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Automatic Intelligence in Road Safety

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ABSTRACT: This work represents improvement of the road safety system which control the road accidents. The drivers get alert about presence of speed breakers from long distance during night and also the smog and mist conditions by using the Radio frequency transmitter and Radio frequency receiver which protect from road accidents in speed breaker. The hair pin bend in the hilly region, the drivers get alert about the another drivers arrival on opposite end of bend curve by using Infrared sensor which detects the obstacle and also movements of vehicle that use to create alert the riders in hair pin bend. Spike system used in the road that depends on the traffic light signal indication. Using the spike system in one way that providing drivers to follow the one-way traffic rules.

KEYWORDS: Spike system, Radio Frequency Receiver, Infrared Sensor

I.INTRODUCTION

Now a day's lot of accidents happen on the road in day to day life. The speed breakers are used to control the speed of the vehicle. The road accidents in speed breakers due to poor visibility condition during night time or cold weather contains smog or mist covers the speed breakers and dust particle disturb the drivers eyes that cause the drivers are unable to find the speed breakers from the long distance. The high speed vehicle cannot control the speed in the speed breakers that leads to major accidents or severe injury because the speed breakers does not clear visible to riders. Rate of death and rate of injury increase rapidly due to less chance for detection of speed breakers. Existing method is using the ultrasonic sensor that measure distance and time to reach the speed breaker. But ultrasonic sensor sensing range is small. It does not detect the speed breakers efficiently. The proposed method is to solve the problem of existing system for speed breakers detection. The proposed system is to use the Radio frequency transmitter and Radio frequency receiver. Radio Frequency Transmitter has three pins. There are supply pin, ground pin and data pin that is connected to digital pin of a micro controller. transmitter transmits the data, the transmitted data is received by the receiver. The receiver has four pin. there are supply, ground and two data pins D1 and data pin D2. D1 and D2 are short circuited that is connected to digital pin of Arduino microcontroller then it is connected to Liquid crystal display gives the alert about the speed breaker from the long distance. Major road accidents occur in the hilly regions at the shortest bend curve and hairpin bends. Even the drivers follow the traffic rules in the hairpin bends, there may be our huge chance for road accidents. The drivers do not know the vehicle which is in the opposite end of curve and the vehicle arrival on the other side of bend. Vehicle horn is a traditional way to alert the opposite and nearby vehicle and also to avoid accidents in the hairpin bend. The drivers guess the distance between them by sensing the intensity of the sound of a horn. The drivers get confused because of their different hearing abilities. Sometimes in horn the battery failure may occur, this leads to dangerous situation. The head lights are mostly in hilly regions the climatic condition contains fog which reduce the light travelling distance. This is also a traditional method. The drivers find each other by brightening their head lights while reaching the hair pin bend. It doesn't work that much because it is effortless in day time. Convex mirror setup in the hair pin bend or bend curve give information to drivers on the opposite end or drivers arrival on the other side of the bend. They should be cleaned regularly; it is tougher to clean regularly in the hilly region. It a does not works in misty conditions[1][2][3]. Drivers feel uncomfortable in day time because of the sunlight reflected from convex mirrors placed in the bends. Convex mirror is not perfect method in hairpin bend. The proposed system eliminates the existing problems in hair pin bends. The vehicle arrival on the first bend in forwarding direction that vehicle motion is sensed by first two sensors. The indication light shows red colour on second bend that alert the drivers in the second bend side about drivers' arrival on the first bend. The vehicle arrival on the second bend in forwarding direction that vehicle motion is sensed by other two sensors in the second bend. The indication light shows red colour on first bend that alert the drivers about another driver arrival on the second bend side about drivers' arrival on the second bend.[4] The indication light does not show red colour indication when the vehicle travel in reverse direction in signals there will be a limit line before the zebra lines which the vehicles should not cross when their lane signal is red. this is the traditional method followed in the signals. But many peoples violate the rules and move even when the signal is red. Because of this those who want to cross the road can't cross the road and



