Smart Highway

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Abstract: *Smart highway is a new technic to connect through the developing technology. It helps to develop the highways and make them involve in the connecting through it. It consists of the technology like smart streetlight, smart speed breakers, smart energy production technologies and an automatic charging for the e-vehicle. It also makes to connect to the various sensors. The smart streetlight helps to save the energy by detecting the presence of the vehicles. Smart speed breaker help to control the speed of vehicle which help to reduce the accident on the highways. Smart Energy Production Technologies help in production of energy by the renewable resource.*

Keywords: Smart Streetlight, Smart Speed Breaker, Smart Energy Production, Automatic Charger for E-vehicle

I. INTRODUCTION

Smart Highway is a new technology consists of Smart Streetlight, Smart energy production technology, Smart speed breaker, automatic chargingfor e-Vehicle. The smart streetlight is used to control the intensity of the light by controlling the brightness of the light in presence or in absence of the vehicle. Smart speed breaker will help to controlthe speed of vehicle by adjusting the height of it.It uses the ultrasonic sensor which will help to detect the object. Smart Energy Production, by using the renewable source i.e. Wind Turbine,we used to produce the energy. We used Traffic Wind Turbine which helps to produce the energy for the pressure of wind produce by the vehicle andautomatic chargingfor e-Vehicle will help to charge the electric vehicle .This will help to travel the electric vehicle for the long distance.
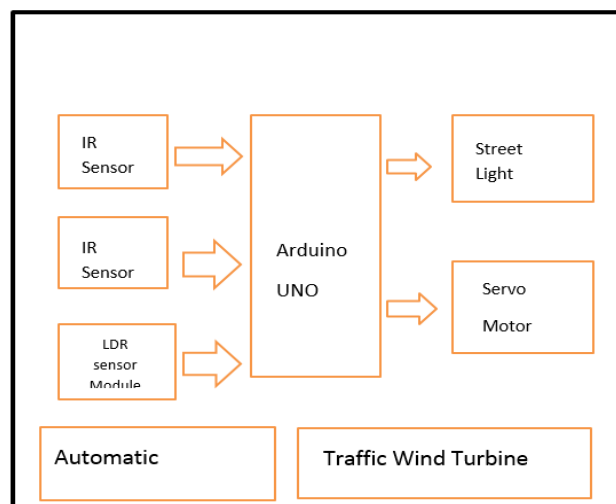
II. BLOCK DIAGRAM

Fig 1: Block diagram of Smart Highway

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Block diagram consist of Arduino Uno, two IR Sensor module, LDR sensor Module are the input and the output of it are street light, servo motor that is speed breakers automatic charger.

LDR sensor is used to detect the presence of the light and IR sensor is used to detect the presence of object which helps to control the brightness of the light. If the object is present then the brightness of light will be high and if there is no object detection then the brightness of the light will low. It only works at night time, in day time street lights will be remain off. This process takes over under the Smart Street light.

The two IR sensors are used to detect the speed of the object, according to the speed of the object the function of servo motor take place. If the speed of the vehicle is very high as compare to the maximum speed of the vehicle then the height of the speed breaker will increase. This process is done by servo motor. The angle of the shaft of servo motor is placed between the $0\circ$ to $40\circ$. The movement of the shaft is according to the output of the IR sensor. This whole process is taken under the smart speed barker.

The Arduino UNO is the central part of it. All the process is done by the help of Arduino IDE. This whole process is controlled by the Arduino Uno.

The automatic charger is placed to charge the E-vehicle. The process take place in the moving condition of the vehicle and the process is shown by the glow of the LEDi.e. charging is going on. Here we used the copper wire winding, through this the magnetic field is created and the charging of the vehicle takes place.
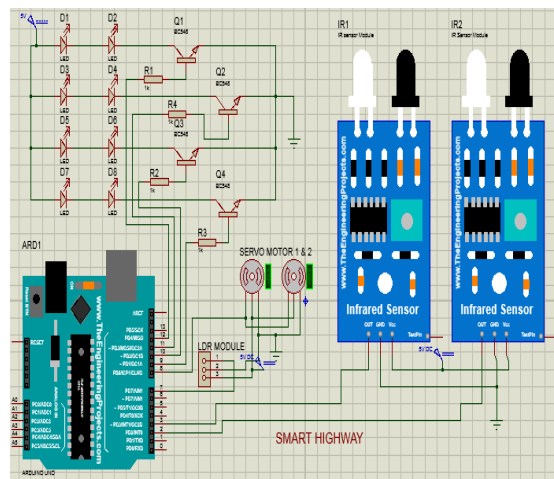
III. CIRCUIT DIAGRAM AND WORKING

Fig 2: Circuit diagram of Smart Highway

This project is proposed for Advance development in Highway to make it SMART HIGHWAY. In this Project to make it SMART HIGHWAY electronic control system is used. Arduino UNO is heart of the control system. Smart street Light system and Smart speed breaker system is controlled by Arduino.

