EVOLUTION OF ELECTRONICS IN AUTOMOBILE SAFETY, COMFORT AND SECURITY FOR INDIAN SCENARIO TECHNOLOGY ASSISTED CAR SAFETY SYSTEM

SINDHU RANJANI.S , SANJANA MANOJ KUMAR
GUIDED BY :PROF.S.GOVINDARAJU
KUMARAGURU COLLEGE OF TECHNOLOGY

ABSTRACT:

Electronics is being used in vehicles for safety and security, infotainment, networking, power train and engine management and more. Rapid advancements in sensor technology, microcontrollers,wireless communications, embedded systems, etc. are opening up a lot of new challenges and opportunities in this space.
In India, most of the highways do not have sufficient lighting which is a major cause of accidents and because of the high speed of travel, people do not expect the car ahead to stop suddenly, which is also a cause for accidents. Another common problem in India is intrusion at highways, both human and animals.We can use ultrasonic sensors in order to detect the objects ahead of the car. Using ultrasonic sensors, the distance between the car or objects ahead can be calculated and it sends an alert to the driver if it is dangerously close and slows down the car automatically if the driver does not respond.

Many accidents are also caused because of people not following the traffic signals. To avoid this, we use a webcam that continuously scans for signals and slows down the car if the orange light is on and does not allow the car to run the signal when the red light is on.

INTRODUCTION:

The latest world-wide statistics released by International Road Federation (IRF) reveal that 1,19,860 people are killed in road accidents every year in India. This is the highest in the world. Majority of these accidents happen on highways as the travelling speeds are very high and thus impacts are huge; killing people. Driving on highways can also be very monotonous and people tend to be distracted and sluggish- not reacting fast enough for sudden intrusions. In such cases, an alert system is very useful to help avoid an accident . If the driver does not respond to the alert, then the car temporarily takes control and slows down the car automatically.

Similarly, at signals people tend to not follow the rules and many pedestrians, two wheelers lose lives because of this. This can be avoided by interfacing the webcam which captures the image of the signal with the Electronic Control Unit of the car.

NEED FOR NEW TECHNOLOGY:

In the already existing systems, interfacing between the webcam which scans for signals and the car does not exist and adding this feature will definitely reduce the number of accidents occurring on a daily basis. Also, the use of ultrasonic sensors to detect obstacles will improve safety of the passengers considerably, especially while travelling at high speeds on highways.

TOOLS USED:

- Labview
- Arduino

OBSTACLE DETECTOR:

Ultrasonic sensors (also known as transceivers when they both send and receive, but more generally called transducers) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. Thus, the ultrasonic sensor acts as an efficient obstacle sensor with the added advantage that it can measure the distance to the object. The ultrasonic sensor is connected to the Arduino Duo which is then programmed to get integer value of the distance calculated by the ultrasonic sensor with the help of Arduino software.

The ultrasonic sensor continuously calculates the distance between itself and objects ahead and it need not alert the driver if the object(car) ahead is maintaining the same distance . However, if the distance suddenly reduces below a certain programmed distance or there is a sudden interception (human or animal) , the driver must be alerted immediately and if he fails to respond, the car takes control and automatically slows down.

ARDUINO PROGRAMMING:

```
constint trig = 7;
constint echo = 8;
void setup()
{
Serial.begin(9600);
pinMode(trig, OUTPUT);
pinMode(echo, INPUT);
}
void loop()
{
long duration, inches, cm;
digitalWrite(trig, LOW);
delayMicroseconds(2);
digitalWrite(trig, HIGH);
delayMicroseconds(5);
digitalWrite(trig, LOW);
duration = pulseIn(echo, HIGH);
inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);
Serial.print(cm);
Serial.println();
delay(100);
}
longmicrosecondsToInches(long microseconds)
{
return microseconds / 74 / 2;
}
longmicrosecondsToCentimeters(long microseconds)
{
return microseconds / 29 / 2;
}
```

