ACCIDENT PREVENTION AND IDENTIFICATION SYSTEM FOR VEHICLES USING ARDUINO

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Abstract – *The automobile industry is growing at a steady pace across the world. As a result, there's a good chance that the number of people who own cars will increase. Despite the fact that numerous safety measures are being used to make the vehicle's architecture substantially more adaptive, there is still a huge hole in the post-accident reporting centres. Although road accidents are unavoidable, many lives can be saved if emergency services are supplied with timely data and assistance. The proposed model provides an alternative solution to this problem. This research also includes a mechanism for preventing accidents caused by reckless driving and excessive speeding.*

1. INTRODUCTION

India is a developing country with the world's second largest population. The usage of cars rose as a result of the rising population. As a result, a variety of issues arise, including traffic bottlenecks, violations of traffic regulations, and accidents. According to the National Crime Record Bureau's 2016 report, there were 496762 road traffic accidents in 2015. Uttar Pradesh has the greatest number of road accidents. According to a UN WHO global study, India's road accident rate was close to the global average of 17.4 fatalities per 100,000 people. Throughout Though the creation of transportation systems is one of the greatest human inventions, it also brings calamity to the human race through accidents. Road traffic collisions For decades, have been the leading cause of unintentional deaths. Many fatalities may have been avoided if accident information had reached emergency personnel considerably sooner and had a quicker reaction. According to statistics, more than half of all fatalities are caused by the wounded user's delay in getting to the hospital. A MEMS ADXL345 (Micro-Electro Mechanical Systems) device named Accelerometer is used in the automatic accident indication and reporting system for road ways utilising the Internet of Things system to detect rapid changes in a moving vehicle and report such incidents with the related location. Furthermore, the server stores the location information. When an accident happens, the accelerometer's coordinated axis shifts. The value change is now supplied into controller. The controller will look for the suggested algorithm's limit value. When the recommended value differs from the actual value, the signal is sent to the user and the AMRSC centre. Also suggested is a safety system that checks driving speed and alerts the driver first with an alarm, and if the driver does not respond, a message regarding over speeding will be sent to the concerned person.

2. EXISTING SYSTEM

At present, it is not possible to recognize the accident site, nor is it possible to recognize the accident site. Therefore, it is not possible to predict that an accident has occurred. Identifying the person who caused the injured to die results in

3. PROPOSED SYSTEM

The Internet of Things automated traffic accident detection and reporting system uses a MEMS ADXL345 (Micro Electro Mechanical Systems) device called an accelerometer to detect sudden changes in a moving vehicle and is appropriate via GSM network reports. Report such an accident at the location. In addition, location data is stored on the server. When a crash occurs, the accelerometer changes its adjusted axis. The value change is now sent to the controller. The controller checks the limits of the proposed algorithm. If there is a discrepancy between the suggested value and the actual value, the signal is sent to the user and the AMRSC center. It also proposes a safety system that monitors the vehicle speed and first issues an alarm to warn the driver of the driving speed, and if the driver does not care, it sends a message of overspeed to the concerned parties. Vehicle use increases with the proportion of the population. Accidents are increasing day by day due to traffic congestion. This delays the arrival of ambulances at the scene of the accident and the arrival of the hospital from the scene of the accident, resulting in loss of life. Therefore, it is necessary to take the victims of the accident to the hospital as soon as possible. In the event of an accident, you should report to the investigative agency. Therefore, it is also advantageous to transfer the report to the research department so that the research time can be minimized.

