

# Accident Prevention System for the Road Curve

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**Abstract-** because the variety of car in transit area unit apace increasing; therefore it's been a significant concern for route authorities to facilitate effective management of traffic for collision dodging. For numerous highways, these rising demands can't be counteracted by any extending the prevailing road infrastructure giving a special importance to the economical use of the prevailing network. during this side, digital signals area unit important issue since it's visible from long distance that is commonly capable of up the traffic flow. For expeditiously predicting the opposite finish traffic from the unrecognized curve, a digital approach is taken into consideration. the gap between 2 vehicles with a proof indication between them can assist the motive force to regulate the speed of car at the curve finish to cross it with none collision. The traffic density is calculable mistreatment the speed sensors and also the vehicle with most worth bigger than threshold speed can get aided mistreatment actuators to prevent its speed to avoid the collision on the curves.

**Keywords**— Atmega- Arduino, EMU, EMM

## I. INTRODUCTION

Over the globe Asian nation bangs the highest most position in accidents deaths. Nearly 1.2 large integer of individuals killed per annum on Indian road. change accidents area unit currently to blame for virtually 1/3 of all route vehicle indweller facilitation change tend to be a lot of serious thTAalternative styles of accidents. For lightweight trucks and SUVs the proportion of indweller fatalities related to rollovers is regarding five hundredth. For significant trucks the amount is regarding hour.areas.Fatal accidents occur oftentimes on low-volume rural roads, and also the accident rates area unit up to four times higher at curves. it's so of preponderant importance to perform road inventory of rural roads to develop safety plans. However, most states in U.S. face a challenge to keep up a information for low-volume rural roads as a result of restricted funds for road inventory The common causes for vehicle accidents area unit driver distraction or negligence, urban location heavily inhabited areas or little with short transport facilities, vehicle handling drawback and weight distribution drawback. Accident in road curve principally happens once the force is over the direction and momentum force that makes the vehicle to maneuver in an exceedingly line rather than curvilinear path. A change may be a form of vehicle crash during which a vehicle tips over onto its facet or roof. Rollovers have a better mortality than alternative styles

of vehicle collisions. Vehicle rollovers area unit divided into 2 categories: tripped and un-tripped. Tripped rollovers area unit caused by forces from AN external object, like a curb or a collision with another vehicle. Un-tripped crashes area unit the results of steering input, speed, and friction with the bottom Un-tripped rollovers happens once cornering forces destabilize the vehicle. As a vehicle rounds a corner, 3 forces act on it.

## II. SYSTEM DESCRIPTION

The Fig one shows the diagram of Arduino-Mega. the outline of every block is given below..

### A. Displacement sensor

The kind of displacement device we have tend to area unit about to use is supersonic device which might accurately erect the thing and measure the gap between them by transmittal a brief burst of supersonic sound toward a target. once the sound is mirrored, it returns to the device as AN echo. the gap between the supersonic linear position device and is calculated from the signal's come time.

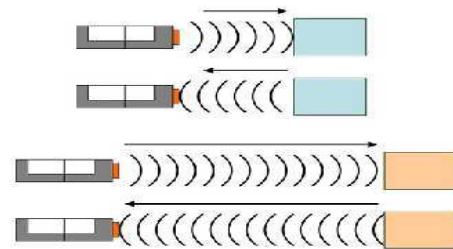


Fig 1. Displacement sensor.

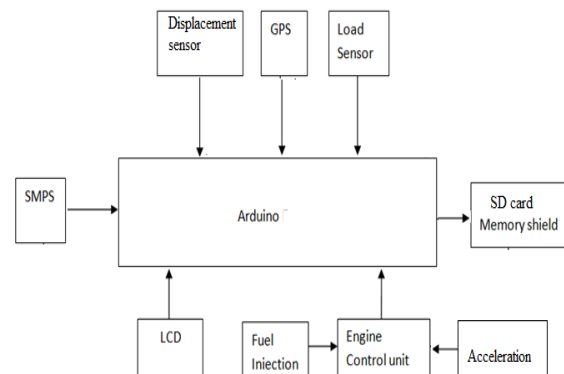


Fig 2- Block diagram of Arduino-Mega

**B. Load Sensor**

Load sensors area unit introduced within the vehicle to calculate the entire load carried on the vehicle. The load sensors area unit unbroken at the place wherever the chassis and also the vehicle frame area unit in-tuned. This calculation are going to be drained a periodical time so the gradual derived results area unit noted down so they're sent to the engine management unit. The load/weight knowledge obtained from the device shows the pressure generated on the spring that area unit resulted from the gap changes from the mechanical system of the vehicle.

