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Road Safety in Ghat Section

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***Abstract:** This paper describes the safety measures to be taken in the ghat section. The main reason for these safety measures is to prevent the accidents that is most common on the ghat road. The main problem in these curve roads is that the drivers are not able to see the vehicle that is coming from another end of the curve. If the vehicle is in great speed then it is difficult to control, which leads to disasters. Therefore the main aim is to prevent such problems. We have proposed this vehicle accident prevention system. Here we use sensors that is powered by Arduino board, which consists of IR sensors, LED lights, LCD display, GSM and buzzer. When a vehicle has entered one end ,the sensor alerts the driver by flashing a red light in another end, and when the road is clear it will turn on to green light.*
***Keywords:** Accident prevention, Alerting the driver, Curve roads sensor, IR sensor.*

I. INTRODUCTION

Nowadays along with the population the transportation of vehicle has also increased which leads to high traffic, and also leads to accidents. There are many dangerous road such as narrow and T roads, curved roads which are largely seen in the ghat section. Large number of accidents mainly takes place in such roads. The main problem in these curve roads is that the drivers are not able to see the vehicle that is coming from another end of the curve. If the vehicle is in great speed then it is difficult to control, which leads to disasters. Therefore the main aim is to prevent such problems. Driving on ghat section is not an easy task. Driver must get some alert signals while driving.

Accidents mainly occur due to many reasons in ghat roads, firstly due to over speeding of vehicle while driving, secondly driver is unable to see the vehicle coming from another end of the curve.

In Ghat section or in curve roads , first preference should be given to vehicles moving an upward slope. But, problem is rules are not strictly followed and thus resulting accidents[1].

Fig 1. Ghat Section Road

Now a days accidents have become common reason for deaths. The main reason for accidents are rash driving, signal jumping, drunk and driving, due to minor drivers etc. While driving on roads at ghat section many drivers faces accident which results them into serious injuries or even death. This is the main reason behind this accident is curves and bends of roads in ghat section. It becomes very difficult for driver to see vehicles coming from other end and drivers while taking a turn has to assume a way for turning at such critical section this leads to a great risk of life, other reason for accident in ghat section is that only one vehicle can pass at a time in such lane [2]. The number of accidents in India is highest in the world.

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Nowadays safety on roads has become a serious issue as well as all over in the world. There are many road accidents occur every day in every part of the world. Nowadays we all use Google maps and its application for navigation during travelling, but these applications are not so friendly to tell you any road's condition or its complexity. In some part of the ghat section there are obstacles are present. Trees branches are grows across the road also in rainy season due to smog and foggy environment, it is difficult for the driver to see the road properly.

II. EXISTING SYSTEM

In the past, lot devices are used to detect detect rash driving . Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement. Present day automobiles don't have effective lighting system. Due to this many accidents are taking place during night times especially in ghat sections Street lights tend to shine off the road entirely, which can lead to unsafe condition.

III. PROPOSED SOLUTION

The accidents can be prevented through the use of LED screen, LCD display and Buzzers it will give a clear pictures and distinct view of vehicles coming from the other side. It does not make any distraction to drivers while driving. When two cars pass from the opposite side of a mountain curve the IR sensor senses the car and the LED colours changes to red and raises the buzzer giving signal of danger and then it changes one LED colour into green to allow the one car to pass and then the other LED colour turns green. Due to the simple techniques it is beneficial to use large number of places and even in critical cross section of roads. . We have also implemented offline Emergency alert for travelers. When vehicle is stuck between ghat sections they can send SMS 'A','F' or 'P' which calls nearby ambulance, Fire station or police. GSM model is used to receive SMS and alert the officer. We have implemented automatic Alert System within fixed limit of period. If the vehicle does not cross the ghat within given time then alert will be send to the nearest police station. This will solve the problem of those people who will face problem within the ghat section due to landslide, animals or other reason. The system is capable of detecting any number of vehicle passing from the same zone. The system is also capable of providing an alternative path for the vehicle if it faces any traffic. Due to the simple techniques it is beneficial to use large number of places and even in critical cross section of roads.

IV. SYSTEM DESIGN

The system design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on a specified requirements. The purpose of the design phase is to plan a solution of the problem specified by the requirement document. The design of a system is perhaps the most critical factor affecting the quality of the software, and has a major impact on the later phases, particularly testing and maintenance. The output of this phase is the design document.The design of this system mainly consists of hardware design and software design.