4. BLOCK DIAGRAM

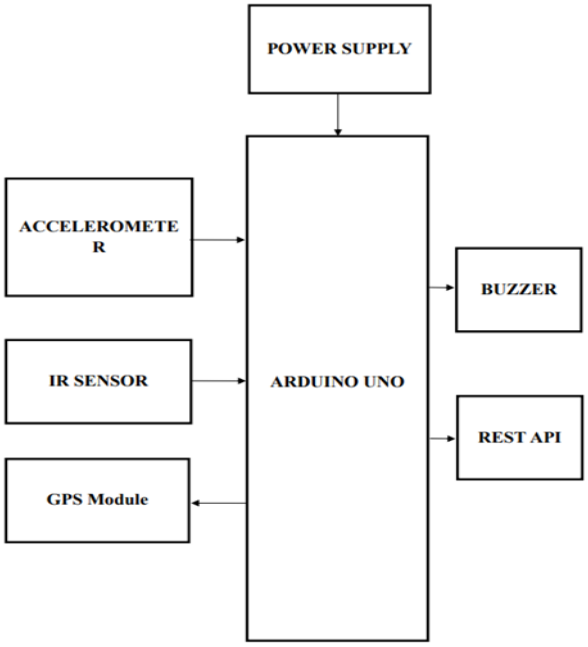

Fig: Block Diagram

This article proposes an automatic wiper system that turns on automatically when it rains and stops when it stops raining. This paper does not require any human physical intervention to control the wipers of the car. In this post, we will use a servomotor, Arduino rain sensor, and LCD module to control the wiper system. When it rains, a rain sensor detects the intensity of the rain and sends that information to the Arduino. The information collected by the rain sensor is processed by Arduino and the processed information is sent to the servo motor to perform the desired action. The rain sensor consists of digital-to-analog output pins that calculate the intensity of the rain. The information sent to the microcontroller controls the speed of the wiper and is based on the intensity of the rain. Precipitation intensity is displayed on the LCD.

4.1 Arduino

Arduino Uno is a microcontroller board based on ATmega328. It has 14 digital input / output pins (6 of which can be used as PWM outputs), 6 analog inputs, a 16MHz crystal oscillator, a USB connector, a power jack, an ICSP header, and a reset button. It contains everything you need to support a microcontroller. Connect to your computer with a USB cable, or power on with an AC to DC adapter or battery to get started. Uno differs from all previous boards in that it does not use the FTDI USB toserial driver chip. Uno and version 1.0 will be the reference version of the evolving

Arduino. The Uno is the latest product on the USB Arduino board and is the reference model for the Arduino platform. For comparison with previous versions. The Arduino Uno R3 is a microcontroller board based on a removable dual inline package. The board is equipped with a set of digital and analog input / output (I / O) pins that can be connected to various expansion boards (shields) and other circuits. The board has 14 digital I / O pins (6 with PWM output) and 6 analog I / O pins, which can be programmed in the Arduino IDE (Integrated Development Environment) via a USB Type B cable. There are 5V output pins and 3.3V output pins. It also includes three ground pins.

Technical Specifications:

Microcontroller AT mega	328
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V

Digital I/O Pins	14
Analog Input Pins	6
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB ofwhich0.5
KB used by	Boot loader
SRAM	2 KB
EEPROM	1 KB
Clock Speed	16 MHz

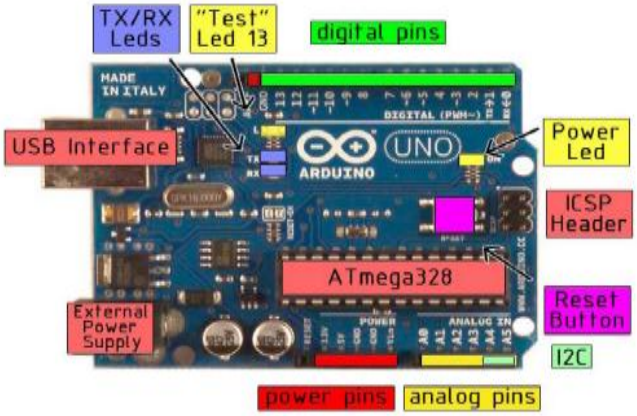

Fig: Arduino

4.2 Accelerometer:

An accelerometer is a device that measures proper acceleration. Proper acceleration, being the acceleration (or rate of change of velocity) of a body in its own instantaneous rest frame, is not the same as coordinate acceleration, being the acceleration in a fixed coordinate system. For example, an accelerometer at rest on the surface of the Earth will measure an acceleration due to Earth`s gravity, straight upwards (by definition) of g ≈ 9.81 m/s2. By contrast, accelerometers in free fall (falling toward the center of the Earth at a rate of about 9.81 m/s2) will measure zero. Accelerometers are widely used in cost sensitive, low power, motion and tilt sensing applications like Mobile devices, Gaming systems, Disk drive protection, Image stabilization and Sports & health devices. Ever wondered how your smartphone knows up from down! It`s one of the coolest features of today`s smartphones. They all got a tiny device called Accelerometer built into the circuitry which can sense when you tilt it from side to side. That`s how your smartphone automatically figures out when to switch the screen

