VEHICLE ACCIDENT PREVENTION SYSTEM FOR MOUNTAIN ROADS

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Abstract - *Vehicle accident prevention system can be a major step in accident safety on mountain roads. In our past we have noticed 100s of accident and death on mountain roads, some even fall of the cliff and cannot even be traced after that .Such accidents not only causes loss of human life but also major loss financially not just to the individual but also the government. Mountain roads are narrow and any such accidents can force it to be closed for hours which can be a huge issue. This paper proposes a model which can be implemented on mountain roads which can warn drivers coming from both sides of the road about the oncoming traffic. This will be using sensors which will be able to detect any oncoming traffic in both the directions. This can prevent accidents massively and can be a crucial milestone in vehicle safety on mountain roads.*

1. INTRODUCTION

There are many dangerous roads in the world like mountain roads, narrow curve roads, T roads. Some mountain roads are very narrow and they have many curves. Every year 100s of deaths occur on mountain roads, many even fall off the cliff and there is no trace of such people some- times. The problems in these curve roads is that the drivers are not able to see the vehicle or obstacles coming from another end of the curve. If the vehicle is in great speed then it is difficult to control and there are chances of falling off a cliff. Hence there is a need of many road safety systems. To avoid these problems in curve roads of mountain areas. Not only accidents are a common occurrence for such places but also many vehicles even fall off the mountain with no trace of driver for days. This causes loss of human life and also loss in property. Mountain roads are specially very narrow and any accident on such roads can even cause it to close the road for hours and even days sometimes till the road can be cleared. We have also read in news how many mountain roads remain closed for hours and sometimes even days after a major accident occurs. The vehicles involved in the crash need to be removed safely, sometime heavy machinery needs to be taken on the spot like cranes, JCB which can also

be a massive task. All in all it causes loss in government money, time, loss of lives for people involved in the accident, loss of time and resources for people stuck because of the accident on both sides of the road.

2. LITERATURE SURVEY

"SENSOR BASED ACCIDENT PREVENTION SYSTEM"
Author: ARAVINDA B, CHAITHRA LAKSHMI C, DEEKSHA, ASHUTHA K.

This paper is introducing sensor based accident prevention system:-

That is we are keeping ultrasonic sensor in one side of the road before the curve and keeping a LED light after the curve. Ultrasonic sensor which is also called as obstacle sensor sends signal as pulse from trigger. If vehicle is present signal will hit the vehicle and it is received by the sensor. At that time light will glow at the other side of the curve. In the absence of the vehicle the signal will not be received by the sensor and the light will not glow. As soon as the light glows driver can slow down his vehicle and he could even stop it if it's necessary. This sensor based light system can be applicable when the driver cannot see the vehicle coming from other end of the road. Using this idea we can make all the mountain roads and curve roads safer from accidents and can save thousands of lives.

The purpose of this paper is to decrease the number of accidents in curve roads. This is done by alerting the driver by means of LED light which glows when vehicle comes from the other side of the curve. The vehicle is detected by the help of Ultrasonic sensor which is interfaced to the micro controller Arduino UNO. By this we can save thousands of lives in the curve roads.

"VISUAL SEARCH EFFICIENCY EVALUATION METHODS FOR POTENTIAL CONNECTED VEHICLES ON SHARP CURVES"

Author: JINSHUAN PENG, CHENWEI WANG, YIMING SHAO, AND JIN XU.

This paper focuses on accurate discrimination of driving proficiency is essential to improve driving safety. A naturalistic driving experiment was designed and organized to discover the response characteristics among drivers' eye movement behaviors, driving proficiency, and mountain roads 20 drivers were recruited to collect corresponding data of eye movement parameters on sharp turns, including gaze behavior and saccade behavior. The data show that on right turning roads, the main range of eye fixation points is 0.1–0.3 m in the horizontal direction, while the range is 0.35–0.2 m from left turn bends. The main range of the eye horizontal gaze angle is 0–30, the range of the amplitude is 5–25, and its value increased as the curve radius decreased, showing a logarithmic relationship.

Based on the collected eye movement chara-cteristics data, a driver's visual search modal matrix was built. A principal component analysis was used, and a comprehensive evaluation model of driver's eye movement characteristics was estab- lished. The result shows that eye movement comprehensive score and driving mileage were positively correlated. The result also indicates that the discrimination model can be used to quantify and discriminate driving proficiency and can provide a novel perspective for connected vehicle performance assessment.

