

IOT BASED SMART ROAD SYSTEM

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Abstract

The objective of the paper is to provide IoT Based Smart Road system, the street light turns on automatically during night and turn off during day when vehicle passes by the sensor the light turns on with maximum intensity without human involvement, this can save maximum power for street light. Public Lighting ensures safe and pleasant streets. This can perfectly be achieved using less energy without compromising on quality smart techniques help in this respect. The lights in some streets can be switched off or dimmed during the night thanks to motion sensors and adequate lighting equipment lighting can be supplied at the desired time. These crossing worn when pedestrians want to cross the road, they combine safety with energy efficiency are people sitting in the bus stop. If so, the light will turn brighter this means the bus driver can see that he needs to pull over at this particular bus stop even from far away. The car safety system plus is a state-of-the-art safety package designed to help prevent collisions in a wide range of vehicle speeds the system includes Lane Departure alert dynamic ultrasonic cruise control automatic high beam and pedestrian pre-collision system. Pre-collision system PCs is designed to detect obstacles in front of the vehicle such as another vehicle and assess the potential for collision. If it determines there is a high possibility of a frontal collision. The system warns the driver readies the brakes and take steps to protect the occupants reduce the impact and lessen collision damage. Possible collision with another vehicle or a pedestrian based on information received from a variety of sensors similar ultrasonic sensor. The ultrasonic sensor mounted at the front of the vehicle detects vehicles or other obstacles on or near the road ahead the system then determines whether a collision is imminent based on the speed and direction of the obstacle if it determines that a collision is likely it warns the driver with a flashing warning light a buzzer sound. The pre-collision system can be turned off with the PCs switch on the instrument panel. The pre-collision system will only activate when specific operating conditions are met those conditions may vary depending on the specific vehicle.

Keywords: Smart Street light, Collision detection control system, Intelligent bus stop, etc.

1. Introduction

Over the decades, we human beings are manufacturing an abundant number of vehicles for the purpose of transportation. It is hence an obvious fact, that we need double the number of roads for those vehicles to be moving from one location to another. Similarly, lots of street lights are being used on the roads to enlighten the streets which costs electricity waste, similar to this regular road accidents are being happening due external faults, in prior to this people are facing issues at the bus stops. By considering these problems to overcome problems IoT Based Smart Roads paper will give perfect solution.

There are several advanced technologies and innovations available for vehicle safety. Even though there are advanced technological innovations for vehicle safety, the growth in the number of accidents is continuously increasing. And these accidents are due to collision or intersectional accidents. A collision of vehicles occurs due to mistakes done by the driver and intersectional accidents are caused due to bad weather conditions. Hence, to overcome these mistakes an intelligent collision avoidance system is proposed. So, the mistakes done by the driver are eliminated. Only sports cars and other luxury cars consist of an antilock brake system, speed sensor, and other automatic systems. But these cars cannot be affordable for everyone. So, this system is developed in such a way that it can be implemented in every car.

The final problem is being facing is at bus stop the bus transport cannot figure out the people who are waiting at the bus stop due to busy traffic this is being solved by identifying the people density in the bus stop and is being indicated by notifying though the signal light at the bus stop.

2. Literature Survey

Saving electrical power is very important, in any city “Street Light” is one of the major power consuming factors. Most of the time, street lights are switched on all night until the sunrise., a large amount of energy and power has been wasted when it is not needed. In this paper, Light dependent resistor and Infrared radiation sensor will be used for our Smart Street Light which to ensure this system will save the power consumption. Smart Street Light used when it is dark, and the lamp will only glow when there is a vehicle on the road. The street light will depend on the sensor used which sensor to detect the vehicle movements on the road. If the sensors detecting a motion on the road the lights will automatically be turned and if there is no motion on the road the light will be turned). "his Smart Street Light system also would not work during day time even though there is a motion on the road because has been used in the circuit which to detect light presence from the sunlight.