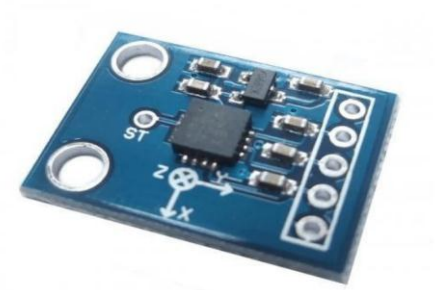

Figure: ADXL 335 with Arduino

4.3 GPS Module:

A GPS navigator, GPS receiver, or simply GPS, is a device that can receive information from GPS satellites and calculate the geographic location of the device. With the appropriate software, the device can display its location on a map and provide directions. The Global Positioning System GPS consists of a network of at least 24, but currently 30 satellites, launched by the Global Navigation Satellite System GNSS US Department of Defense. The GPS module contains a small processor and antenna that directly receives data broadcast from the satellite over a dedicated RF frequency. From there, get the timestamps from all the satellites displayed, along with other data.

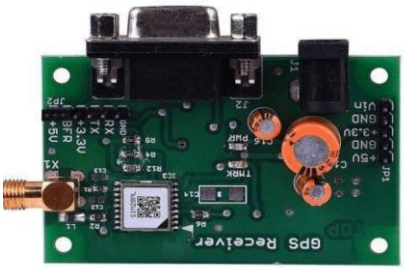

Figure: GPS Module

4.4 Buzzer

A buzzer or buzzer is a mechanical, electromechanical, or piezoelectric audible signal device. Common uses for buzzers and buzzers include alarm devices, timers, and confirmation of user input such as mouse clicks and key presses.

Figure: Buzzer

4.5 IR Sensor

Infrared (IR) sensors are electronic devices that measure and detect infrared rays in the environment. There are two types of infrared sensors, active and passive. An active infrared sensor emits and detects infrared rays. The active IR sensor consists of two parts: a light emitting diode (LED) and a receiver. As the object approaches the sensor, the infrared light from the LED is reflected by the object and detected by the receiver. The active IR sensor acts as a proximity sensor and is commonly used in obstacle detection

Figure: IR sensor

4.6 Rest API

A REST API (also known as a RESTful API) is an application programming interface (API or Web API) that adheres to the constraints of REST architecture styles and allows you to interact with RESTful web services. REST stands for expression. An API is a set of definitions and protocols for building and integrating application software. This, sometimes referred to as a contract between an information provider and an information consumer, specifies the content that the consumer needs and the content that the producer needs. The functionality of the API helps the system understand and execute what it needs. request.

The API must meet the following criteria for it to be considered RESTful:

- A client-server architecture consisting of clients, servers, and resources, where requests are managed over HTTP.
- Stateless client / server communication. This means that client information is not stored between Get requests and each request is not connected individually.

4.7 Power Supply

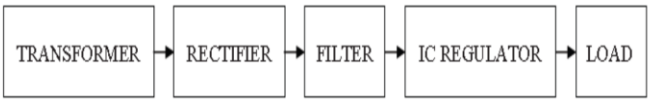

Figure: Block diagram

The AC voltage (typically 220Vrms) is connected to a transformer that lowers this AC voltage to the desired level of DC output. Next, the diode rectifier provides the full-wave rectifier voltage. This voltage is first filtered with a simple capacitor filter to produce a DC voltage. The resulting DC voltage usually has ripples or AC voltage fluctuations.