A. Hardware Design

Hardware design consists of arduino, infrared sensor, a microcontroller, GSM, Buzzer and LED. Infrared sensor uses +5V DC supply. IR sensor is used for sensing the vehicle or obstacle and to operate the LED by using Arduino tool. We make use of two LED lights which is green and red.

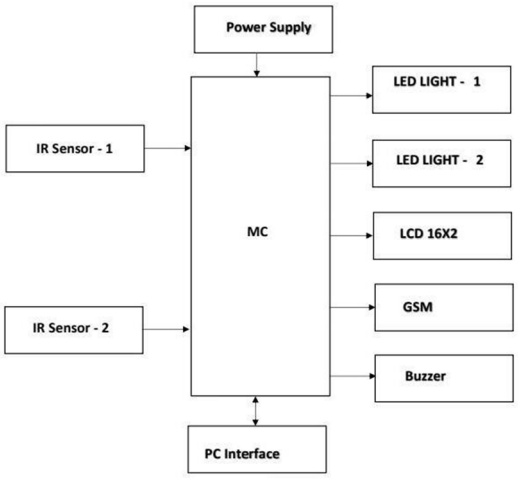

Fig 2. Block Diagram of connection of components

Infrared sensor has 4 pins.. The sensor provides a digital as well as analog output. This digital output can be directly connected to an Arduino to read the sensor output. When no object is detected within the range of the IR receiver, the output LED remains off. When a object is detected within the range of the IR sensor the LED glows. Buzzer is raised to allert the controller when the vehicle is stuck in ghat section for a long time.

In the presence of vehicle the sensor senses the vehicle and the light will glow at the other end of the curve. In the absence of the vehicle the sensor will not sense and the light will not glow. This process repeats continuously.

B. Software Design

Fig. 3 shows the flowchart of software design of microcontroller which is programmed by using Arduino 1.0.5 IDE tool which is open source software. Programming can be done by using embedded C. Operating system that we used is windows 10. As shown in the flowchart first the user needs to login and enter username and password. If the enterd password is valid then the user gets to see the updates or notification. There will be two senosr attached to an either side of the road. When sensor senses the vehicle , the vehicle wil be detected and the notification is been sent to the controller. At the initial stage when there is no vehicle in the ghat section the led light is appeared to be green on both the zones. When a vehicle moves from zone1 then the led ight turns red on the zone 2, which indicates that there is an vehicle in the ghat section. We implemented the automatic Alert System within fixed limit of period. If the vehicle does not cross the ghat within the given time limit, then the buzzer will be raised and alert will be sent to the nearest police station. This will solve the problem of those people who will face problem within the ghat section due to landslide, animals or other reason. We have implementated the offline Emergency alert for travelers. When vehicle is stuck between ghat sections they can send SMS ‘A’,’F’ or ‘P’ which calls nearby ambulance, Fire station or police. GSM model is used to receive SMS and alert the officer. The system is capable of providing an alternative path for the vehicle if it faces any traffic. Due to the simple techniques it is beneficial to use large number of places and even in critical cross section of roads.

