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ADAPTIVE LIGHTING SYSTEM FOR AUTOMOBILES

Abhinandan Suryawanshi[1], Shashank Sawane[2], Nikhil Walsane[3], Prof. C. K. Bhange[4]
Student, AISSMS IOIT PUNE[123]
Asst. Professor, AISSMS IOIT PUNE[4]
abhinandansuryawanshi96@gmail.com, shashanksawane22@gmail.com, walsanenik123@gmail.com, Chandrakant.bhange@aissmsioit.org

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Abstract: In this project a Passenger Safety Module has been developed. Emergencies, by definition, are unavoidable, uncertain and rapid response may be a key requirement in emergency management. Globally, most number of deaths occurs each year due to excessive delays in rescue activities. This idea of Adaptive Lights for automobiles isn't recent and therefore the automobile industries have created tremendous progress inoptimizing the technology. This paper is an attempt to make a contribution there in location of generation. Here we are seeking to control the headlights with sensor because it facilitates in identifying the situation and if the values of parameters are extra than the defined values than it's getting to set situation to proper and therefore the code written for initiating the switching the headlights to appropriate level/mode gets executed. With this method the illumination of the road is achieved.

Keyword: *Driver Assistance, Adaptive Lighting, Fog Lamp, Road Safety, Arduino, Crash avoidance system, Security system.*

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I INTRODUCTION

Globally as Automotive market leaps, huge growth of automobiles is seen on the road. Indiscipline road rage, morals, mentalities, physical and mental status during driving results in lots of accidents .Nearly 2 lakhs accidents occur on an average. When a vehicle is driven on the highway at night, high intensity light beam is required to illuminate the road at a distance sufficiently ahead, a glare is experienced by the driver of the vehicle, when the vehicle coming in the opposite direction approaches with the high-beam headlight, which may result into dazzle effect and blindness of driver of approached vehicle. This dazzle effect is one of the major problem faced by a driver in night driving, to overcome this impermanent blindness, separate filament is fitted in the dual-filament bulb in a position such that light beam from this second filament is deflected both down and sideways so that the driver of the oncoming car is not blinded. Where in the road user, pedestrians, cyclist, motor bike users, even small car users are faced to sudden collision due to blind spots generated by such impermanent blindness caused by the inappropriate usage of the high beam, resulting into incidents causing near miss to serious injuries

Sometimes in a Scenario during night driving the area from shoulders of the road is not sufficiently visible, along the curves especially due to design flaws in kerb and camber specifications and unskilled work, it becomes a need nowadays to illuminate this part as well because a vehicle at high speeds has a potential risk of getting toppled over by hitting the boulders which lie on the edges of the roads and are completely unnoticeable due to insufficient visibility.

In this project, we are proposing to create an Arduino based lighting System, using LDR, Arduino and humidity Sensor. LDR detects the sudden change in intensity of light then feeds the input to microcontroller the change is compared with the default preset condition within controller and mode switching is done to either upper or lower beam setting We've also enhanced Fog Lamps with integration of humidity sensor with it, which turns on/off by continuously monitoring the drop in humidity or hazy, foggy weather conditions.

II LITERATURE SURVEY

Product Survey- In this paper, author has proposed a memristor analog model based on a light dependent resistor (LDR) This model is simplified into two parts:

1) A control circuit 2) A variable resistor.

Used to easily verify theoretical presumptions about the properties of memristor. This LDR based memristor model can also be used in both simulations and experiments for future research into memristor applications. Mathematical models that describe the behaviours are derived. Multisim simulations and experimental results are also derived. "Sensor less illumination control of a networked LED-lighting system using feed-forward neural network." IEEE (2014) Author: Tran, Duong and Yen Kheng Tan

Product Survey- The scheme is based on a feed forward neural network to model all the nonlinear and linear relationships inside the lighting system as the controlled plant. Because the scheme does not rely on lighting simulation software, it is flexible to be implemented on microcontrollers. Without using light sensors in its control loop, the approach can save significant cost and provide ease of installation as well. In addition, it also has the strength of fast response owing to feed forward control based on neural networks. "Emergency Traffic-Light Control System Design for Intersections Subject to Accidents." IEEE (2016). Author: Qi, Liang, MengChu Zhou and WenJing Luan.

Product Survey- Petri nets (PNs) are well utilized as a visual and mathematical formalism to model discrete-event systems. This paper uses deterministic and stochastic PNs to design an emergency traffic-light control system for intersections providing emergency response to deal with accidents. According to blocked crossing sections, as depicted by dynamic PN models, the corresponding emergency traffic-light strategies are designed to ensure the safety of an intersection. The cooperation among traffic

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lights/facilities at those affected intersections and roads is illustrated. For the upstream neighbouring intersections, a traffic-signal-based emergency control policy is designed to help prevent accident-induced large-scale congestion.

