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A Review Paper on Arduino Research Papers

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Abstract: Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics.
Keywords: Global System for Mobile Communications (GSM), Global Positioning System (GPS), Tracking, Security, Arduino.

I. INTRODUCTION

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

II. METHODOLOGY

1) Research Paper -1 IOT Based Smart Energy Meter

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The IOT based energy meter is based on Arduino. This system eliminates the human involvement in electricity maintenance. The theft of electricity increases the costs paid by customers. Hence this system is used for the detection of theft. The energy meter is connected to the Arduino. The Arduino checks the main meter and sub meter reading. If the difference between the main meter and sub meter is occurred then the message that theft has occurred will be displayed on the LCD display as well as on the thingspeak. The comparison between the main meter and sub meter reading is used to check the theft status. Customer can be access the thingspeak from anywhere on the globe at the anytime using the consumer number. Hence the customer can be easily access their energy usage.
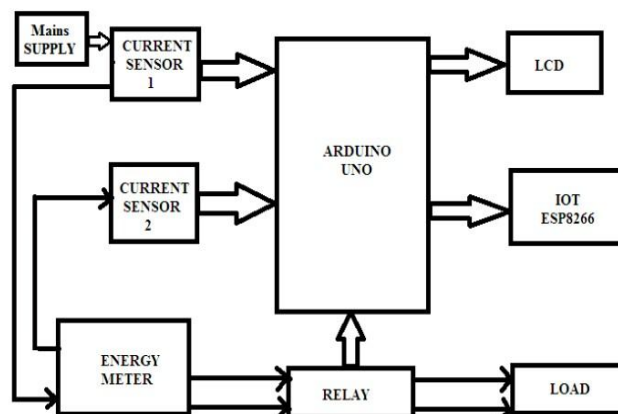

Figure- 1 Block Diagram Of The System

This design implements the energy meter using the IoT concept. It is based on the Arduino. The internet of things is the internetworking of physical devices which enables object to connect and exchange data in the above system energy meter is connected to the internet using IoT. So there is a way for consumer to track their energy consumption time to time so that they can control their consumption as they design. This system is useful for both consumer and supply.

a) *Advantages:* It provides accuracy in meter reading and Checks theft status hence improves security. This system Helps in effectively controlling energy consumption and also avoids Energy wastage. Meter reading can be accessed from anywhere on the globe at   any time. This system eliminates the human involvement in energy management.

2) Research Paper -2 Real-Time Tracking and Fuel Monitoring System for Vehicle

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The application of Manage the wheels is mainly attended to monitor multiple vehicles simultaneously. Although most of apply GPS to monitor vehicles, there is no currently available system that can provide real-time fuel consumption information and calculation service. For the aim of real-time monitoring and dynamic mobile data-recording, this study developed a fuel consumption calculating system, which combined Vehicle Tracking System (VTS), GPRS/3G, GPS and Web Server by using Machine to Machine (M2M) framework. In this design, the VTS could extract the necessary information from the vehicles, and with GPRS/3G and GPS techniques, it could achieve both data instantaneity and location preciseness.
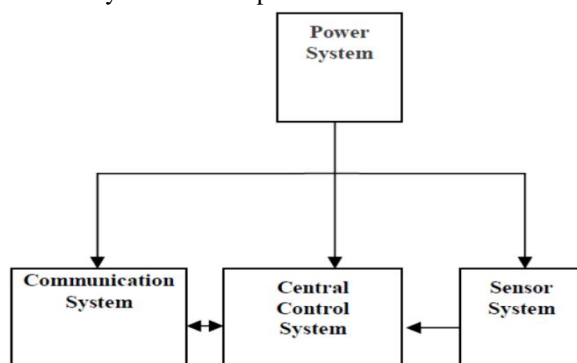

Figure 2: Basic Structure Of The System

Basically, the system is composed of the central control System, communication system, sensor system and power system. The system structure is shown in the figure.