**C. Engine management unit**

An engine management unit (EMU), conjointly ordinarily referred to as AN engine management module (EMM), may be a form of electronic management unit that controls a series of actuators on an enclosed combustion engine to make sure optimum engine performance. It will this by reading values from a large number of sensors among the engine bay, decoding the info mistreatment three-d performance maps (called operation tables), and adjusting the engine actuators consequently. Before EMUs, air-fuel mixture, ignition temporal order, and idle speed were automatically set and dynamically controlled by mechanical and gas suggests that. In automotive physical science, Electronic management Unit (EMU) is any embedded system that controls one or a lot of of the electrical system or subsystems in an exceedingly transport vehicle.

**D. Speed Management Unit**

. Speed management UnitThe throttle pedal is connected to the throttle position (APP) device. The electronic throttle body includes position device to supply throttle angle feedback to the vehicle pc some system use a throttle mechanism management (TMM) module to control the throttle blade (plate) Electronic Throttle management (ETM) is that the automobile industry's "Fly by Wire" system. In ETM systems, a vehicle's electronic management unit uses data from the throttle position device (TPD), throttle position device (APP sensor), wheel speed sensors, vehicle speed device and a range of alternative sensors to work out a way to change throttle position.

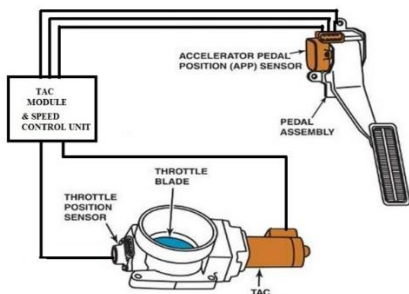
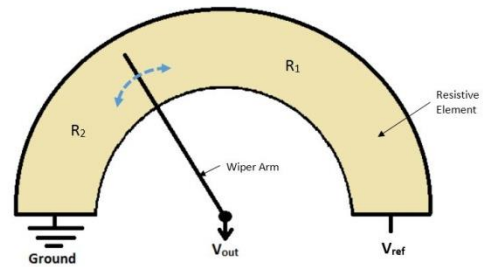


Fig 3- Speed Management Unit

Voltage Divider Diagram



The image on top of helps illustrate the fundamental principle behind however a resistance works. The resistive component, conjointly referred to as a carbon track, is essentially a chunk of carbon. Moving the arm across the resistive component effectively alters the resistance on either facet of the arm (R1 and R2). Moving the wiper right-handed will increase R2 and reduces R1 and moving it counter right-handed will the other. Let's show however the APP device works as a resistance. after you step the foot pedal, you progress the wiper nearer to the reference voltage finish of the resistive component (Vref). What will this do to the output voltage sent to the EMU? Imagine current flowing from positive (Vref) to the wiper. By moving the arm nearer to the reference voltage, you decrease the "amount of resistance" through that this should flow before it reaches the wiper. This will increase the output voltage to the eu. the precise relationship between the output voltage, the reference voltage, and also the position of the wiper are often written as an equation

$$V_{out} = \frac{R_2}{R_1 + R_2} \times V_{ref}$$

Deriving this equation is straightforward. It involves use of law (V=IR) and Kirchoff's Current or Voltage Law. We'll forgo this derivation, because the key here is to know the conception. The eu provides a reference voltage to the APP device. Physical movement of the pedal moves a wiper across a resistance component and alters the output voltage to the eu. The eu takes during this signal, and sends an applicable signal to a throttle mechanism, that moves the throttle plate. The throttle position device works in an exceedingly similar manner. The potentiometer wiper is connected to the valve spindle. because the valve opens and closes, it varies the output voltage from zero to the reference voltage. This output voltage is distributed to the eu. this can be however the eu is aware of the position of the throttle plate. The problem with potentiometer-based sensors is that, because the wiper and also the resistive component rub against each other, they eventually wear out. Newer throttle position sensors and throttle position sensors do not have this drawback, as they use Hall result as their basic operational principle. These sensors contain transducers that convert external magnetic fields into voltage. mistreatment magnets placed on the pedal and throttle shaft as reference points, Hall result sensors

output a special voltage looking on the intensity of the magnetic flux. because the pedal or throttle moves, therefore will the magnet. This movement changes the magnetic flux strength and so alters output voltage from the device to the eu. Now let's have a glance at however these 2 sensors move. Electronic Throttle management may be a closed-loop system. The throttle opens supported user input (which is transmitted to the eu via the throttle sensor), and adjusts supported readings from the throttle position device (which measures the position of the valve spindle).

III. SYSTEM METHODOLOGY

The methodology that we can apply is two way first is Sensor based and second is GPS based. According to Study we are designed the basic concept that is we are received the data from sensors and perform the action according to sensor data. For that we are choose the arduino due as a controller, which is the strongest processor is arduino Serial having multitasking and Higher Clock Speed. Then we are plan to used ultrasonic sensor (Displacement sensor) for distance measurement and load sensor for load measurement of vehicle.