Smart Street light are made using LED. Two LED are connected in series and connected to collector of BC548 transistor. This transistor is activated using Arduino digital pins 9,10,11,12. At a time two transistors are activated to make light on and off.

In day light mode - LDR sense the light and make LED light off. When first IR module sensor sense the vehicle arduino start time counting .If second IR sensor module sense the vehicle before five second then it means vehicles is going high speed and arduino gives signal to servomotor to operate speed breaker.

In Night mode - LDR sense the light and make LED light on. When first IR module sensor sense the vehicle arduino start time counting and make Two LED light pole ON. If second IR sensor module senses the vehicles then first two light pole led will off and next two pole led ON. If second IR sensor module sense before five second then it means vehicles is going high speed and arduino gives signal to servomotor to operate speed breaker .The pole third and fourth LED will off after five second.

It also contain the smart charging system. As the vehicle passes near from that it will generate the magnetic flux and it will make a charging process ON.

It also involve Smart Energy Production technology , where the energy is produce from the wind, and known as Traffic Wind Turbine. It uses motor to generate electricity when vehicle is pass near to wind turbine wind is generated and that wind is converted into electricity.
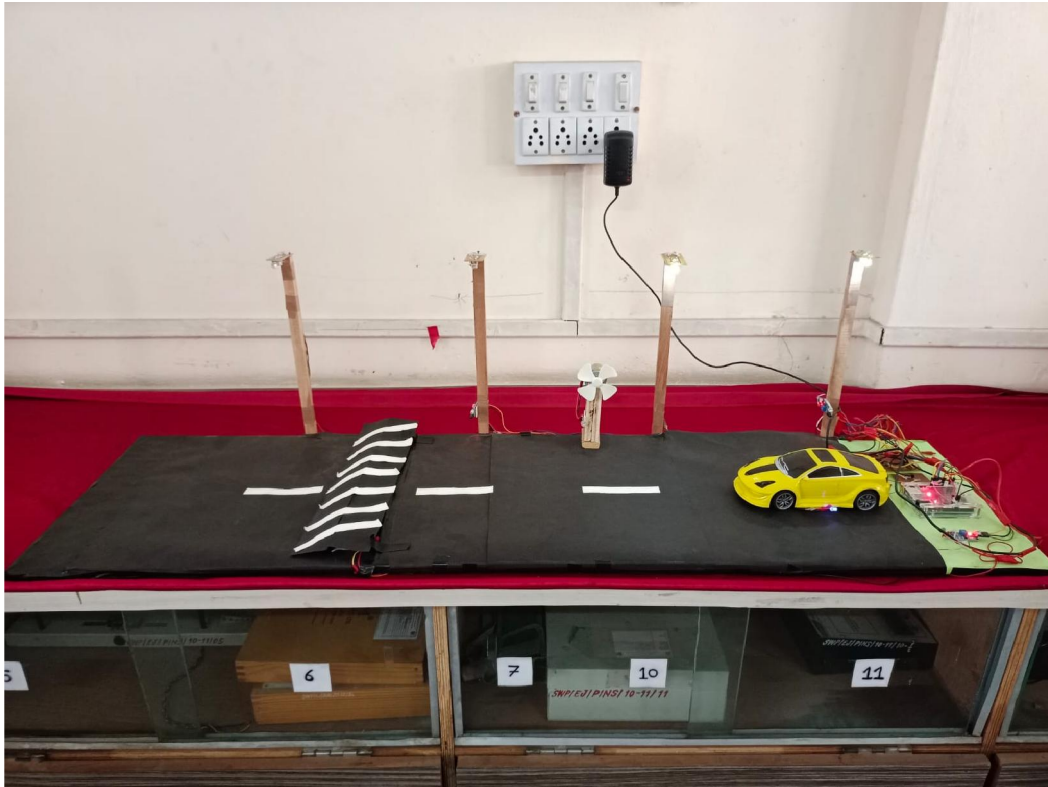
VI. RESULT

Fig 3: Result of Smart Highway after Implementation

VII. FUTURE SCOPE

- Using IoT platform we are able to detect the vehicle which doesn't follow the rules and make a count of the vehicle on the traffic.
- Connecting through the Smart accident detection technology.
- Using the smart technology we can do various of changes through it.
- The electricity generated by wind turbine is given to street light as well as we can also generate electricity by using piezoelectric plates.

VIII. CONCLUSION

From this project, we can conclude that Smart highways are the easy and initiative way to connect with the developing technology. The smart streetlight help to save the energy and also reduce the thermal energy .The smart speed breaker help to reduce the accident level. This project help to making your city smart and help to connect with the government for developing the nation.

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