The unit is placed inside the vehicle to sense the fuel level at various time instances and it also tracks the vehicle with help of GPS. To achieve these things the system is equipped with obstacle sensor along with Arduino UNO, GSM, and 8 mega 328 IC as main building blocks of our system.
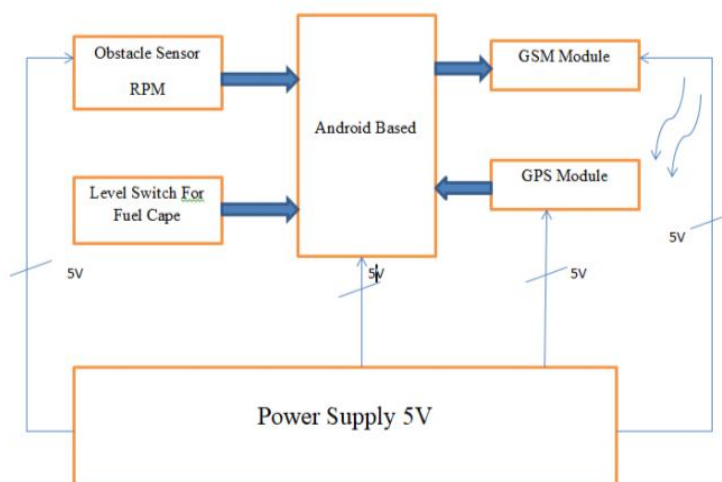

Figure 3: Block Diagram Of The System

The 8 mega 328 IC is the heart of our system. Arduino UNO is the electronic device which contains processing Power, memory and IO ports to interact with different connected devices. In this system 8 mega 328 IC is the brain of the system which stores the status of fuel level in a fuel tank and position of a vehicle. The system is powered by DC power supply with proper specifications. This supply can be provided by batteries. Obstacle Sensor will be used to sense the measure of RPM along with a quantity of fuel consumed and notify microcontroller about the level of fuel in the fuel tank. By counting this RPM and dividing it by a flow factor we will get the exact amount of fuel filled.

a) *Advantages:* This project will grow features and facility in the transportation field. Many new features are being added to enhance the monitoring and tracking operations using recent technologies.

3) *Research Paper:* 3 Vibration detection instrument based on Internet of Things

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This project is based on Vibration Detection using the Internet of Things. Vibration monitoring is the measurement of passing movements in a structure. This project involves developing an SMS alert when unusual vibrations are detected. It includes a lab-based experiment of detecting vibrations when the different magnitude of the force is applied. This force causes the change in values of the sensor from its initial values. Values of acceleration can be seen on the webpage and analysis can be done when required. Considering the maximum magnitude at which destruction is high, the alert signal would be generated. This alert would be sent to different mobile phones using GSM Technology. With the help of this, we can be aware of the vibrations. Properly done, vibration monitoring can be extremely helpful in preventing damage to structures understanding the nature of the damage and ascertaining its cause.
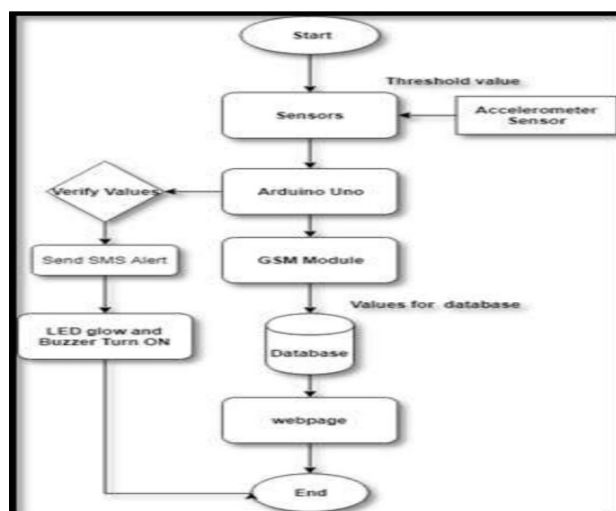

Figure 4: Overview Of The Design Of The System

The main goal of this project was to detect the unusual vibrations and generate the alert when the limit exceeds. This can be useful for emergency response planning. It is going to implement by using both hardware and software and thus its implementation is easy and economical.

a) *Use Of The System*

1) Emergencies can come without warning at any time.