3. THEORETICAL ISSUES

* There is no efficient existing system available to prevent accident in mountain roads as compare to first paper which is used to alert.
* This system used to alert only one side of curvy road, thus the other side is left in blind.
* It is less Accurate.
* It requires more maintenance.
* The second paper is totally based on eye movement pattern so it is different for every user as different driver can have different behaviors. Thus their eye movement will be different
* .It is very difficult to implement, thus it's not implemented yet.

4. PROPOSED SYSTEM

In this project, propose a vehicle accident prevention system which will alert the drivers on both sides of the blind spot on mountainous roads about the oncoming traffic from the other side. It would change colors and alert the drivers with the help of LEDs. Our paper proposes a system which would be installed on mountain roads and will use sensors to detect vehicles. It would also be a major safety booster for mountain roads.

5. WORKING FEATURES

This accident prevention system using sensors is powered by Arduino board, it consists of IR sensors, LED lights, and buzzer. When two cars pass from the opposite side of a mountain curve the IR sensor senses the car and LED color changes to red and raises the buzzer giving signal of danger and then it changes one LED color into green to allow the one car to pass and then the other LED color turns green. In this way we can prevent the accidents of curved road.

6. ARCHITECTURE OF SYSTEM

In this system there will be warning lights which are LED's shown in architecture installed on side of mountain roads specifically on blind spots .There will be sensors on the both side of roads that will track the oncoming vehicle from both the sides. The lights will change colors according to the vehicles coming and the distance between two vehicles. If the light is red that means there is a vehicle coming from the opposite side and it is very close. Similarly if the light is green it would mean vehicle coming from the opposite side has passed and it is safe to go ahead. LED decisions will be taken on software coding using Arduino IDE tool which is open source software.
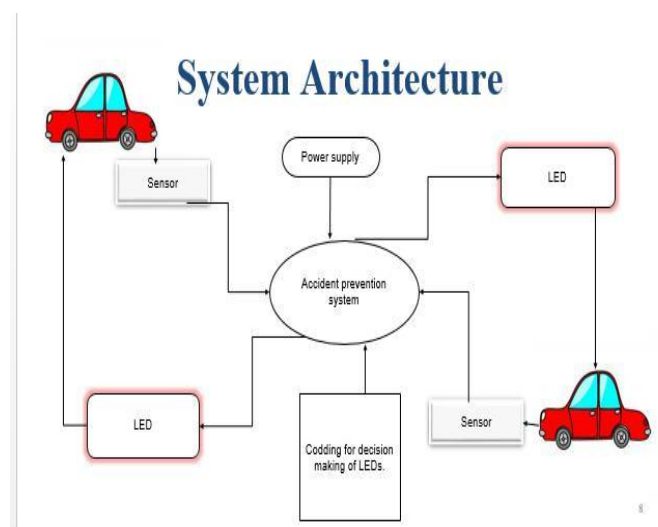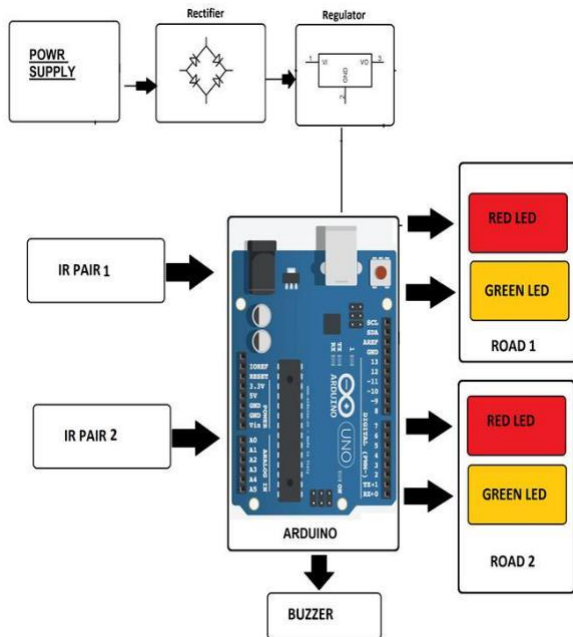