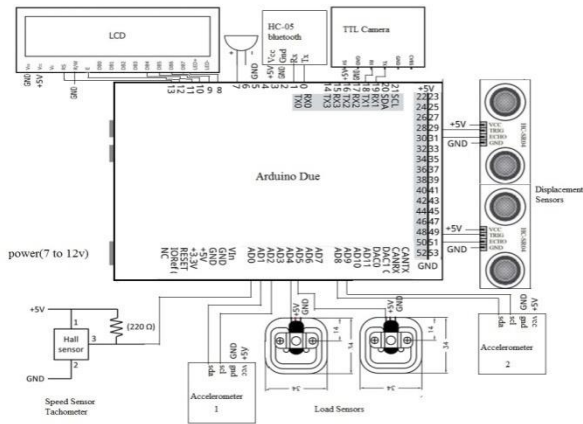


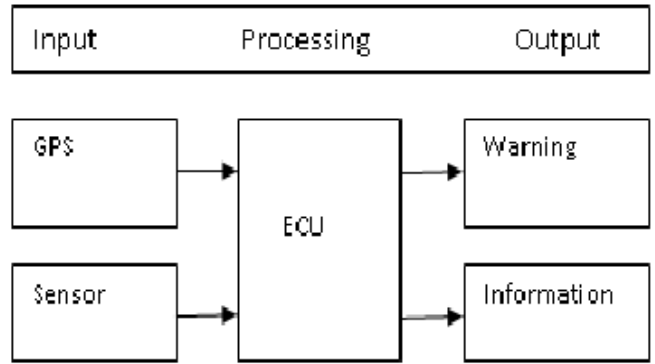
Fig 4- Sensor based technology

Accelerometer for checking Road condition, if the Road condition is not right then Speed gets automatically slow.

A) GPS Based Technology

In GPS based technology the Processor is same but Instead of Sensors we are plan to used GPS and SD card shield. The Predefined Locations of Routes are save when we call API, and then at curve Road the GPS sense the Location and match with predefined location, if it is match or some near about according to threshold value that we are set then the car speed gets automatically slow. The all process of engine control unit is same.

IV. OPERATION



The operate of the sensors is managemented by the engine control unit. This device gets activated once first by GPS so finds a road curve ahead the vehicle. data from the 2 sensors and GPS from the American state card protect area unit processed by the engine management unit. The engine management unit can mechanically cut back the speed by decreasing the fuel flow provided from the tank to the engine. In-car safety technology is experiencing a amount of fast development. These developments area unit well placed to support older individuals driving for extended in later life. though older individuals area unit quite acceptive of those technologies, the planning of their associated HMIs are often seen to be distracting. this can be a big cause for concern once considering older drivers. needs|the wants} and requirements of older individuals area unit each numerous and specific encompassing, any and every one of, a gradual decline in psychological feature, vision or deftness. There looks very little proof of older individuals being thought of as a bunch in their title to tell the planning and effectiveness of those system management interfaces. The accidents as a result of the carelessness of the motive force area unit prevented by alerting him through the buzzer and light-weight indication moreover by voice recognition. Similarly, if the traffic happens as a result of the repair or accidents of the vehicle, the transceiver sends the signal to the controller through the Wi-Fi router and shows the message regarding the spot wherever the matter has occurred. The Unit has been designed to forestall AN accident by collision. The 'heart' of the Unit is Arduino micro-controller that performs all the important tasks of the system. And it'll be mentioned within the following ulterior sections. this technique can receive data from the supersonic transceiver, and consequently transmit the info via the Wi-Fi router to the controller. Through the buzzer indication, lightweight emitting show, and liquid show, the vehicle data are going to be shown to the vehicle users. this can be to be done by the functioning of 3 units. the primary Unit is input unit that consists of supersonic transmitter receiver combine on each bend. The second unit is management unit that

consists of micro-controller and Wi-Fi router. It is to be done whenever the vehicle is being driven on the roads having curves or through the accident prone areas. There are a lot of prospects of accidents in such areas and hence this project encompasses a scope of labor in that.

#### IV. COMPARISON

Sr.no	Existing system	Proposed system
1.	Based on sensors only	Based on sensors and GPS
2.	Accuracy is less	Accuracy is more
3.	Feasibility is less	Feasibility is more

#### V. CONCLUSION

This system can sense and live totally different parameter like road curve distance, load on the vehicle. The on top of live parameter facilitate cut back the accident within the road curve. Thus, it makes the general public transport a lot of economical and effective.

#### VI. REFERENCES

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