III WORKING METHODOLOGY

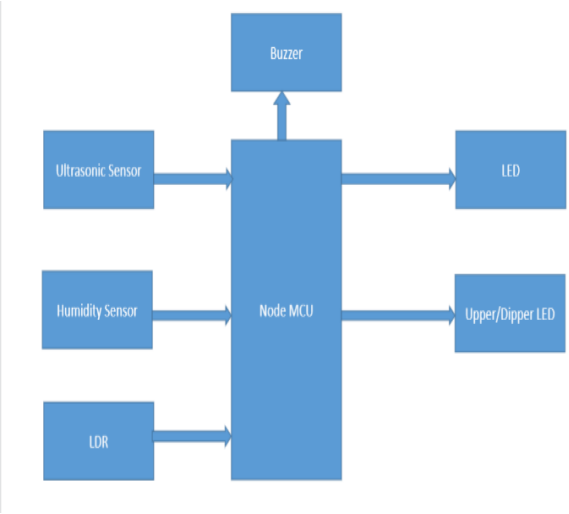

Fig.3.1 Block Diagram of Adaptive Lighting System

The block description of system is given below-

- The system consists of : -
  - 1: -The circuit installed in the vehicle
  - 2:- The Wi-Fi Interface for establishing connection between automobile and the user.
- The circuit installed in the vehicle consists of various components such as LDR, Humidity SENSOR & Atmega328p interfaced with Arduino.
- The proposed system consists of Wi-Fi module for the communication between user and automobile.
- The system actually works in two modes, first the user mode where user can track status of the system automatically getting connected to internal control system.
- It will display the reply message that contains the information and status of all the sensors.
- The important part is to understand functioning of the adaptive mode.
- Now whenever there is a detection of the high intensity light, the LDR senses and values changes are detected. These values read by Arduino and checks if any change occurs in lights of vehicle.
- If any change occurs then Arduino reads and necessary changes are done to suit the needs.

IV COMPONENTS DETAIL

Arduino (Node MCU)

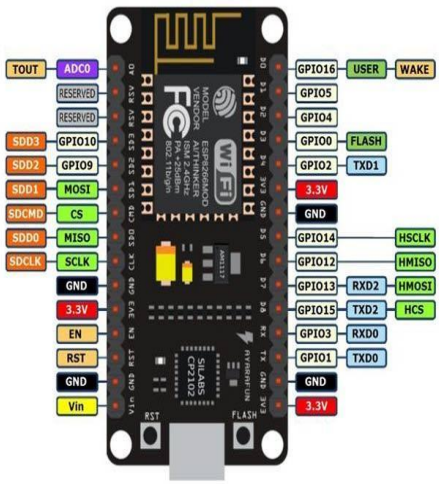

Fig. 4.1 Arduino (Node MCU)

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Node MCU is a microcontroller module with built-in wife that can be programmed using the Arduino IDE. This Node MCU uses the ESP-12E Wi-Fi module based on the ESP8266EX microcontroller with 28 KB RAM 4MB of Flash memory.

LED

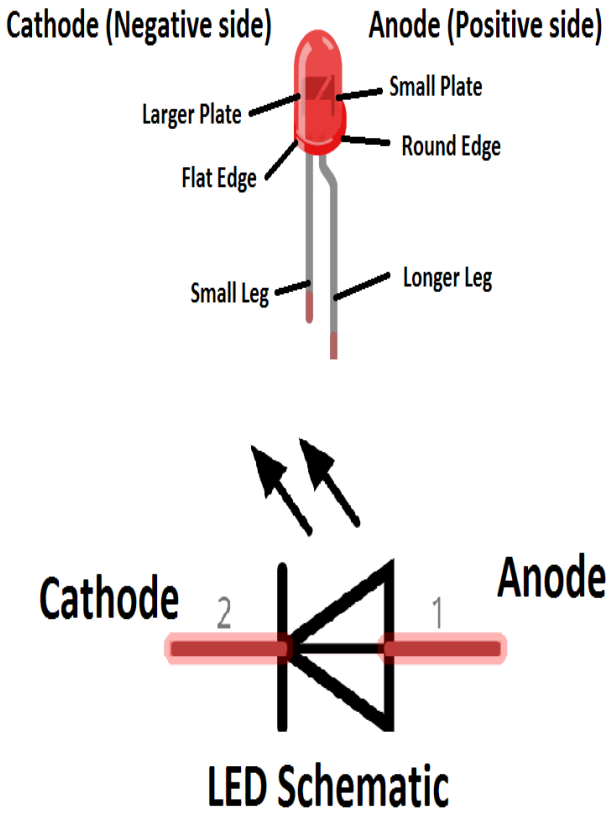

Fig. 4.2 LED

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The colour of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.