LABVIEW FRONT PANEL DISPLAY:
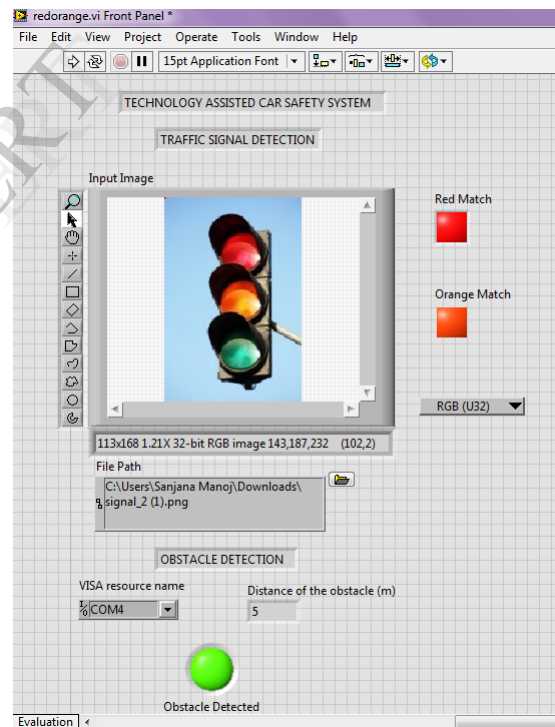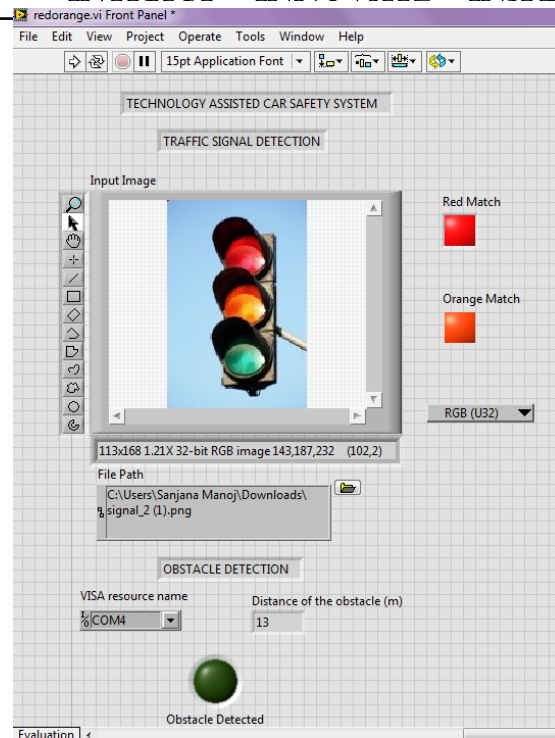
LABVIEW BLOCK DIAGRAM :
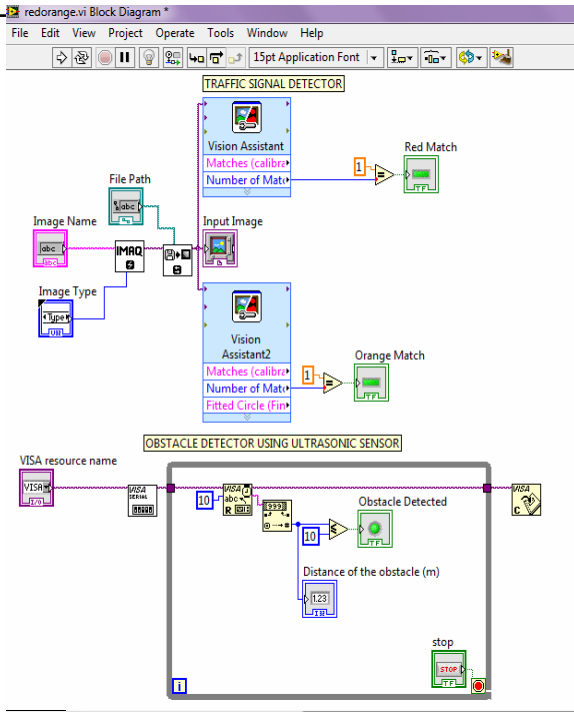
REFERENCES:

1. http://en.wikipedia.org/wiki/Ultrasonic_sensor

2. www.ni.com

MENTOR: SUFIAN K.A.

SIGNAL DETECTOR:

The image of the signal is captured using a webcam and processed in labview. The colour location tool is used to match a particular colour and locate it in an image. But, doing just this will detect any object in that colour. Hence, we check if the detected colour location is circular since the signals are circular. Further the webcam is designed to capture images above an average height so as to avoid other red images. By doing this, we reduce the chances of wrong detection. If a red light is detected, a signal is sent to the ECU(Electronic Control Unit) of the car and the car comes to a stop and does not move. If an orange light is detected, the car automatically starts to slow down.

CHALLENGES:

The webcam cannot differentiate between a red light and a red object.

At late nights, the traffic light blinking can cause problems.

If the interceptions are too sudden, although an alert is sent to the driver, the car may not be able to stop completely without collision.

CONCLUSION:

Thus the obstacles are successfully detected by the use of sensor and this drastically reduces large impact accidents. The rate of accidents drastically decreases at signal junctions when a car does not run a red light. Moreover the components used are cheap and replaceable and can be implemented and used on large scale.