2) Being prepared is the best way to handle these unexpected incidents and disasters.

3) Emergencies are the source of risk and therefore have the probability of causing an undesired event. The emergency shelter may be needed in some situation.

4) After a disaster occurs, immediate action is taken to protect staff, visitors & collections and sending alert text messages to concern authority using SMS alert.

5) Contact names and phone numbers must be listed for sending alert SMS.

6) Since it is done on a small scale as it is lab-based analysis, it could further be implemented on real data. The volume of the container is not measured.

4) *Research Paper:* 4 SMS Alarm System for Weather Station using Arduino and GSM

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Basically, SMS alarm system is the warning which sends important information of weather data. Weather is the state of the atmosphere, that it is hot or cold, wet or dry, calm or stormy, clear or cloudy. weather conditions are closely relative to the production, the agricultural field, human life and so on. So people are trying to forecast the weather condition with many methods. This system is designed for sending the important SMS that limits wind speed and temperature value by the user.

This real-time weather station is to send the LCD display and the alert to the user via short message sending (SMS) in the wake of a critically of an event which is predefined by the user. One of the important applications of the system is to send the alarm message to the defined mobile phone number. This system is to be convenient for monitoring the weather conditions without manual efforts.
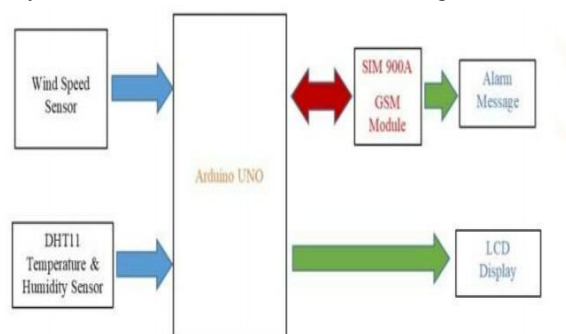

Figure 5: Block Diagram Of The System

a) *Designing Of The System:* In this system, Arduino and GSM module are used which connected to the input sensors "wind speed and temperature" and to output SMS alarm message and LCD display. Arduino is an open source hardware prototyping platform, which allows an easy implementation of sensors and interactive element.
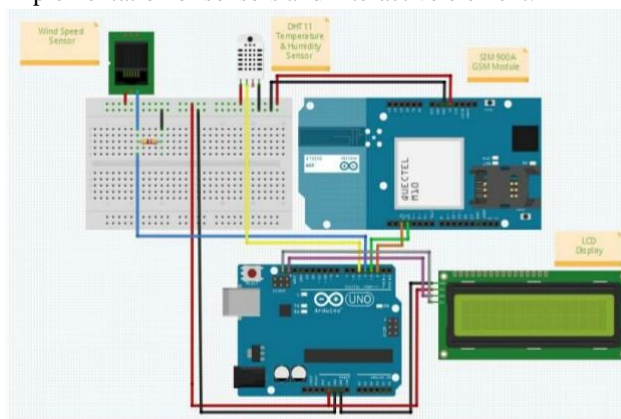

Figure 6: Schematic Working Diagram Of The System

5) *Research Paper:* 5 Fingerprint based security system for vehicles

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Automobile security is one of the growing concerns in India. Safeguarding of vehicle against theft is one of the major issues confronting developing countries. Varied techniques have been tried and tested to protect and secure the automobiles. Embedded computing is an emerging technology widely used in improving and enhancing security against the theft of vehicles. In 2013, Radiofrequency Identification (RFID) cards were designed for ignition start of automobile. However, the chances of losing the card or it being stolen led to the failure of the system.