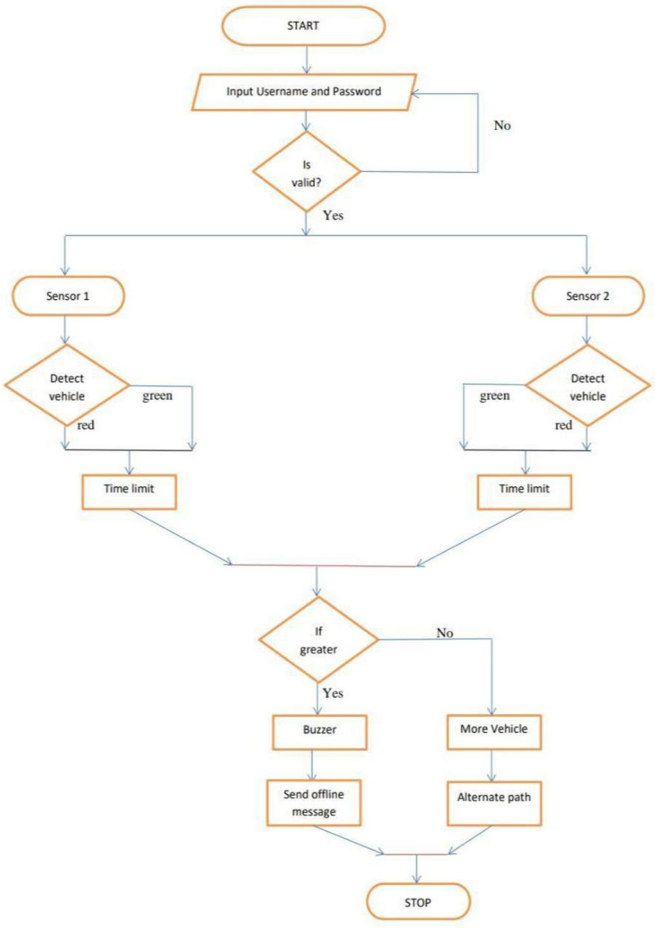

Fig 3. Flow chart for software design of road safety in ghat section.

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V. EXPERIMENTATION AND RESULTS

1) *STEP 1:* The fig 4 shows the coding for microcontroller which consists of set of commands to process the data from sensor and to operate the LED.

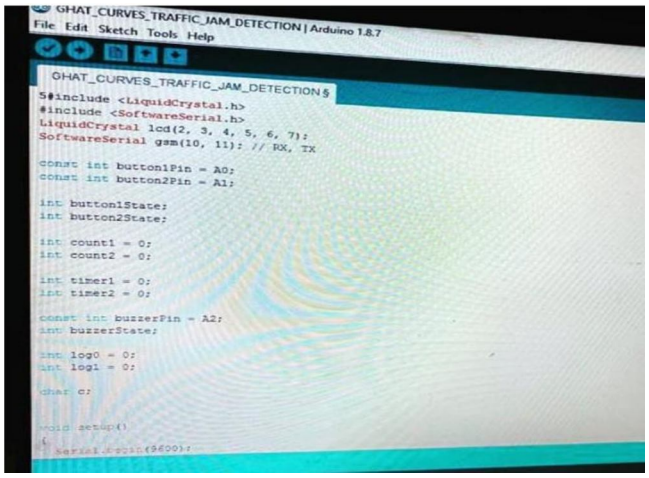

Fig 4. Coding for microcontroller arduino

2) *STEP 2:* The fig 5 shows the circuit connection of hardware which involves sensors, lcd, buzzer, GSM. the senors senses the object and it is been processed further by microcontroller.

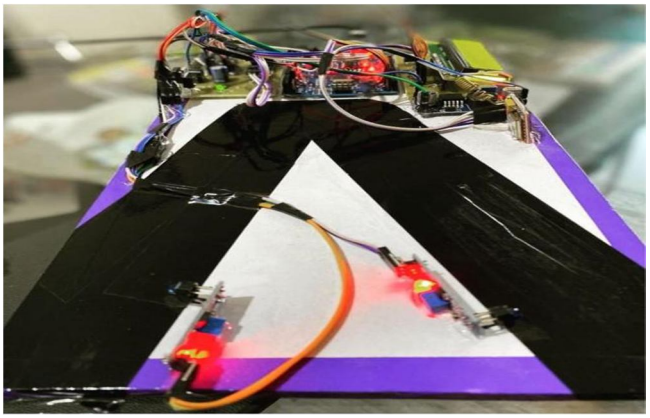

Fig 5. Circuit connection having sensor, arduino, GSM.

3) *STEP 3:* The fig 6 shows the output data. Sensor senses the object and gives the signal information to microcontroller arduino UNO. Microcontroller arduino UNO is powered by using laptop. It possesses and the output is shown in the serial monitor.

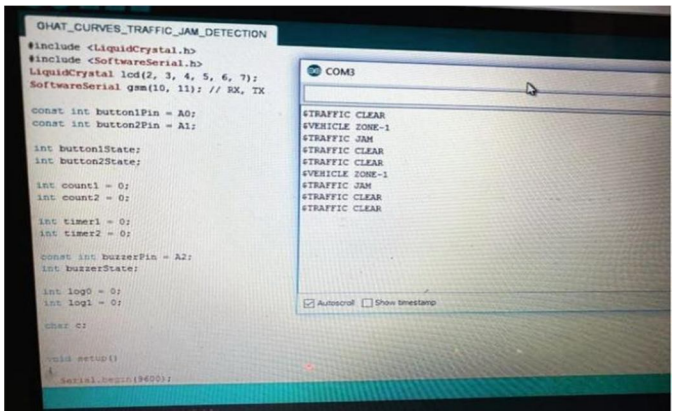

Fig 6. Analysing the output of road safety in ghat section

4) *STEP 4:* When the vehicle passes from zone 1 the IR sensor senses the car and turns the LED light of zone 2 to red giving the signal that there is an vehicle moving in zone 1.