accident might also occurs. In some places there will be a closed-circuit television camera in signals to monitor the violations and other accident. It doesn't have any safety measures to prevent peoples from the accident. It is useful to identify the person those who violating the signal. Spike is raise and down on the road .The spike system depends on the indication light .The indication light shows red then the spike raise on the road and the indication light shows green colour then the spikes goes down .But in emergency conditions like ambulance crossing the spikes gets puncher in the ambulance. But the major problem in that is even in emergency condition they have to wait till the spikes goes down. In the emergency condition it uses radio-frequency identification reader, the indication light changes from red colour to green colour then the spikes goes down .Many people does not follow the one way traffic rules that leads to accident .They keep dividers which also have an indication to mention that the way is one-way. But it is useless because people violate the rules and goes even with the gap left for the correct way members[5]. The proposed system is spike is placed when the vehicle travel in opposite side or return back in one way the spike system is effective method to solve the problems in one way.

II. HAIR PIN BEND ALERT SYSTEM

The problem of existing system is vehicle Horn. Vehicle horn is a traditional way to avoid accidents in the hairpin bend and also bend curves. drivers decide the distance information between them by sensing the intensity of the sound from the horn. The drivers get confused because of their different hearing abilities. Sometimes the horn or battery failure may occur that leads to accidents in the hairpin bends. So, vehicle horn is not suitable safety system in the hairpin bends. Another problem of existing system is head lights. Mostly in hilly regions the climatic condition contains fog which reduce the light travelling distance. This is also a traditional method. The divers find each other by bright their head lights while reaching the hair pin bend. It does not work that much because it is effortless in day time that leads to accidents in the hairpin bends. So, vehicle horn is not suitable safety system in the hairpin bends. Another problem of existing system is convex mirror. Convex mirror is setup in the hair pin bend or bend curve give information to drivers on the opposite end or drivers arrival on the other side of the bend. They should be cleaned regularly. it is tougher to clean regularly in the hilly region. It a doesn't works in misty condition. Drivers feel uncomfortable in day time because of the sunlight reflected convex mirrors placed in the bends.[6]

III.EXPECTED OUTCOMES OF THE SYSTEM

In the hair pin bend, the vehicle arrival on the first bend in forwarding direction that vehicle motion is sensed by first two sensors. The indication light shows red colour on second bend that alert the drivers in the second bend side about another drivers arrival on the first bend .The vehicle arrival on the second bend in forwarding direction that vehicle motion is sensed by other two sensors in the second bend .The indication light shows red colour on first bend that alert the drivers about the another driver arrival on the second bend . The indication light does not show red colour indication when the vehicle travel in reverse direction.



