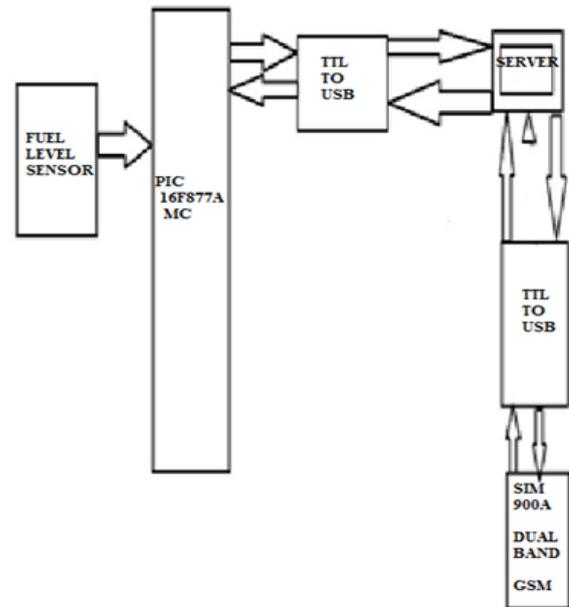


Fig. 3: Architecture

B. Components:

In the proposed system, we used microcontroller-8051, GSM, RTU, TTL and level sensors. Here the microcontroller is connected to GSM and the level sensor via RTU. The function of microcontroller is to commands the GSM when the level of the fuel gradually decreases. For every microsecond, the level sensor detects the level of fuel in the fuel tank. The GSM is used to send the messages to the customer who is driving the vehicle.

USB to TTL:



Fig. 4:

C. Controller:

In this system, the microcontroller which is connected to the system (server) and the level sensor. We know that the level sensor senses the level for every microseconds and the microcontroller is programmed to read two values i.e.value1 and value2 from the level sensor. The value1 will be in the box1.The value2 will be in the box2.When the process begin the microcontroller reads value1 and after few microseconds the value2 will be read from the sensor. Then, the difference will be computed in the third box.

Microcontroller:



Fig. 5:

D. Role:

The working of the GSM is similar to the working of the SIM in the mobile. The difference which is computed in the above section will be checked whether it is greater than 2 or not. If it is greater than 2, then the GSM is commanded to send the message to the driver. Then, we assume there is a leakage the message will be sent automatically to the driver. Thereby accidents can be minimized.

GSM MODEM SIM900:



Fig. 6:

E. Calculation:

For example: If the value read is 5 that indicate the tank is full. The second value is read from the sensor after few seconds. Consider the second value is 4 i.e., it is decreased by 1. Then the difference will be 1. It indicates that there is no leakage in the tank. Assume if the value of box1 is 5 and value of box2 is 3 then the difference is 2 which says that there may be a gradual decrease of fuel in the tank.

V. SAMPLE OUTPUT

A. When There Is No Leakage:

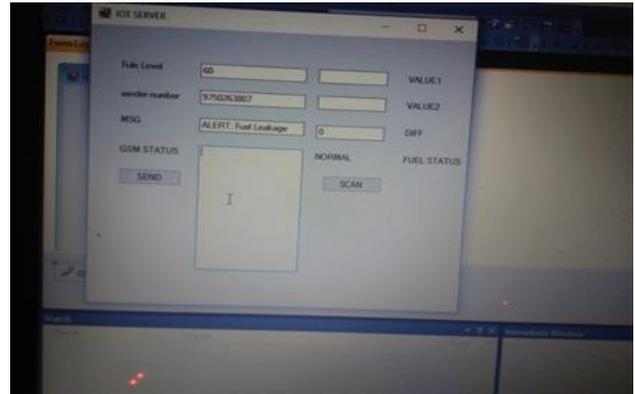


Fig. 7:

B. Output Message To Driver :(When There Is A Leakage)

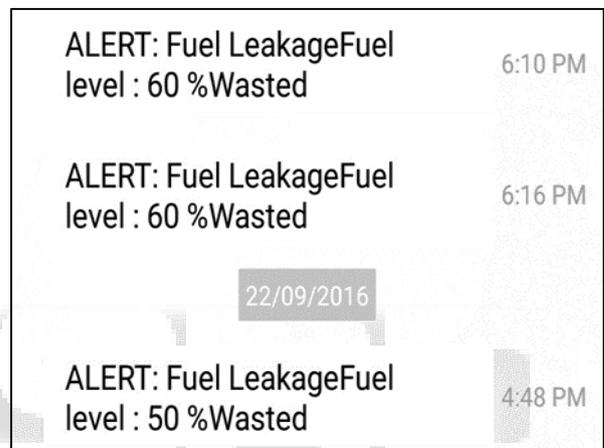


Fig. 7:

VI. CONCLUSION

As from proposed model we can conclude that the owner or driver will warned before getting into any accidents and the message will be sent only if there are any cases of gradual decrease in the fuel. By this proposed we can reduce the chance of getting into any accidents that may happen due to fuel leakage.

VII. FUTURE PROGRESS

In future, we will try to display the message in the monitor beneath the steering and with the information of the mechanical shops available nearby.

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