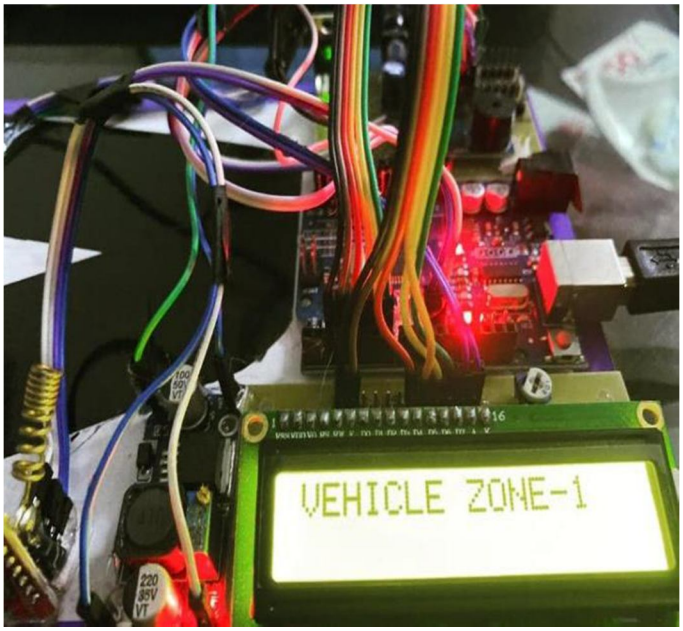

Fig 7. Sensor senses the vehicle and gives the signal

5) *STEP 5:* The implementation of offline Emergency alert for travelers. When vehicle is stuck between ghat sections they can send SMS 'A','F' or 'P' which calls nearby ambulance, Fire station or police. GSM model is used to receive SMS and alert the officer.
6) *STEP 6:* The system is capable of detecting any number of vehicle passing from the same zone.
7) *STEP 7:* The system is capable of providing an alternative path for the vehicle if it faces any traffic.
8) *STEP 8:* The implementation of automatic Alert System within fixed limit of period. If the vehicle does not cross the ghat within given time then the buzzer will be raised and alert will be sent to the nearest police station. This will solve the problem of those people who will face problem within the ghat section due to landslide, animals or other reason. Due to the simple techniques it is beneficial to use large number of places and even in critical cross section of roads.

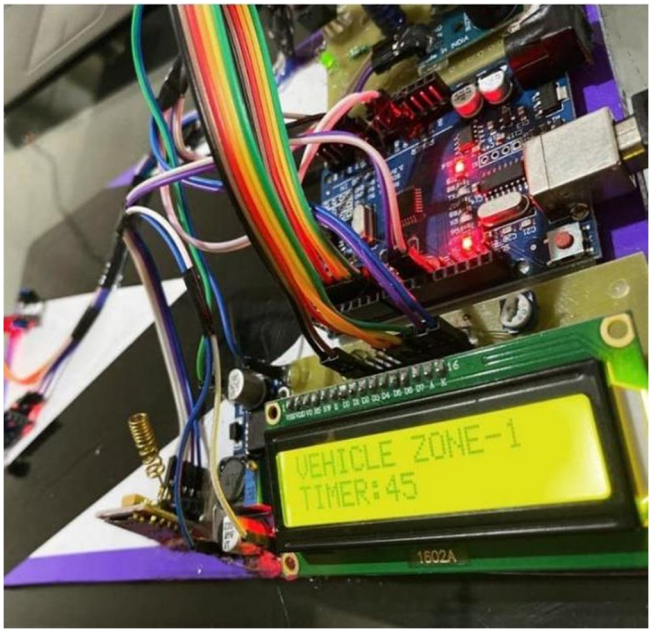

Fig 8. Automatic alert system.

VI. ADVANTAGES

A. Helps in reducing the percentage of accidents.
B. The signals on the road(LED light), helps the driver to understand the traffic flow and to balance the speed.
C. Reduces traffic jam.
D. Less maintenance required.