- Forward Current (30mA)
- Forward Voltage (1.8V To 2.4V)
- Reverse Voltage (5V)

Fog sensor

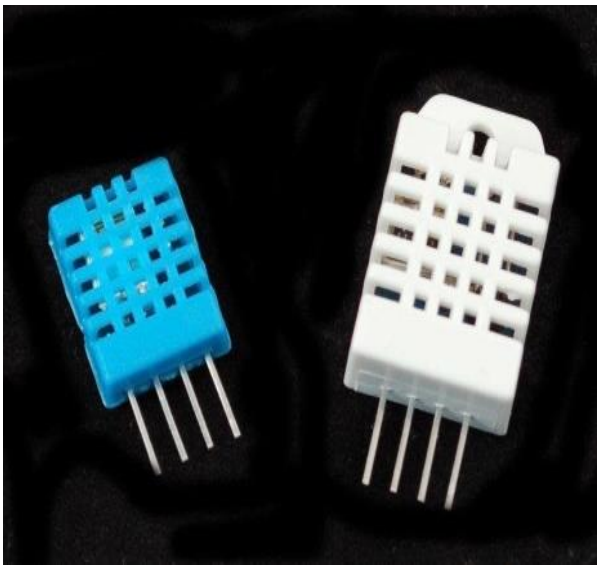

Fig. 4.3 Fog sensor

Sensors that indicate the time of fog formation and dissipation have been used to automate systems for the collection of fog water or to document spatial and temporal variations in fog occurrence. In situ fog detection has typically been performed with visibility monitors or specialized cloud microphysical instruments.

- Dimensions: 68*45*34 mm
- Temp. range: -20 to +50 deg C

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ALGORITHM AND FLOW CHART OF THE SYSTEM

- **Algorithm**

1. Start
2. Initialize LDR, Ultrasonic, FOG Sensor, Wi-Fi and ARDUINO.
3. If value is less than preset then it stays on dipper mode
4. If value is more than the present value then it turns to upper mode
5. The Fog Sensor Reads the humidity to present value, if value is less than preset it turns on fog lamps.
6. If NO it will waits for the request.
7. System Checks further continuously and switches lights on and off.
8. If ultrasonic changes its values.
9. These values are read by Arduino and checks if any change occurs in crash sensors and ultrasonic sensor.
10. If any amendment happens then Arduino reads coordinates by triggering an alarm/buzzer and sending SMS.
11. And send SMS to the predefined number to the users stored as emergency Contacts.
12. When we receive the SMS then we only need to click the link and we will redirect to the Google map and then we can see the exact location i.e., Latitude and longitude.
13. End