The method it was built the system to avoid the accident and save the human life and the system was provided by substantial numbers of sensors Presented predictive vehicle collision avoidance system using Arduino Uno. it seemed like to avoid accident in the blind spot area using ultrasonic sensor using Arduino Uno module. The ultrasonic sensor works like a radar system to detect the obstacles in the blind spot that can Cause the accident, but it is cheaper than it. In addition to that the ultrasonic sensor is used to measure the distance between the vehicle and the obstacles and saved the distance safe before fatalities happened and alerting the driver before the accident using two ways visualization using light emitting diode (LED) and make a sound using buzzer and the driver alone apply the brake or steering to controlling on the speed.

Considering the bus stop development is being modified by using IR sensor to primary places at the bus stop and calculate the people density is being indicated on the bus stop and notify to the bus through the signal lights at the bus stop. As in this way my problem structure is being solved and get solved in a smart way using IoT.

3. Existing System

Currently, we have a manual system where the street lights will be switched ON in the evening before the sunsets and they are switched OFF in the next day morning after there is sufficient light on the outside. But the actual timing for these lights to be switched ON is when there is absolute darkness. In midnights the traffic in the streets is very minimal. streets lights are working without any vehicles in the street in some cases. Due to this lot of energy is being wasted. There is no particular technology for people bus stop basically the bus conductor will notify them when he is free in the bus, this effects the passengers at the bus stop by missing and having no idea of bus seats availability.

The industry strategy for automotive safety systems has been evolving over the last 20 years. Initially, individual passive devices and features such as seatbelts, airbags, knee bolsters, crush zones, etc. was developed for saving lives and minimizing injuries when an accident occurs. Later, a preventive measure such as improving visibility, headlights, windshield wipers, tire traction, etc. were deployed to reduce the probability of getting into an accident. Now we are at the stage of actively avoiding accidents as well as providing maximum protection to the vehicle occupants and even pedestrians. The systems that are under intense development include collision avoidance systems. Which do not provide a clear signal to the system under some conditions such as when turning a corner, the PCs may detect a vehicle or object directly ahead predict that a collision is likely and activate even if the danger is not really great this does not indicate a malfunction. The pre-collision system may not function properly in inclement weather condition such as heavy rain, fog or snow.

4. Proposed System

This system focuses on reducing the energy by automatically switching ON and Off-street lights. When vehicles come to the street/road the sensor will capture the movements of the vehicles then lights automatically ON. Otherwise automatically OFF the lights. This Street Light System provides good energy efficiency. It reduces cost and gives more reliability. This consists of sensor, light, power system. This architecture is used to sense the vehicles and act accordingly. In this street lights control by the sensors. It gets the data from object. When vehicles appear to sensor then automatically lights ON. That the object moved on from sensors lights turn OFF. When objects or vehicles appear to the sensors it is detect movements of the objects and street lights automatically ON. Then objects crossed to the sensor's lights go to turn OFF. It is used to save the power energy.

If necessary, signal posts at dangerous traffic nose light up when needed they automatically caution for reduced visibility in the event of an accident or traffic congestion. These crossing worn when pedestrians want to cross the road, they combine safety with energy efficiency are people sitting in the bus stop. If so, the light will turn brighter this means the bus driver can see that he needs to pull over at this particular bus stop even from far away. The main focus of this system is to provide energy efficient lighting with low consumption which reduces power scarcity in present situation. IR sensor is used here to detect the Human body movement, whenever there is any body movement in the bus stop the voltage at output pin changes. Basically, it detects the Change in Heat, and produce output whenever such detection occurs., there are some useful features in IR sensor like how to change the distance range, how to set the duration for which the light should be ON etc.

