CAR OVER-SPEEDING DETECTION USING ARDUINO

ABSTRACT

Road accidents occurrences have increased recently so there needs to be a system that allows to detect over speeding cars. Current speed detection systems are handheld guns held by police personnel that allow them to check car speed and then manually inform authorities about the vehicle. Whereas this proposed system does not need any human interception and records car speed as well as wirelessly informs authorities of over speeding detections. The system first calculates the time required by the specific car for moving from first point to the second. Based on this data it calculates the car speed. This data is gathered and then transmitted by the system wirelessly to concerned authorities at a remote location. The mechanism consists of IT transmitter- receiver pair that work in combination for vehicle detection purpose. The Arduino is now used to process this data and calculate the time required by vehicle to travel from one point to the other. Depending upon this time it now calculates vehicle speed as well as displays this on an LCD display. The system also sends this data wirelessly. It sounds a buzzer alarm if an overspeed vehicle is detected.

INTRODUCTION OF PROJECT:

Our proposed project aims to develop a system that detects carsdriving at speeds over specified limit and inform concerned authorities immediately. Road accidents occurrences have increased recently so there needs to be a system that allows to detect over speeding cars. This proposed system does not need any human interception and records car speed as well as wirelessly informs authorities of over speeding detections. The system first calculates the time required by the specific car for moving from first point to the second. Based on this data it calculates the car speed. This data is gathered and then transmitted by the system wirelessly to concerned authorities at a remote location. The mechanism consists of IT transmitter- receiver pair that work in combination for vehicle detection purpose. The microcontroller is now used to process this data and calculate the time required by vehicle to travel from one point to the other. Depending upon this time it now calculates vehicle speed as well as sounds a buzzer alarm if an overspeed vehicle is detected.

MOTIVATION OF PROJECT:

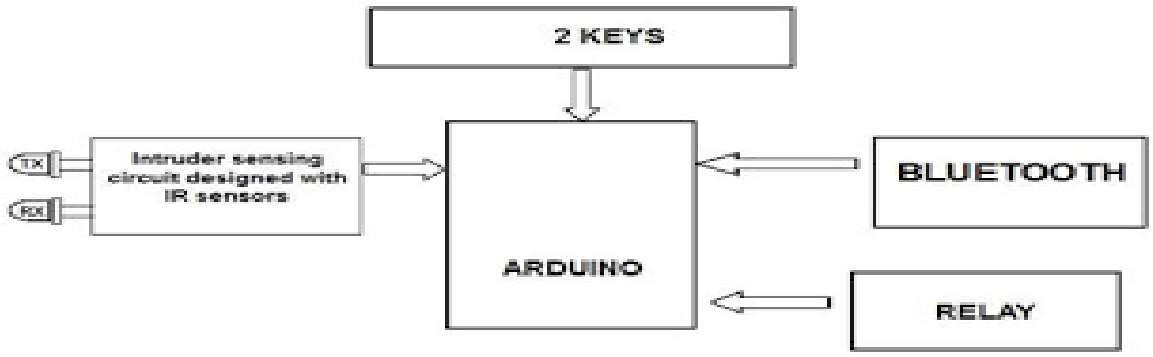
The design of Car Over-speeding detector using Arduino UNO microcontroller and IR sensors for speed detection and relays for acting as accelerators and a buzzer for alerting when the vehicle over speeds. The main of this project is that to make sure to lessen the road accidents and to ensure

the safety of the people who drive faster. Our motivation about this project is to lower the percentage of accidents occurring in our country at a low cost and also making it in-built in the vehicle with a buzzer as it gives the alert to the driver. And we also wanted to learn about the Arduino UNO and it's use cases in real life.

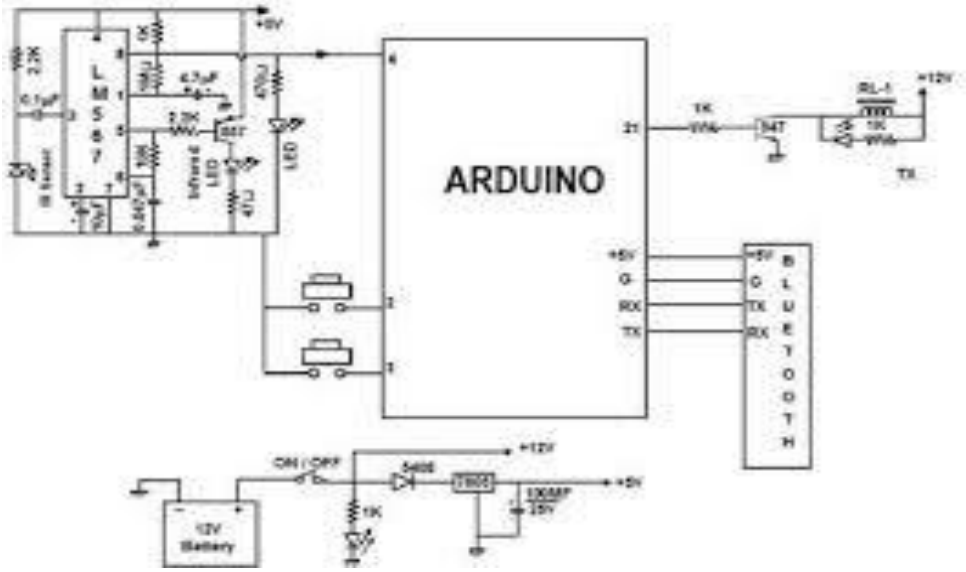
BLOCK DIAGRAM:

Block Diagram of Car Over speed Detector Figure 1.1 show the block diagram of our project car over speed detector which is a Arduino based project which helps in giving alerts to the driver whenever the vehicle is at a over speed. This project is developed using Arduino UNO, relays, buttons, Bluetooth, and IR sensors. The arrows in the block diagram indicates the connectivity of the other components to the

Arduino microcontroller board. In our project the IR sensor senses the number of rotations of the wheel and detects the speed as per the rotations. Whenever the wheel takes number of rotations more than required then the buzzer gives a beep alert and sends the signal to the mobile connected through the Bluetooth. Here, each block has separate function to do and all the blocks work with the central brain of project i.e. the microcontroller Arduino uno. Power supply, connecting wires, bluetooth, a circuit board are used to complete the circuit.



CIRCUIT DIAGRAM:



Vishal Pande et.al [1] has proposed a framework for autonomous speed control of over speeding vehicle using Radio Frequency to design a controller to control vehicles speed and display to monitor the zones which can run on an embedded system platform. Monika Jain [2] presented a device to detect the rash driving and alerts the traffic authorities in case of any violation. This frame of reference intends to design a system aimed at early detection and alerts vehicles driving patterns which is related to rash driving. The speed limit is by the police at very location who uses the system depending on the traffic. This device reports, displays and data base system for over speed violation management. Ni Hlaing et.al [3] designed a system that detects the speed of the vehicle in the roads, main highways and the places where the drivers over speed. If the speed exceeds the limit, the information will be sent to PC (Personal Computer) which starts the camera which captures the vehicle of over speed. Nehal Kassem et.al [4] introduced a novel RFbased vehicle motion and speed detection

system which can detect vehicle motion estimates the vehicle speed in typical streets with an accuracy of 90% and detects motion with an accuracy of 100%.

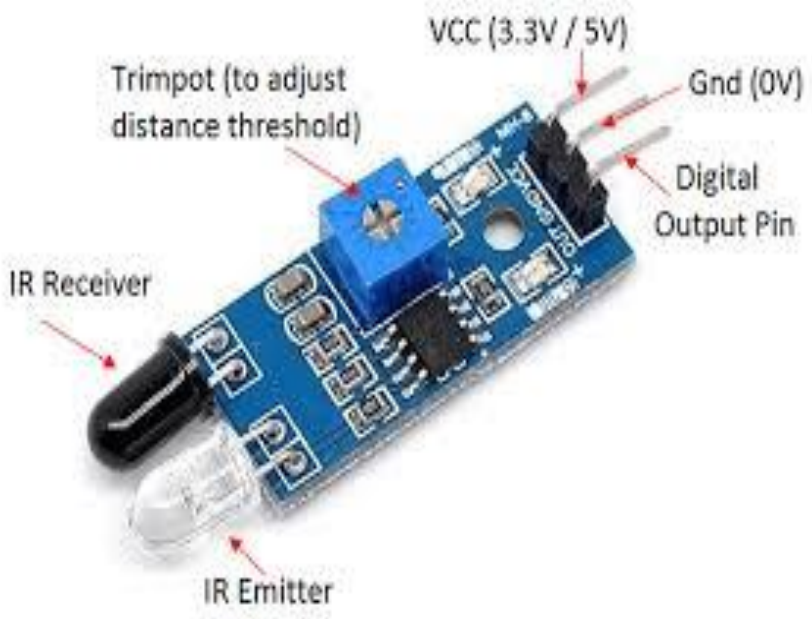
TECHNICAL DESCRIPTION

Arduino UNO:

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. "Uno" means "One" in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in

a series of USB Arduino boards and the reference model for the Arduino platform. To control the Arduino Uno board, the user has to write instructions in human readable form on the Host PC and convert it into machine language and upload it to the board. This whole process is carried out.