IV.CIRCUIT DIAGRAM OF SPEED BRAKE ALERT SYSTEM

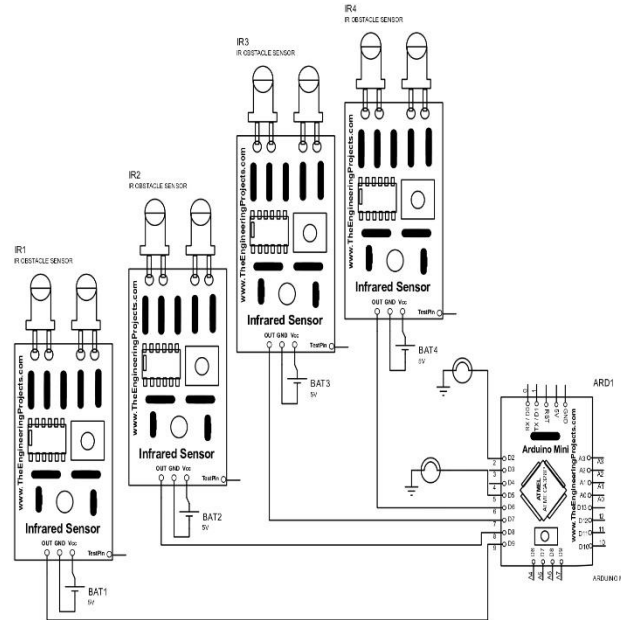


Fig .1 Proposed hairpin bend alert system

Figure 1 shows the circuit diagram of the hairpin bend alert system. The infrared sensor consists of three pin configuration Voltage Common Collector, ground and output. The circuit consists of four Infrared sensor, indication light, and Arduino micro controller. Initially provide 5-volt supply to Voltage Common Collector pin in all the four sensors and provide ground for all the four sensors. The infrared sensor 1 output pin is connected to the digital pin 9 in Arduino. The infrared sensor 2 output pin is connected to the digital pin 8 in Arduino. The infrared sensor 3 output pin is connected to the digital pin 7 in Arduino. The infrared sensor 4 output pin is connected to the digital pin 6 in Arduino. The indication light emitting diode 1 positive terminal is connected to the digital pin 5 in Arduino. The indication light emitting diode 2 positive terminal is connected to the digital pin 2 in Arduino and the negative of both the light emitting diode is connected to the ground. [7][8]

V. RESULT AND DISCUSSION

In this hair pin bend alert system, infrared sensors are used to detect the object that entering into particular zone. The infrared sensors consists of two led bulbs, one is transmitter and another one is receiver the transmitter sends the infrared radiation and the receiver, receives the radiation due to change in the infrared radiation the object is identified in this project the infrared sensors are used to detect the running object for that four infrared sensors are used to detect the forward and backward motion in the infrared sensors. In the hair pin bend the ways consist of two road the way one road consists one two infrared sensors and the way infrared sensors consists of two infrared sensors, for that four infrared sensors sensor we name infrared sensors 1, infrared sensors 2, infrared sensors 3, infrared sensors 4. The way one road consists of infrared sensors 1 and infrared sensors 2 when the infrared sensors 1 is initially in ‘0’ condition and the infrared sensors 2 is also in ‘0’ condition. When the infrared sensors 1 detect the object the ‘0’ condition change to ‘1’ and the indication red light turn ON in the other side of way 2 road. This condition is for forward direction. During the reverse direction the ON and OFF condition varies in the infrared sensors. For that reverse direction the infrared sensors 2 changes from ‘0’ to ‘1’ condition and the infrared sensors 1 is at ‘0’ condition for this condition there is no indication in the way two road. This is the working system for the way one road. The way two road consists of infrared sensors 3 and infrared sensors 4 when the infrared sensors 3 is initially in ‘0’ condition and the infrared sensors 4 is also in ‘0’ condition. When the infrared sensors 4 detect the object the ‘0’ condition change to ‘1’ and the indication red light turn ON in the other side of way 2 road. This condition is for forward direction. During the reverse direction the ON and OFF condition varies in the infrared sensors. For that reverse direction the infrared sensors 3 changes from ‘0’ to ‘1’ and the infrared sensors 4 is at ‘0’ condition for this condition there is no indication in the way two road. This is the working system for the way two road. The continuous and sequence of working of the infrared sensors detect the vehicle and alert the drivers in the hairpin bend turns.



Direction	Infrared sensors 1	Infrared sensors 2	Infrared Sensors 3	Infrared Sensors 4
Initially	0	0	0	0
Forward	1	0	0	0
Forward	0	0	0	1
Reverse	0	1	0	0
Reverse	0	0	1	0

Table .1 Different Working conditions of the proposed system

VI. ALGORITHM

The following steps represent the flow chart process of hair pin bend alert system technology. The steps are shown below.

Step 1:

Initialize Arduino micro controller and four Infrared sensors in way one and way two line to start the process.

Step 2:

Provide 5-volt supply to the Arduino and Infrared sensors.

Step 3:

Check whether all sensors is working or not and adjust the adjustable resistance to make the system detect the motion or not.

Step 4:

If all the Infrared sensor shows zero the system is ready to start the analysing process and fetching reading process.

Step 5:

When the four Infrared sensors show zero value there is no vehicle is detected in the road way. The value from the all the sensor get decrease.

Step 6:

When the Infrared sensor 1 condition changes from '0' to '1' condition and Infrared sensor 2 shows '0' condition, there is an objected by the Infrared sensor, where those signal is processed by the Arduino and a signal is sent to the tower to turn on the indication light in way two line .