The scope of this work is to develop a collision avoidance system using ultrasonic sensor and to design a vehicle with less human attention to the driving. Currently in cars doesn't have technologies to prevent accidents. The accident avoidance system helps to avoid the regular accidents that will normally occurring on highways and in city. These accidents are mainly happened by distraction, unconsciousness, distance unknown between our vehicles. In this work we are enhancing the existing work by introducing automatic alarm system, which would get its input from the sensors, which will then generate the alarm and prevent from collisions to take place. We will have ultrasonic sensor placed in front of car. Due to this sensor, we can calculate distance of another automobile nearing us. Thus, we can locate other cars and we protect ourselves from accidents.

4.1 Objectives of the proposed system

The objective of this work is to develop a collision avoidance system using ultrasonic sensor and to design a vehicle with less human attention to the driving .This system focuses on reducing the energy by automatically switching ON and Off-street lights.

5. Algorithm

5.1 Algorithm for collision Detection Warning System

Step1-.start

Step2–transmit signal at 37khz.

Step3–if Echo received, calculate object distance.

Step4–else go to step 2.

Step5–if calculated object distance < 40cm, reduce car speed.

Step6–Continued step 2.

5.2 Algorithm for Smart Street Lights and Intelligent Bus stop

Step 1- start

Step 2–Sensors turned on to detect Object.

Step 3–if Object detected, Sensors send signals to microcontroller.

Step 4–else go to step 2.

Step 5–microcontroller turns street lights ON.

Step 6–if Object still on Sensor, keep lights turned ON.

Step 7–else, Turns light OFF

Step 8–Stop.

6. Result

6.1 Collision Detection Warning System

The following figure shows Results for Collision Detection Warning System. It first detects the object through ultrasonic sensor. calculate the distance from another vehicle. if distance less than 40 then identify the object.



Figure1.Collision Detection Warning System

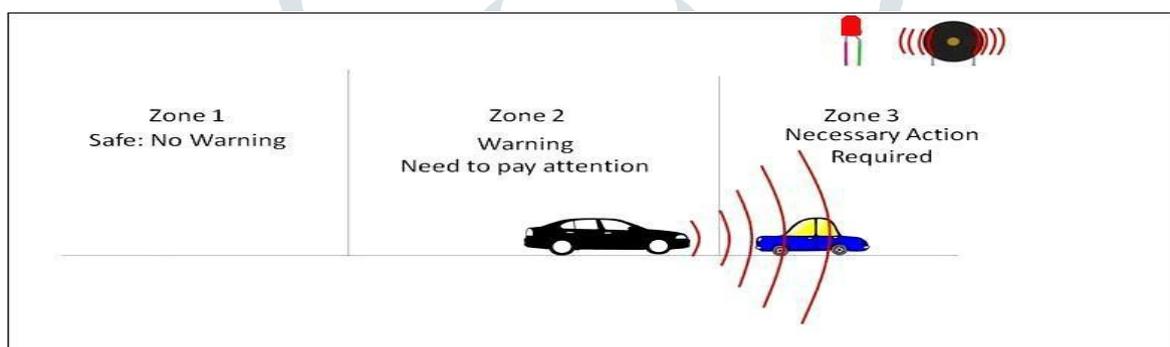


Figure 2. Collision Detection Warning System

6.2 Smart Street Light System

The following figure shows results for Smart Street Lights. Sensor turned on to detect vehicle. vehicle detected. Sensor send signals to micro-controller. Micro-controller will turn street light ON. If vehicle still on sensor keep lights turned ON, otherwise turn OFF.

