

# Accident Prevention Based on Climatic Condition using Sonar and IoT for Electrical Vehicle

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**ABSTRACT:** In this project there is a system which is used to identify accidents to prevent from it. In such scenarios, a driver cannot fully monitor the environmental around the vehicles using only rear-view mirrors and front mirrors due to foggy areas and heavy traffic. The parameter of climatic condition is measured with the help of sensors such as fog sensor and ultrasonic sensors and also whenever accident will take place, the GPS system will be easily locate the particular place and send an information to emergency team by using the IoT, GSM.

**KEYWORDS:** AT89C51 Microcontroller, (IR, Tilt, Fog, Sonar) Sensors, DC Motor, Voltage Regulator, Power Supply, LCD display, IoT, GSM.

## I. INTRODUCTION

In day to day life the obstacle detection and accident avoidance is increasing in the foggy regions. Due to there is heavy fog in New Delhi there is more number of probability to undergo accidents. Situational awareness to driver provided by driver information system. Forward and backward collision warning to avoid the collision provided allows the user to be safety. The introduction of new technology vehicles has become increased by auto manufacturers as there is no proper system to avoid accidents in the foggy regions. Since now there is no way to prevent from accident in Delhi due to heavy fog. However, GSM is vulnerable to several methods of attack each of them aimed at different parts of network. As the population increased, vehicle usage also increased. So it leads to accident when the speed is out of the limit. So, we have a speed control system which controls the vehicles in all directions. This prevents the accidents. The paper consists of objective, existing system, proposed system, methodology, conclusion and references. To avoid accidents in foggy area this system is used to detect the vehicles which will be detected by using SONAR and Infrared sensors.

## II. METHODOLOGY

### A. System Design:

A motor Driver module like is mandatory because the amount of current required for running the DC gear motor cannot be sourced by the I/O pin of the micro-controller. The sensors and the module is powered by the +5V supply which is being regulated by the 7805. The motor driver module can be powered even using +12V, the complete vehicle is powered by a Power source in my case. You can also use any ordinary power bank and by pass the regulator section or use the above circuit and use any 9V or 12V battery for the vehicle.

When an object is detected by the US sensor, it is time to change the direction of the vehicle. We can either turn left or right, to decide the turning direction we use the help of IR sensor to check if there is any object present near the Left or right side of the robot. If there is an objected detected on the front and right side of the vehicle, then the vehicle will come back and turn left. We make the robot to run backward for a certain distance so that it does not collide on the object while making the turn. There is an objected detected on the front and left side of the vehicle, then the vehicle will come back and turn right. The complete circuit Diagram of this obstacle avoiding vehicle. As you can see, we have used two IR sensors to detect objects on left and right of the robot

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respectively and an Ultrasonic sensor to measure the distance of the object that is present ahead of the vehicle. We have also used a L293D Motor Driver module to Drive the two-motor present in this project. These are just ordinary DC gear motors for wheels and hence can be derived very easily.