Fig -1: System Architecture

Fig -2: Component Diagram

Figure-2 shows components of hardware system in which we have used microcontroller (Arduino Atmega 328P), 5mm LED lights, IR sensors measures in infrared radiations and +5V power supply with Regulator. IR sensors sends infrared radiation .When this radiations hit the object it will get reflect back to analog input pins and received by microcontroller Arduino Atmega 328. Microcontroller process data and sends digital signals to LEDs which is connected to output digital pins of Arduino 328. LED will work according to input. Vcc is connected to +5V power supply with regulator for constant +5V supply and GND of microcontroller is connected to GND.
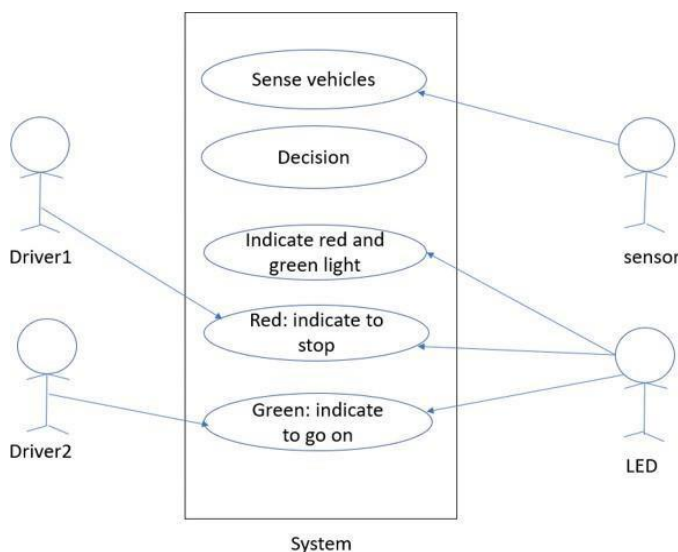

Fig -3: Use-Case Diagram

7. SOFTWARE & HARDWARE REQUIRED

The following are the software and hardware required to implement the desired recommendation system.

7.1 SOFTWARE:-

Arduino IDE:
- Arduino IDE is an open source software which makes easy to write code for microcontroller Atmega 328 and allows to upload on board. The environment is written in java and based on processing and other source software.
- Arduino IDE can be used on Windows, Linux (Both 32 and 64 bits), and Mac OS.
- Current versions are Arduino 1.0x or Arduino 1.5x Beta Version.

7.2 HARDWARE:-

- Microcontroller (Arduino Atmega 328P): with 23 general purpose input output lines.
- LED lights : 5mm high power photo diode
- IR sensors : Passive IR sensors
- Power supply : +5V power supply
- Voltage Regulator: (5V to 18V) with working temperature 0 degree to 125 degree.

8. OBSERVATION

This vehicle accident prevention system was developed so that any person on the road can realize that someone is coming from the other side or not. It consists of modern sensors, LEDs, buzzers etc. which provide a modern solution for the safety of such roads.

The system after being installed on the curved section of the mountain road with the LEDs, sensors, buzzer etc. When a car came close on the curved road, the sensors sensed the vehicle and the LED turned RED and the buzzer gave a sound to alert the driver, also it was noticed that when there was no vehicle on the road, the LED remained GREEN. This basically provides useful information to the driver that incase the LED is red he should understand that some vehicle is coming from the other side of the road and he should be alert and slow down, and if the LED is GREEN then there is nothing to be worried about as there is no vehicle coming from the opposite side.

It was also observed that nothing of this sort was available before this, there was hardly any measure to ensure safety on mountain roads, government relied mostly on warning signs and awareness campaigns but it required modern technological solution for this problem, this system is new and unique and will massively ensure the safety of drivers on mountain roads.

9. CONCLUSION

In our country there is a massive need for a modern technological solution for safety measure on mountain roads specially the curved section of the road. This project will definitely ensure the safety of drivers on mountain roads and hence will make sure human lives are saved. This project is a modern solution to this problem and will ensure safety and reliability.

REFERENCES

[1] DEEKSHA ASHUTHA K. ARAVINDA B, CHAITHRA LAKSHMI C. Sensor based accident prevention system. International Journal of Computer Applications, pages 36–39, 2012.

[2] YIMING SHAO JINSHUAN PENG, CHENWEI WANG and JIN XU. Visual search efficiency evaluation method for potential connected vehicles on sharp curves. 1Progama de Pos-Graduac ao em Ciencia da Informacˆao (PPGCI) Universidade Federal de Minas Gerais (UFMG), pages 132–143.