Kulkarni et al. proposed a face detection subsystem with GPS and GSM module. A digital camera was used to capture the video which was continuously uploaded into the web server using the ARM9 processor. AdaBoost algorithm Face detection was adopted in a security system to identify the person who is trying to start the vehicle. This methodology, however, proved to be error-prone in detecting those faces, not in front of the camera. Using the Global System for Mobile (GSM) and GPS technology, the vehicle can be identified and located very easily.
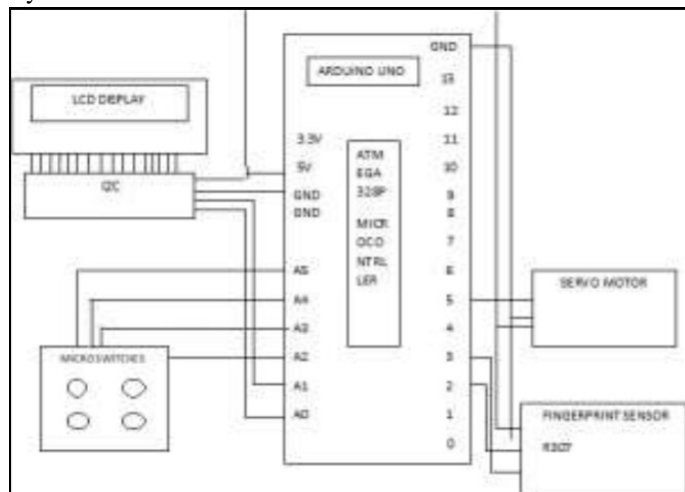

Figure 7: Block Diagram Of The Proposed System

a) Comparison

SNO.	PAPER	RESEARCH
1.	IOT Based Smart Energy Meter	This system Helps in effectively controlling energy consumption and also avoids Energy wastage. Meter reading can be accessed from anywhere on the globe at any time. This system eliminates the human involvement in energy management.
2.	Real-Time Tracking and Fuel Monitoring System for Vehicle	The system helps the owner of the vehicle who is at a remote location to perform the tasks of detecting the fuel theft and tracking the vehicle accurately and measuring RPM continuously. Many factors of the transportation system are considered.
3.	Vibration detection instrument based on Internet of Things	This project is based on Vibration Detection using the Internet of Things. Vibration monitoring is the measurement of passing movements in a structure. This project involves developing an SMS alert when unusual vibrations are detected.
4.	SMS Alarm System for Weather Station using Arduino and GSM	In this system, Arduino and GSM module are used which connected to the input sensors "wind speed and temperature" and to output SMS alarm message and LCD display.
5.	Fingerprint based security system for vehicles	Varied techniques have been tried and tested to protect and secure the automobiles. This work is aimed at improving the level of security in automobiles. They have developed an embedded system that uses fingerprint biometric pattern, a low-cost yet effective method, for authorizing the user

III. CONCLUSION

Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics. Designers and architects build interactive prototypes, musicians and artists use it for installations and to experiment with new musical instruments. Makers, of course, use it to build many of the projects exhibited at the Maker Faire, for example. Arduino is a key tool to learn new things. Anyone - children, hobbyists, artists, programmers - can start tinkering just following the step by step instructions of a kit, or sharing ideas online with other members of the Arduino community.

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[3]   International Journal of Trend in Scientific Research and Development (IJTSRD)   International Open Access Journal ISSN No: 2456 – 6470 | www.ijtsrd.com | Volume – 2| Issue - 5 SMS Alarm System for Weather Station using Arduino and GSM

[4]   ISSN: 2454-132X Impact factor: 4.295 (Volume 4, Issue 6) Available online at: www.ijariit.com Vibration detection instrument based on Internet of ThingsPg. No. 91 – 100

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[6]   Available online at: www.ijariit.com [pg. no. 370 – 372]Fingerprint based security system for vehicles

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