AUTOMATIC ACCIDENT PREVENTER FOR TRAINS AND AUTOMOBILES

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Abstract: The increased growth in the population has resulted in an increase in the traffic density across India. This has resulted in the increase in the number of accidents involving trains as well as on road. In this paper, our system includes some features which prevent accidents. It includes automatic speed controlling, collision detection, detaching of obstacles automatically automatic gate control. This system makes use of IR sensors, fire sensor, zigBee and other embedded systems, and vehicle control, automatic breaking systems.

Keywords: Vehicle control block, Train control block, track control block, zigbee, IR sensors.

I. INTRODUCTION

The main objective of this paper to design speed control & automatic braking system in the train. The speed control & automatic braking system will involve the circuits such as sensor, relay, control system, microcontroller, signal transmitter and signal receiver, Peripheral Interface Circuit. In this project we will apply the skill and knowledge in designing electronic circuit for the speed control & automatic braking system. We will use the software Proteus to design the circuit. The concept in designing the speed control & automatic braking system is strategic control of an accident being vehicles. We will use ultrasonic sensor for detection the obstacle & IR sensor for automatic braking system purpose. The system will be design to prevent the driver and passenger inside the vehicle from accident. Automation is fundamentally changing the role of people in many systems, and driving is no exception. An increasing number of vehicles are being equipped with speed control system. This system uses ultrasonic sensor to detect the obstacle or moving vehicle ahead and warns to driver about collision risk. When following another vehicle, the speed control system (SCS) will automatically give signal about distance between car and obstacle through LED display to the driver to reduce the speed of vehicle. The ultrasonic sensor is fitted in front of vehicle. This ultrasonic sensor transmits the signal continuously towards the obstacle and when obstacle is detected this signal is reflected from obstacle and receiver received this echo-signal from obstacle. The receiver sends this signal to the microcontroller for the control system purpose. The controller controls the speed of motor as per the distance and reduces the speed of motor and warns to the driver to reduce the speed. When diver or user is being fail to reduce the speed of vehicle then by controller automatically reduce the speed and when the distance between the car & obstacle is minimum, means if accidents like situation is detected by IR sensor then the controller takes total charge to control the speed of vehicle from driver or user and microcontroller make its own decision to activate the automatic braking system and our

vehicle stop automatically. Means in simple language it gives the signal to driver to reduce the speed & about the danger accidents and also save the life of driver or passenger which are seated inside the train.

We have the objective to minimize the train accidents due to above mentioned facts in real time using embedded system platform in low cost. In our project, we proposed few concepts to minimize the accidents due to violating rules and carelessness. The increased growth in the railway sector has resulted in an increase in the train traffic density across the world. This has resulted in the increase in the number of accidents involving trains. In this paper, the proposed system includes several features which prevent train accidents. It Includes IR sensor, relay, DC motor. In our project, two trains are used. train is controlled by using the switch. Two switches are used one for train controlling purpose second switch is ON /OFF switch. By pressing this switch operation of project is going to be start. and the battery is 12 Voltage 7AH D.C lead acid battery used. Then relay is used to drive the D.C motor. When both IR pair sense the obstacles then only train stops. Otherwise, it runs continually on track.

This paper introduced a low cost, low-power embedded system for railway accidents control system. In this paper, we discuss the design of proposed safety system for railway, using ARDUINO Microcontroller[11].

Main working is When both IR pair sense the obstacles then only train stops. Otherwise, it runs continually on track. The result shows that this new innovative technology will increase the reliability of safety systems in railway transport. By implementing these features in real time application railways can avoid accidents approximately 70%.

II.LITERATURE SURVEY

The increased growth in the railway sector has resulted in an increase in the train traffic density across the world. This has resulted in the increase in the number of accidents involving trains[16]. In this paper, the proposed system includes several features which prevent train accidents. It Includes IR sensor, relay, DC motor. In our project, two trains are used. train is controlled by using the switch. Two switches are used one for train controlling purpose second switch is ON /OFF switch. By pressing this switch operation of project

is going to be start. and the battery is 12 Voltage 7AH D.C lead acid battery used. Then relay is used to drive the D.C motor. When both IR pair sense the obstacles then only train stops. Otherwise, it runs continually on track.The main objective of this paper to design speed control & automatic braking system in the train. The speed control & automatic braking system will involve the electronic circuits such as sensor, relay, control system, microcontroller, signal transmitter and signal receiver, Peripheral Interface Circuit (PIC). In this project we will apply the skill and knowledge in designing electronic circuit for the speed control & automatic braking system. We will use the software Proteus to design the circuit. The concept in designing the speed control & automatic braking system is strategic control of an accident being vehicles. We will use ultrasonic sensor for detection the obstacle & IR sensor for automatic braking system purpose. The system will be design to prevent the driver and passenger inside the vehicle from accident. Automation is fundamentally changing the role of people in many systems, and driving is no exception. An increasing number of vehicles are being equipped with speed control system. This system uses ultrasonic sensor to detect the obstacle or moving vehicle ahead and warns to driver about collision risk. When following another vehicle, the speed control system (SCS) will automatically give signal about distance between car and obstacle through LED display to the driver to reduce the speed of vehicle. The ultrasonic sensor is fitted in front of vehicle. This ultrasonic sensor transmits the signal continuously towards the obstacle and when obstacle is detected this signal is reflected from obstacle and receiver received this echo-signal from obstacle. The receiver sends this signal to the microcontroller for the control system purpose. The controller controls the speed of motor as per the distance and reduces the speed of motor and warns to the driver to reduce the speed. When diver or user is being fail to reduce the speed of vehicle then by controller automatically reduce the speed and when the distance between the car & obstacle is minimum, means if accidents like situation is detected by IR sensor then the controller takes total charge to control the speed of vehicle from driver or user and microcontroller make its own decision to activate the automatic braking system and our vehicle stop automatically. Means in simple language it gives the signal to driver to reduce the speed & about the danger accidents and also save

the life of driver or passenger which are seated inside the train.

