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Design and Fabrication of Fuel Level Monitoring & Alert System using IoT

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***Abstract*: Unlike an existing system for Fuel Level Monitoring, it differs by monitoring the fuel level and provide the access to monitor the vehicle in any place with the use of (IOT). Automatically updates the information of Fuel entering inside the tank. *Main Purpose of This Device Is to Prevent Fraud in Refueling Station* where in some cases the quantity of fuel displayed in the filling machine is not actual quantity of fuel entering inside the tanks & FUEL THEFT INDENTIFICATION USING (IOT).**

Keywords: LCD Display, IOT Module, Mobile Application

I. INTRODUCTION

A. *GENERAL DESCRIPTION:*

Float based control of the fuel level system using Raspberry Pi and a IOT alert message would be received if the theft of fuel is occurred. All this process must be executed in fast manner and response must be in immediate action. A conductivity is being placed in the cap of the fuel tank as to get notification when the cap is being opened. The indication is that an alert will be sent automatically to the concern person via mobile application. Main motive of this system is to produce a maximum solution for fuel theft, an indication to the concern person at the time of refuelling, so this purpose of this device is to prevent fraud in petrol pumps where in some cases the quantity of fuel displayed in the filling machine is not the actual quantity of fuel going inside the tank. In our project, the main blocks are Raspberry pi unit, fuel level float sensor, Mobile App and LCD display unit.

II. IOT MODULE

The IOT (Internet of Things) Drawing representing the Internet of things (IoT). The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and network connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but can inter-operate within the existing Internet infrastructure.

A. *CONTENT*

IOT are usually widespread recognition of the evolving nature of the design and management of the Internet of things, sustainable and secure deployment of IoT solutions must design for "anarchic scalability." Application of the concept of anarchic scalability can be extended to physical systems (i.e. Controlled real-world objects), by those systems being designed to account for uncertain management futures. This "hard anarchic scalability" thus provides a pathway forward to fully realize the potential of Internet-of-things solutions by selectively constraining physical systems to allow for all management regimes without risking physical failure. Brown University computer scientist Michael Littman has argued that successful execution of the Internet of things requires consideration of the interface's usability as well as the technology itself. These interfaces need to be not only more user-friendly but also better integrated: "If users need to learn different interfaces for their vacuums, their locks, their sprinklers, their lights, and their coffeemakers, it's tough to say that their lives have been made any easier

III. WORKING

- The Float Sensor Is Used to Sense the Motion of The Fuel Tank and An Analog Signal Is Obtained Using a Voltage Divider Circuit.
- The Analog Signal Is Given to The Raspberry Pi Through Analog Input Ports.
- The Raspberry Pi Microcontroller Reads the Input from The Sensor and Provides the Output Signal (Pulse Width Modulation Signal) Which Is Given as Input to The Actuators.
- IoT Module Are Used as Median to Notify the Alert Via Mobile Application.
- Thus, The Imitation of Fuel Theft Is Received.

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Figure 1. Float Level Sensors–Potentiometer

Measuring the Fuel Level in The Fuel Tank
For measuring the fuel level, a Float level sensor is used. The sensor issued to obtain the level in the fuel tank. The sensor consists of a potentiometer and a float capsule along with a rod. The fuel when filled in the tank the level increases,

The transmitting unit with the float capsule which rotates according to the movement of the rod. The rotational movement of the capsule is transferred to the induction potentiometer via a gear mechanism so that the change in the liquid level is converted into DC signal to an indicator, receiver or computer. The capsule rotates in proportion to the change in the liquid level. The rotational speed is increased or decreased by the gear mechanism and is transferred to the induction potentiometer. The potentiometer reads the value and pass the input to the Analog to Digital converter. The A/D converter gives the 8-bit numeric data in accordance with the fuel level in the fuel tank. For the fuel level measurement PIC18f4550 microcontroller is used. Timer 1 is interfaced with the controller so that it will enables the controller to read the data in the data bus at a time interval. Then read data is stored in the Accumulator. The system consists of level detector circuitry integrated with IOT module. Upon reaching the critical water level in the tank, an indication is sent through IOT module to the technician in charge for further action