4.7.1 Schematic diagram

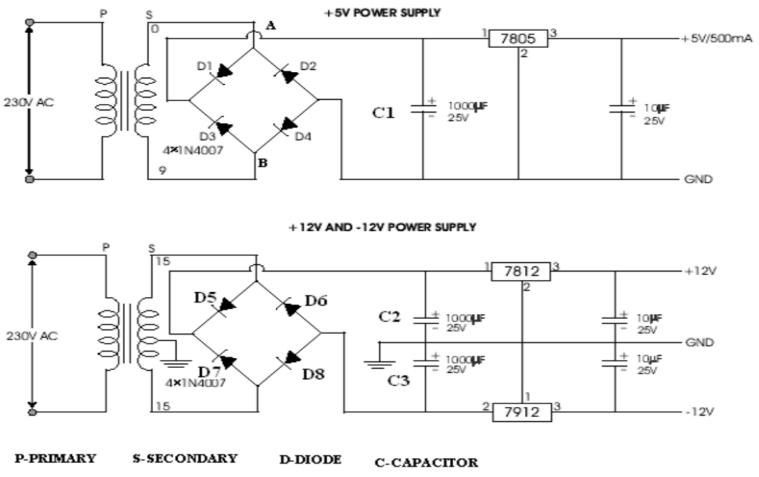

Figure: schematic diagram representation

5. WORKING PRINCIPLE:

Transformers: Transformers reduce the supply voltage (0230 V) to levels (09 V and 15015). If the coil of the secondary winding has fewer turns than the primary winding, the voltage of the secondary winding will drop and the current or amperage will increase or decrease depending on the gauge of the wire. This is called a STEPDOWN transformer. Then the secondary side of the transformer is connected to the rectifier.

Bridge rectifier:

• When four diodes are connected as shown, the circuit is called a bridge rectifier. The inputs to the circuit are applied to the diagonal corners of the network and the outputs are taken from the remaining two corners.

• Suppose the transformer is operating normally, with a positive potential at point A and a negative potential at point B. The positive potential at point A is forward bias D3 and reverse bias D4.

5.1 Advantages:

• Real-time monitoring.

• In the event of an accident, you can quickly alert the ambulance, which can save lives.

• Careless driving and overspeed can reduce

6. RESULTS AND DISCUSSION

Finally, after performing all the necessary steps, we were able to implement a project on "Accident Prevention and Identification System for Vehicles Using Arduino". The final result of the project is:

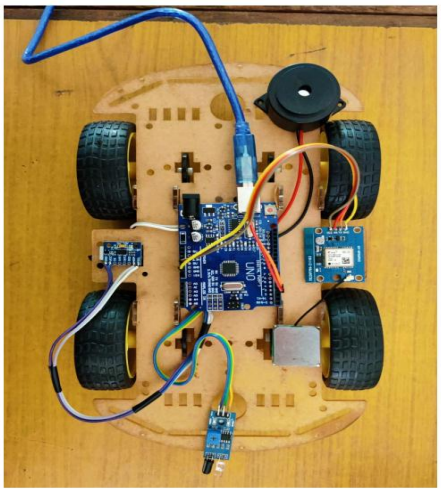

Figure: Hardware Module

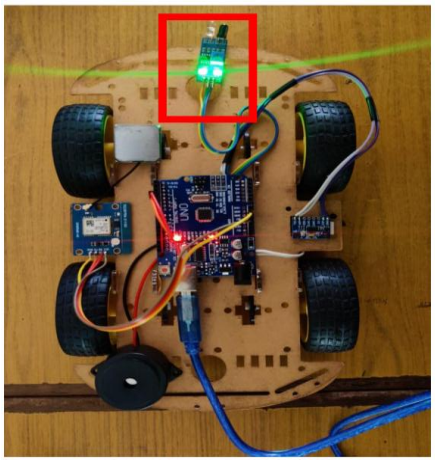

Figure: Nearby Vehicle Detection and Alert

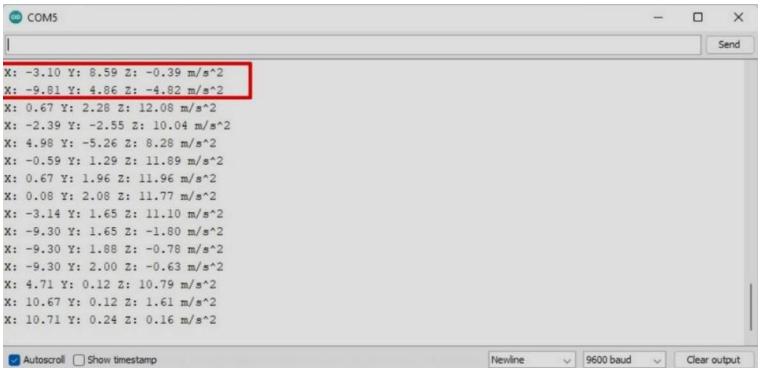

Figure: Accelerometer Readings

Sudden changes in the axes of vehicles sends the alert message on your mobile phone with the location of the accident

Figure: Alert Message Sent With Location

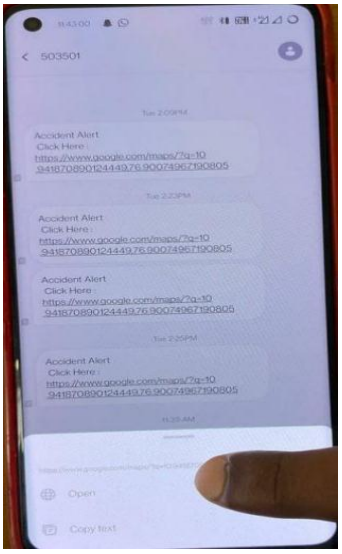

Figure: A Link Is Provided For The Accident Location

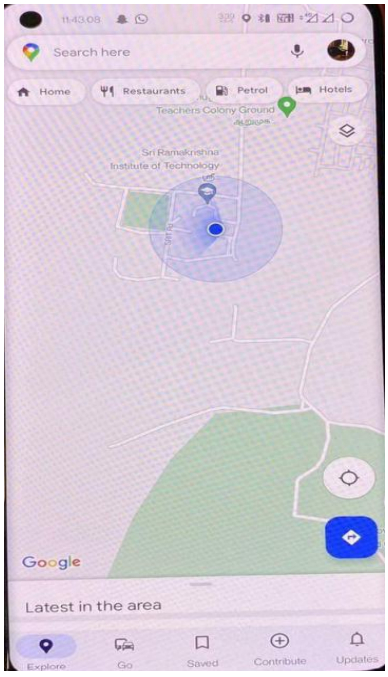

Figure: Exact Location Pinned By Google Maps

6.1 Future Work

Once this project is complete, you can make certain improvements:

• After the driver is found to be drunk, the driver can be automatically fined by stopping the vehicle and connecting the central system to the traffic control center.

• Scientifically proven music to keep you awake can sometimes be played in a taxi.

• The CCTV camera can be installed in the driver's cab and controlled from the travel agency's headquarters, greatly preventing accidents.

• You can connect the vehicle unit to a central server to get contact numbers. Ambulance and police control center.

• If the vehicle is speeding up, the accelerometer may detect this and automatically complain about traffic and penalize the driver. This can also limit the speed of the vehicle and prevent accidents

7. CONCLUSION

With the continued progress of science and technology, vehicle safety is becoming more important. As the number of vehicles increases, the number of traffic accidents increases every day, and it is our responsibility to manage them. Most often, accidents are caused by a drunk driver, drowsiness while driving, and overheating of the engine, causing a fire. Implementing this project will help reduce accidents due to the above reasons. The system is automatic, cost effective and energy efficient, making it easy to install in vehicles. Unfortunately, in the event of an accident, the system can detect it and, with the help of GPS, display and communicate the exact location. The project proposed a system that would allow victims to receive medical care faster than existing methods of delays at all stages from accident detection to emergency services response. In the proposed system design, the vehicle unit consists of an accelerometer used to detect and report accidents so that emergency services can immediately accept the patient. This helps save many lives by notifying rescue personnel in a timely manner. Overall, this system is very affordable, aimed at the general public, and easily implemented on all types of vehicles.

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