Step 7:

In way two line the Infrared sensor 3 and Infrared sensor 4 indicate the '0' condition there is no vehicle detected in the way two line. The value from the sensor get decrease and the process gets continue.

Step 8:

In way one line the Infrared sensor 1 and Infrared sensor 2 indicate the '0' condition there is no vehicle detected in the way two line. The value from the sensor get decrease and the process gets continue.

Step 9:

When the Infrared sensor 4 condition changes from '0' to '1' condition and Infrared sensor 3 shows '0' condition, there is an objected by the Infrared sensor, where those signal is processed by the Arduino and a signal is sent to the tower to turn on the indication light in way one line.

Step 10:

In way one line during reverse direction the turning ON and OFF of the Infrared sensor will varies depending on that the vehicle motion is forward direction or backward direction can be analysed and depending on the analysed data the value and data from the infrared sensor will get increase or decrease.

Step 11:

In way one line when the Infrared sensor 2 changes from '0' to '1' indication and the Infrared sensor 1 changes from '0' to '1' indication in this sensor reading is processed by the Arduino and analyse the direction, for this condition the vehicle moves in backward direction. so, the value gets decrease.

Step 12:

In way two line when the Infrared sensor 3 changes from '0' to '1' indication and the Infrared sensor 4 changes from '0' to '1' indication in this sensor reading is processed by the Arduino and analyse the direction, for this condition the vehicle moves in backward direction. so, the value gets decrease.



At present days turning in the hairpin bend without knowing the other side of the bend. Generally, there is only convex mirror is placed at present. by using this method, we can find whether the vehicle is coming or not in the other side of the road. the following implementation procedure are shown below.

step 1:

Initially make a circuit diagram for the vehicle theft. Once circuit is designed purchase the component.

step 2:

After purchasing all components, interface ATmega328 microcontroller with infrared sensor module based on circuit design.

step 3:

Once an interfacing is finished, then ready to start the program.

step 4:

Depending on the program given to the Arduino and the sensor reading the working of the bend alert system at initial condition all the four Infrared sensor is in '0' condition.so, no vehicle is detected in the zero-state condition.

step 5:

Infrared sensor 1 condition changes from '0' to '1' condition and Infrared sensor 2 shows '0' condition, there is an objected by the Infrared sensor, where those signal is processed by the Arduino and a signal is sent to the tower to turn on the indication light in second line. In line the Infrared sensor 3 and Infrared sensor 4 indicate the '0' condition there is no vehicle detected.

step 6:

In second line the Infrared sensor 3 and Infrared sensor 4 indicate the '0' condition there is no vehicle detected in the way two line. In first one line the Infrared sensor 1 and Infrared sensor 2 indicate the '0' condition there is no vehicle detected in the way two line

Step 7:

If the state of the Infrared Sensor 4 changes from '0' to '1' and the state of the Infrared Sensor 3 shows '0' there is an protest by the Infrared Sensor, where the Arduino processes such signals and a signal is sent to the tower to turn on the indicator light in one line. In the first line during the reverse direction, the Infrared sensor's turning ON and OFF will differ based on whether the movement of the vehicle is forward or backward direction can be analysed and the value and data from the infrared sensor will be ON or OFF signal based on the analyzed data.

Step 8:

In the first section, when the Infrared Sensor 2 changes from the indication '0' to '1' and the Infrared Sensor 1 changes from the indication '0' to '1' in this sensor reading, the Arduino processes and analyses the direction, for this condition the vehicle moves backwards, depending on the value of the Infrared Sensor the total system functioning is dependent on. [9][10]