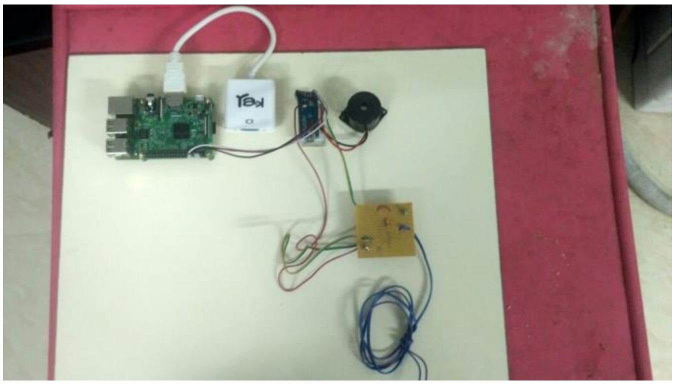

Figure 2. raspberry pi & IoT module

IV. RASPBERRY PI

On the surface, the Raspberry Pi is an inexpensive computer that can lend itself to many light & medium-duty tasks. It is based on a Broadcom SOC (System on a Chip) that includes an ARM7 core, a Video core iv GPU and USB controller. It has either 256MB or 512MB on the board and an SD card slot for storage. That's the cold technical details. now for the less tangible issues. The other machines available at the time were the Sinclair Spectrum, BBC Micro, TRS-80 (if you lived in the US) and Apple-II. Apart from being relatively affordable (in most cases) the other thing that these microcomputers shared was simplicity... they booted directly into a BASIC interpreter, and you could write quite complex software completely by yourself (given an appropriate level of skill). Over the next 30 years, computers became more impenetrable and complex, and the prospect of software development as something anyone, even a child, might turn their hands to, became less and less possible.

V.CAPABILITIES AND LIMITATIONS

The primary limitations related to IoT are the lack of autonomous action powered by context. The second part of that statement is important. We are acquiring a level of automation with IoT - as things get connected, controlling them using software becomes easier. Setting up one or two rules / devices is ok but as the number of devices & things around you grows - it will get "limiting" and complicated. The big limitation IoT must overcome over the next decade is getting the context, and carrying out actions autonomously. A system that learns, and adapts without having to be configured.

VI, LITERATURE REVIEW

This paper summarizes and reviews different technological developments for making efficient and cost-effective fuel alert system. Such fuel level monitoring system compromises the fuel level drop indication at suddenly with in a range of time and place and any time alert to the owner of the vehicle. all the indication will be received through the mobile application Whilst hardware innovation is awesome, we need UX innovation in equal measure to achieve usability in the IoT.

VII. CONCLUSION

The fuel level system was first created to indicate fuel level in vehicles. It was observed that after evolutions of vehicles and necessity of accuracy was needed then the digital level fuel sensing is implemented. Digital level monitoring system shows precise range but the theft control could not be possible as a result using the gsm and conductivity this can be controlled. In this way, the fuel level theft and range of fuel level has been achieved successfully. So, now it is possible that fuel enters the fuel tank can be monitored by the conductivity. The A/D converter with LCD was fitted with the analog fuel gauge of the two-wheeler and the result was successfully obtained. The A/D converter shows the amount of fuel in fuel tank in exact litres (ex: 1.3, 1.4, 1.5). The A/D converter shows the exact fuel in litres only when the fuel in the fuel tank is more than 1 litre. The accuracy level is upto 95 –98% because the error was around ± 0.2 litres, because the fuel in the fuel tank was measured based on float level in the tank and we didn't use any other sensors.it displays the exact litres on plane roads and shows error value on slope surfaces

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