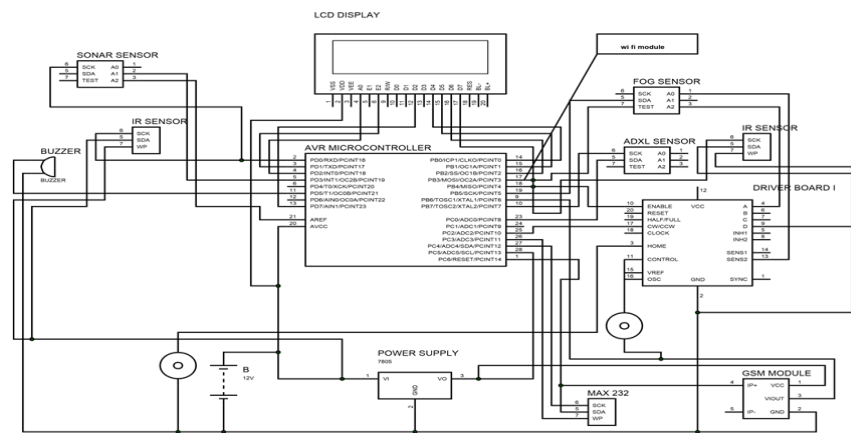


Fig1. Circuit Diagram

**B. Block Diagram Design:**

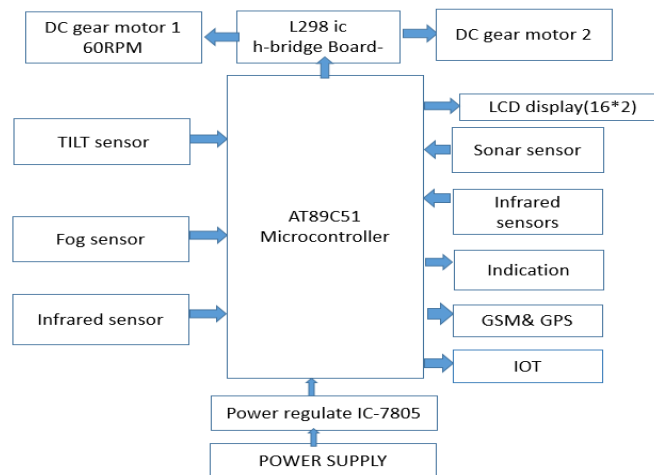


Fig. 2. Block Diagram

**C. AT89C51 Micro-controller:**

In this series is based on 80551 micro controller architecture. In AT89C51 here AT stands for ATMEL, C for CMOS and 89 is a series of variants. When compared to 87 series the 89 series was advanced. The difference between 87 series and 89 series is time. 87 series takes 20 minutes for clearing ROM but, in 89 series it was reduced to few seconds. So, the series 89 is more famous than others.

\*0Hz to 24 MHz full static operation.

\*it has three levels of program memory lock.

\*128 x 8-bit internal RAM ,two 16-bit timer or counter and six interrupt sources.

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\*low-power idle and power-down mode.

*D. Tilt Sensor:*

It is an acceleration measurement with select-able range which allows to find the position of the vehicle. It provides control of the vehicle in all directions in the emergency situation.

*E. IR Sensor:*

The Infrared sensor is an electronic device which is used to sense the object by emitting and detecting the infrared radiation. It can also detect any movement of vehicle without sun light source.

Step 1: No object present - no IR light detected by the sensor.

Step 2: Object present - reflected IR light detected by sensor.

*F. Fog Sensor:*

Fog sensor consist of low power consumption. The main application is used for traffic purpose, this processes is used to measure the amount of water particles present in the air that limit the visibility. Fog visibility will calculate in meter and also measured ambient light etc.

Dimensions:	120*120*90 mm, for details see drawing
Weight:	about 1kg
Warm up time:	about 1 minute
Current consumption:	200 mA from a 12 Volt ( 11-15) supply (without heating about 60
Outputs:	RS232 2400 baud 8N1, analog 0-5 Volt optional switch that changes state at 1000 meters visibility
Temp. range:	-20 to +50 deg C
Laser output power:	less than 5 mW. Laser safety class: 3R
Laser wavelength:	650nm
Housing:	IP 65 aluminium box, openings sealed with O-rings
Visibility range:	Visibility shorter than 10 km - down to 20 meters

Fig 3. Table

*G. Sonar Sensor:*

The Ultrasonic Sensor is used to determine or detect the object with the help of sound waves. This is the method which bats or dolphins can communicate seamlessly without any interruption of signals. The ranging module that it can provides 2cm to 400cm or 1 to 13 feet. The transmitter converts electrical signal into sound signal which act as the ultrasonic wave. The receiver receives them by the time of navigation and the strength of the signal and can be determined the distance between the sound energy and the frequency.

*H. Voltage Regulator:*

A voltage regulator is designed to automatically maintain a constant voltage level .A voltage regulator may be a simple feed forward design or may include negative feedback control loops .It may use an electromechanical mechanism or electronic component. It may use to regulate one or more AC or DC voltages.

### *I. LCD display:*

The LCD is used to display frequency and the strength measurement with the help of the Ultrasonic sensor and the Micro-controller. The given sensors give the value of the each segment in which whether the distance between the two vehicle is more or less. There are different types of LCD panels and they are

1. Twisted Nematic (TN).
2. IPS Panel Technology.
3. VA Panel.
4. Advanced Fringe Field switching.

### **III. EXPERIMENTAL RESULT**



Fig. 4. Accident Prevention Based on Climatic Conditions Using SONAR and IOT for Electrical Vehicle

This is a hardware kit of our project. If any vehicles are present in front side, right side, left side, and back side of the car it will measure the distances and show in the LCD display. If the tilt sensor position change the GPS will locate and send the information to the emergency team in IoT and GSM. If the fog is present in front of the car it detects and show in display speed control.

### **IV. CONCLUSION**

This system can be implemented in vehicles of foggy and accident areas. As the GSM will send the mobile device a message that the vehicle is nearing us and also prevent us from colliding from the accidents. These are very effective that we can avoid accidents within the meter without even seeing the road. And, the main purpose of this project is used to avoid accidents.

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