VI.CONCLUSION

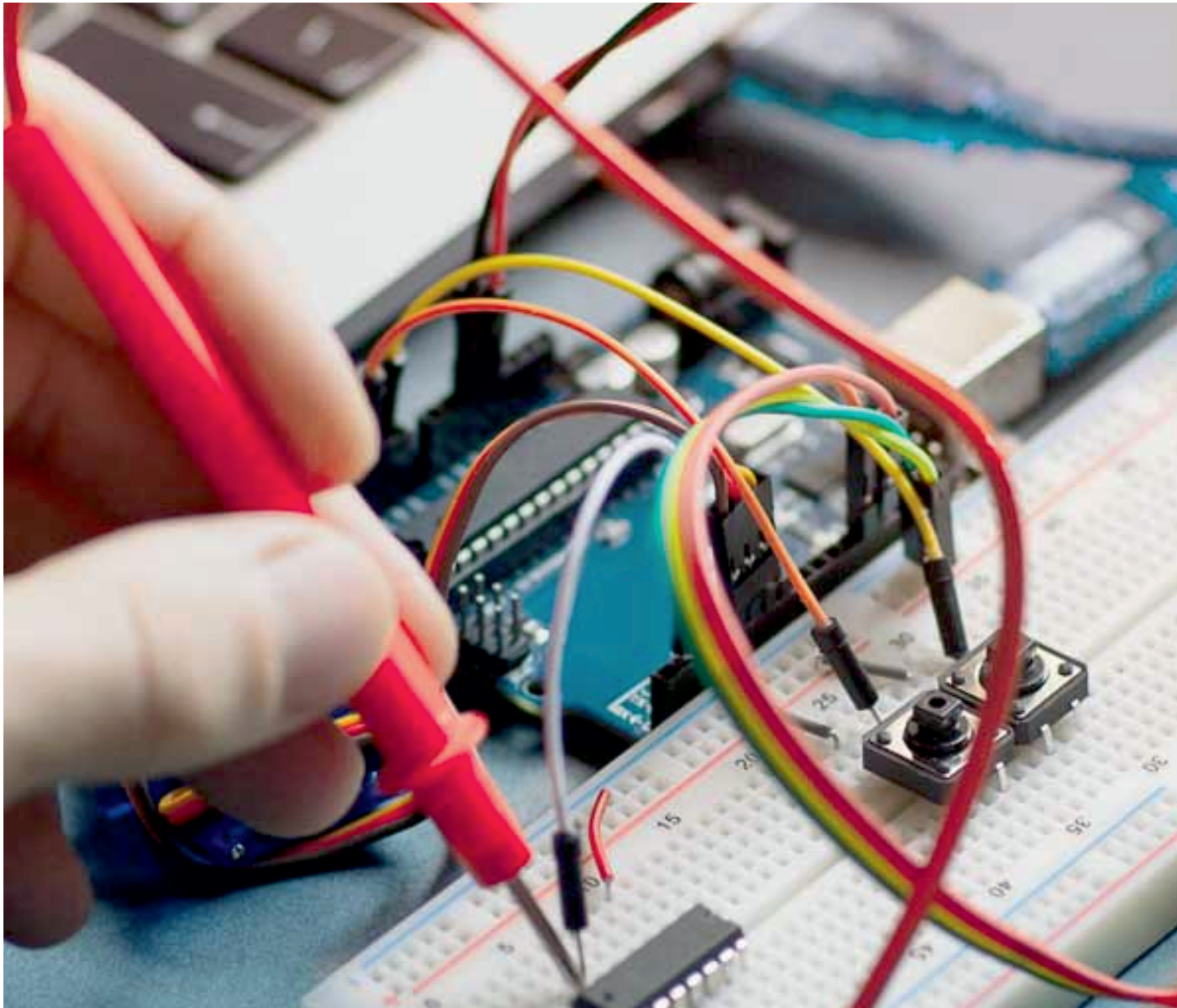
The proposed model for providing Hair pin bend alert system to detect the vehicle arrival on the both ends of hair pin bend by infrared sensor which is working on motion detection principle. Automatic spike system near the traffic signal providing protection for road accidents. The spikes raise and down depends on traffic signal. The spikes raise on the road when the traffic signal indication is red and the spikes goes down when the traffic signal is green. In the emergency condition like ambulance cross the spikes may punchers the tyres of ambulance. When the radio-frequency identification reader tag is placed in the radio-frequency identification reader, the spikes goes down. One-way arrangement providing protection from the accident by the spikes system

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