VII. FUTURE WORK

A. Making use of water proof sensors to make the device usable in rainy conditions and increase the durability.
B. Implementing the system to detect the type of the vehicles and velocity of vehicle.
C. Reduce the physical size of the components being used to make it user friendly.

VIII. CONCLUSION

The purpose of this paper is to decrease the accidents that occur in ghat roads. This is done by using LED lights on the either sides of the road, which is been used to alert the driver. The automatice alert system and offline emergency message are been used to solve the problem of those people who will face issue within the ghat section due to landslide or other reasons. By this we can save thousands of lives in the curve roads.

IX. AKNOWLEDGMENT

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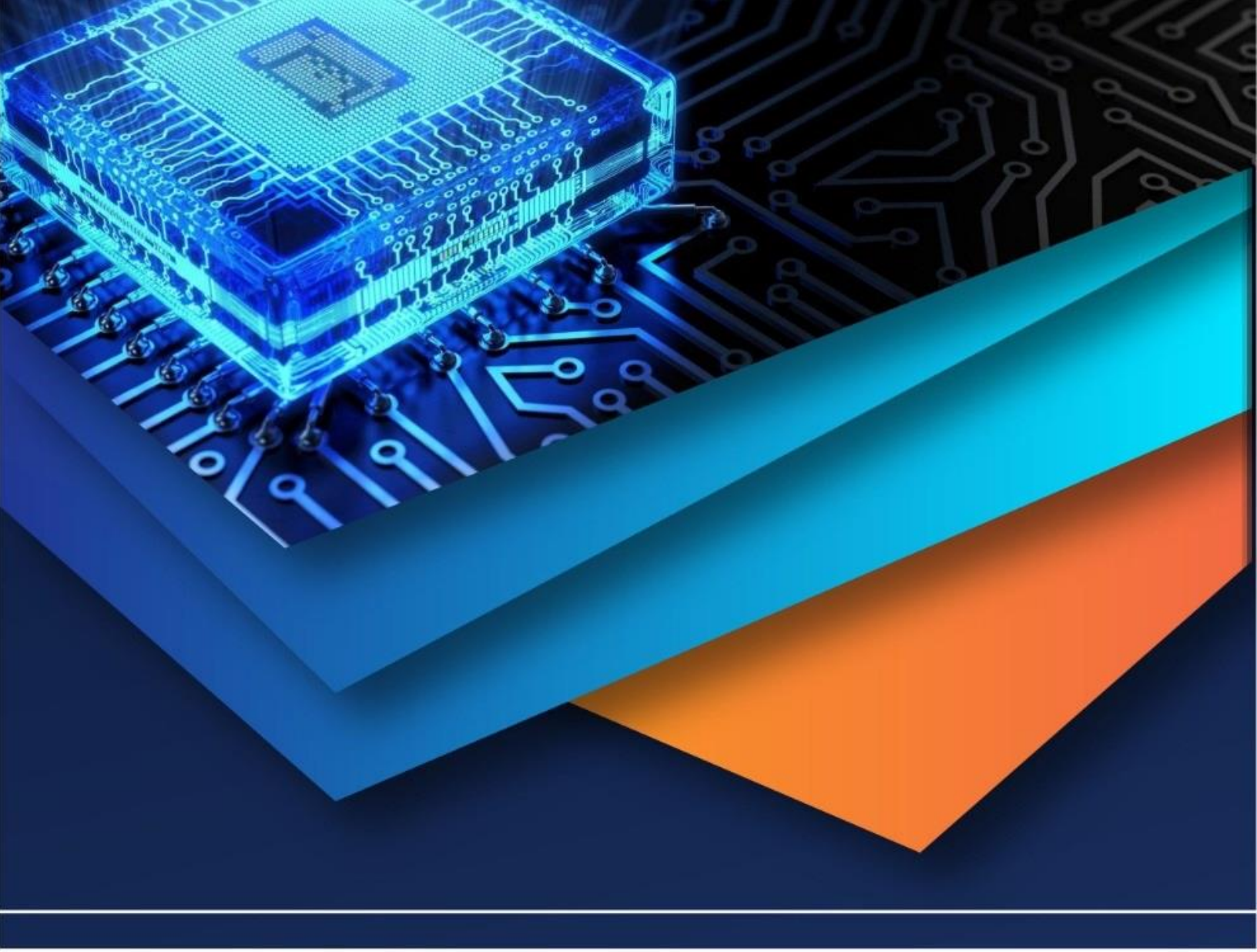

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