IR Sensor:



An infrared proximity sensor or IR Sensor is an electronic device that emits infrared lights to sense some aspect of the surroundings and can be employed to detect the motion of an object. As this is a passive sensor, it can only measure infrared radiation. An infrared sensor is an electronic module which is used to sense certain physical appearance of its surroundings by either emitting and/or detecting infrared radiation. IR sensors are also capable of determining the heat being emitted by an object and detecting motion. Now lets learn the interfacing of IR Sensor and Arduino. Here we are using an IR sensor for detecting obstacles. IRtransmitter transmits IR signal, as that signal detects any obstacle in

its path, the transmitted IR signal reflects back from the obstacle and received by the receiver.

Buzzer:

Basically, the sound source of a piezoelectric sound component is a piezoelectric diaphragm. A piezoelectric diaphragm consists of a piezoelectric ceramic plate which has electrodes on both sides and a metal plate (brass or stainless steel, etc.). A piezoelectric ceramic plate is attached to a metal plate with adhesives. Applying D.C. voltage between electrodes of a piezoelectric diaphragm causes mechanical distortion due to the piezoelectric effect. Here we are using the buzzer as an indicator for the over speeding i.e. whenever the vehicle over speeds then the buzzer gives an alert about the over speeding. Here we used the buzzer for alerting the driver whenever the vehicle overspeeds.

Bluetooth:

Bluetooth is a short-range wireless technology standard that is used for exchanging data between fixed and mobile devices over short distances and building personal area networks (PANs). In the most widely used mode, transmission power is limited to 2.5 milliwatts, giving it a very short range of up to 10 metres (33 ft). It employs UHF radio waves in the ISM bands, from 2.402 GHz to 2.48 GHz. It is mainly used as an alternative to wire connections, to exchange files between nearby portable devices and connect cell phones and music players with wireless headphones. The IEEE standardized Bluetooth as IEEE 802.15.1, but no longer maintains the standard. The Bluetooth SIG oversees development of the specification, manages the qualification program, and protects the trademarks. Here we used the Bluetooth module HC-05 to connect the device to mobile phone so that the alerting messages can be sent to the device instantly when the vehicle over speeds.

PROCEDURE

The main procedure of the project begins when the vehicle starts/ the engine is on. As soon as the engine starts the Arduino gets activated and the IR sensor starts collecting the data about the speed of the

vehicle, then, it continuously starts sending the data to the Arduino and the data will be displayed in the device connected. After some time when the vehicle reaches to the maximum speed which set in the Arduino it again sends the speed to the device. When the vehicle exceeds the maximum speed then immediately the buzzer will start alerting by giving the “Beep” sound and also sending the alerting message to the device connected to the Arduino through Bluetooth.

EXISTING SYSTEM ANALYSIS

The existing system for our project is called vehicle speed detector. This system has the ability to give the alert to the driver with the help of the buzzer and a blinking light. As the vehicle goes in a normal speed then no update is given to the driver but when the speed of the vehicle increases suddenly or exceeds the normal speed suddenly then immediately the buzzer turns on and gives the beep sound to the driver. So, it alerts the driver to slow down the vehicle. So, this process gets repeated and goes on whenever the vehicle is going in a high speed or more than the normal speed.

PROPOSED SYSTEM

In this system, we are mainly using Microcontroller Arduino UNO and bluetooth technology which is very helpful in communication because its low power consumption limits transmission distance to 10-100 meters and great efficiency. Also we are using IR sensors which will help us to detect and display the speed of any vehicle passing through the area where this system is implemented in a device connected through bluetooth. Power supply of LM78XX series which will help to provide us fixed voltage for system. This project has been designed assuming that the maximum permissible speed for highways is either 40 kmph or 60 kmph as per the traffic rule. Our main purpose is to detect speed of over speeding vehicle. This system can display the exact value

of vehicle's speed detected with the respective time duration. Before starting the operation, we have to verify whether the power supply output is proper. If yes, apply power supply to the circuit by keeping switch to ON. Few of the Key points of our proposed system are as mentioned below – First, our proposed system not only detects the over speeding but also gives update about the speed of the vehicle. It displays the message of over speeding in a device that is connected to the detector through Bluetooth. It also gives the beep sound whenever the vehicle exceeds the maximum speed and goes on continuously in the high speed. It also sends an alerting message to the higher officials near by so that they can stop the vehicle and make it slow down or impose a fine

Results:

Car Over speeding Detection using Arduino UNO.

How the project set-up looks!

Advantages:

- To avoid the accidents.
- Cheap in cost.
- Effective method to record vehicle speed.
- Does not need any human interception. Records car speed as well as wirelessly informs authorities of over speeding detection.

Disadvantages:

The main disadvantage of our project is that it alerts the driver about the over speeding but that does not do any work in stopping the vehicle.

Applications:

- In Over speeding vehicles.
- In automatic vehicles.
- In any automobiles.
- In speed detection machines.