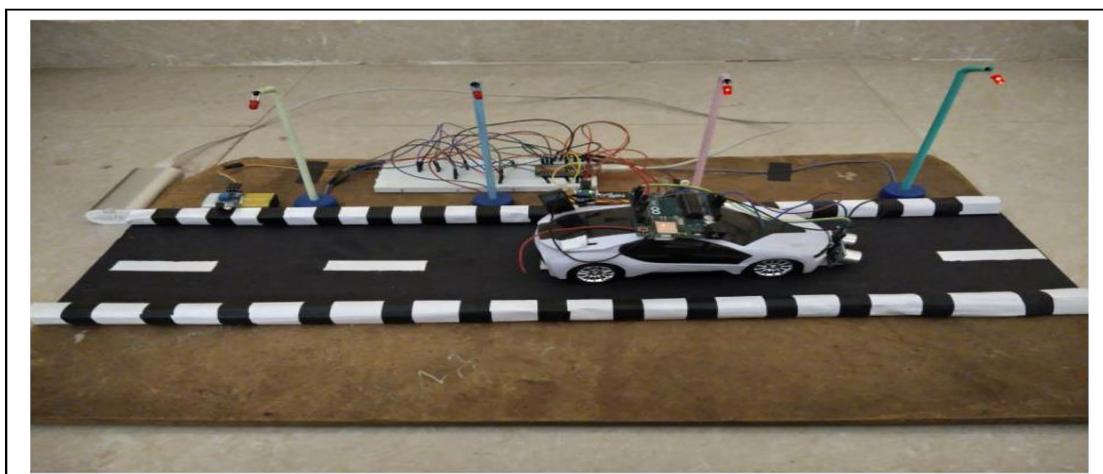


Figure 3.Smart Street Light System

6.3 Intelligent Bus Stop

The following figure shows results for Intelligent Bus Stop. Sensor turned on to detect person. Person detected. Sensor send signals to micro-controller. Micro-controller will turn bus stop light ON. If person still on sensor keep lights turned ON, otherwise turn OFF.

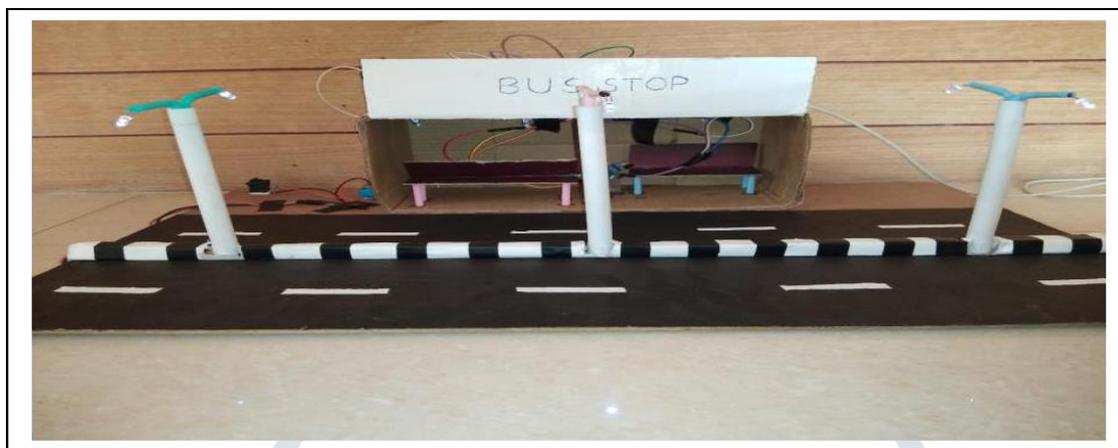


Figure 4. Intelligent Bus Stop

7. Conclusion and Future Scope

The main objective of this IoT based Smart Road System is to make it more innovative and user friendly and it saves more power. Measuring and detecting parameters such as Ultrasonic sensor and IR sensor are present in this system. Due to automation of turn on and turn off lights and calculation of distance between vehicles, more power is saved, and accidents are avoided. Considerable progress has been made in the road transportation and there is a gradual decrease in the number of road accidents. There is a great excellence in product due to minimum requirements.

This setup can be extended by using the GSM module so that, it can be controlled across the globe. Impact sensors can be used for detecting the damage caused to a vehicle during an accident. GSM and GPRS can be used for tracing the location of the vehicle and message is send to user's relatives and the police station in the case of accident.

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