V FLOW CHART

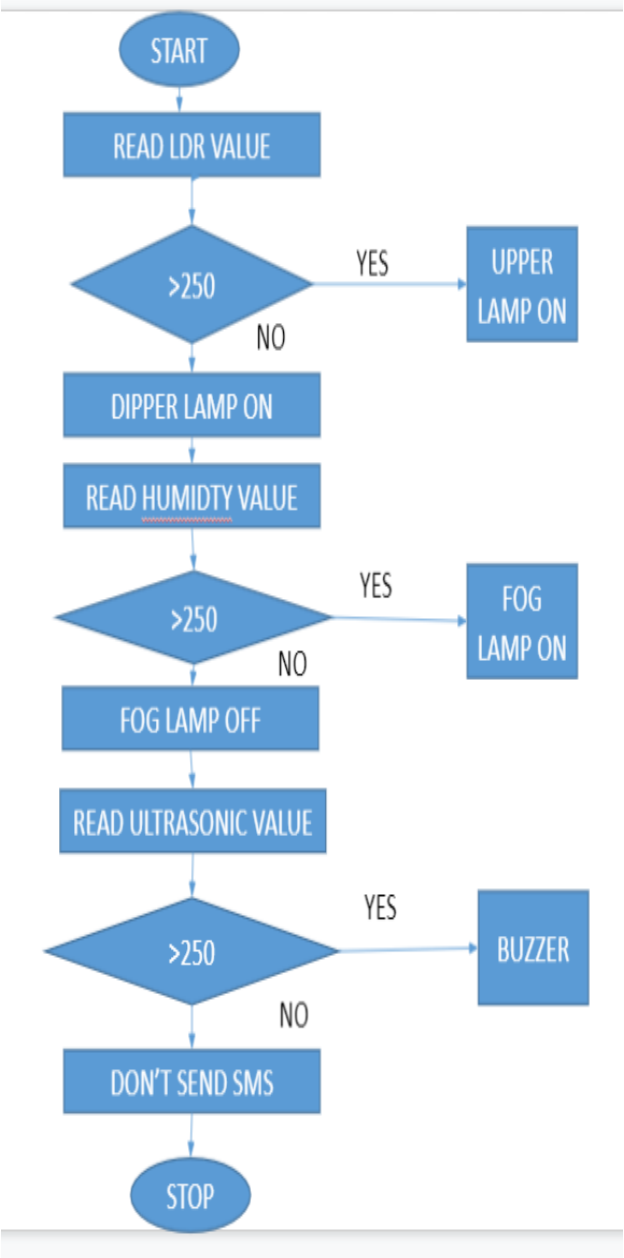

Fig. 5.1 Flow Chart

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VI SIMULATION DIAGRAM

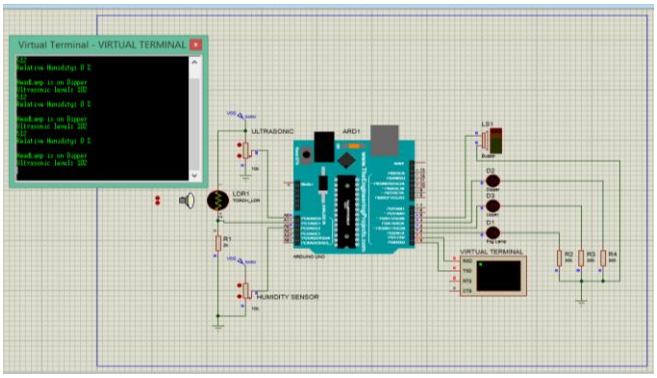

Fig. 6.1 Software Design

VII EXPECTED RESULTS

Glare causing impermanent blindness to the driver is completely obstructed, giving better control at night time driving also reducing the fatigue and dizziness caused.

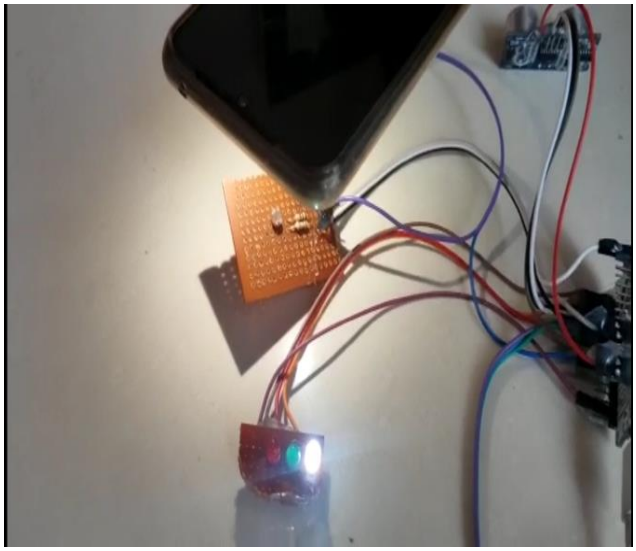

Fig. 7.1 Output1

Safety of passengers and driver is not compromised reluctantly based on visibility issues.

It is reliable and efficient system as each and every thing on the road ahead will be completely visible, leaving no chance to endanger any life forms by reducing the dazzling effect, hence fulfilling the main objective.

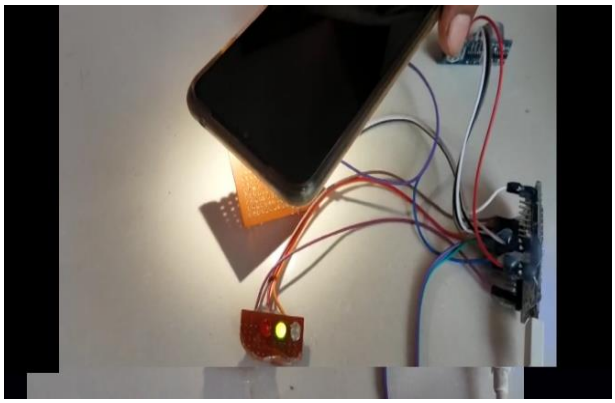

Fig. 7.2 Output2

VIII CONCLUSION

This project presents vehicle overall safety proofing and system with SMS to the user defined mobile numbers. The API alert-based algorithm is designed with ATMEGA 328p MCU in embedded system domain. The Proposed system vehicle accident alerts system can track the intensity of the accident occurred information automatically and sends an alert SMS of location. This method will be highly beneficial for the automobile industry. This project provides the design which has the advantages of low cost, portability and small size, system efficiency.

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