III. PROBLEM DEFINATION

Railway catastrophe is a serious train accident or an untoward event of grave nature, either on railway premises or arising out of railway activity, due to natural or man- made causes, that may lead to loss of many lives and/or grievous injuries to a large number of people, and/or severe disruption of traffic etc necessitating large scale help from other Government/Non-government and Private Organizations. So overcome this problem The goal of this project was to implement the most efficient and automatic accident prevention system with the help of IR Sensor.

Approach to the solution

As seen in the above-mentioned problem with the convectional brakes the problem is arises due to the friction between two or more rubbing parts. Hence the IR sensor brakes can be used as a replacement which is totally frictionless. And due to which there is no question of wear and tear of parts and unnecessary temperature issues as there is no friction in this braking System. Also failure chance is low and in chance of failure or hurdle on the track IR sensor come in action and apply brakes. This results in stable efficiency of the braking system for a longer service span. In addition, it results in longer life span of the braking system without any wear and tear .Therefore, the IR sensor brakes give the answers for the questions that arise in the convectional braking systems for failure, and the brakes becomes less efficient.

IV.PROPOSED WORK

In this project we have the objective to minimize the road accidents due to above mentioned facts in real time using embedded systems platform in low cost. In our project, we proposed few concepts to minimize the accidents due to violating rules. Railway catastrophe is a serious train accident or an untoward event of grave nature, either on railway premises or arising out of railway activity, due to natural or man- made causes, that may lead to loss of many lives and/or grievous injuries to a large number of people, and/or severe disruption of traffic etc, necessitating large scale help from other Government/Non-government and Private Organizations.

Train accidents are a common place in today's scenario. Accident prevention has been one of the leading areas of research. In Indian scenario, normally vehicles are equipped with ABS (Anti-Lock Braking System), traction control, brake assist etc. for driver's safety. All these systems employ different types of sensors to constantly monitor the conditions of the vehicle and respond in an emergency situation. There are many intelligent people working on this topic and developing new technologies. We are also working and studying parallel to this topic. In this project we are developing the prototype of the IBS which uses infrared (IR) sensors in safety systems for controlling the speed of a train. This project known as 'Intelligent braking system'(IBS) includes an infrared wave emitter provided on the front portion of the car. An infrared receiver is also fitted to receive the signal. The reflected wave gives the distance between the obstacle and the vehicle. Then an Arduino is used to detect the pulses and apply brakes to the vehicle.

4.1 Module
Module 1:

Relay 1 This relay connection is given to the P.M.D.C. Motor so that the vehicle moves in Forward Direction

Relay 2 This relay connection is given to the P.M.D.C. Motor so that the vehicle moves in reverse Direction

Module 2:

Stopping the vehicle if obstacle is found

4.2 WORKING

In our project lead-acid battery is used. The lead-acid batteries output is given to the FM receiver circuit. FM Receiver is having 2 relays.

Relay 1-This relay connection is given to the P.M.D.C. Motor so that the vehicle moves in Forward Direction

Relay 2- This relay connection is given to the P.M.D.C. Motor so that the vehicle moves in reverse Direction
The cordless FM transmitter and receiver circuit is

used in our project. The FM transmitter is giving the signal to the receiver. This receiver activates the proper relay so that the vehicle working. In our project, there are two set of IR sensor units are used to fit the two vehicles separately. This unit is used to switch of the motor supply when there is any obstacle in their path and also activate the magnet open/close motor immediately. The IR transmitter and IR receiver circuit is used to sense the obstacle. It is fixed to the front sides of the frame stand with a suitable arrangement.

Our projects working on following two conditions or cases:

• CASE 1:

If there is no obstacle in front of vehicle then the sensor output remains unchanged that means LOW and so that motor

Drives the vehicle as its output is HIGH.

• CASE 2:

If there is obstacle detects by the IR sensor in front of our vehicle then sensor outputs the

Motor stops running as its value will be LOW and our vehicle will be stops.

V. SIMULATION TOOL

The core function of the project is to develop an automatic braking system for train that is cost effective so the following components are used that has effective operation and usage. In this section, hardware part i.e. hardware component used for the project are discussed in details. The heart of the project that is, the IR sensors are used. It Includes IR sensor, relay, DC motor. In our project, two trains are used. train is controlled by using the switch. Two switches are used one for train controlling purpose second switch is ON /OFF switch. By pressing this switch operation of project is going to be start. and the battery is 12 Voltage 7AH D.C lead acid battery used. Then relay is used to drive the D.C motor. When both IR pair sense the obstacles then only train stops. Otherwise, it runs continually on track.

Hardware requirement

- ARDUINO
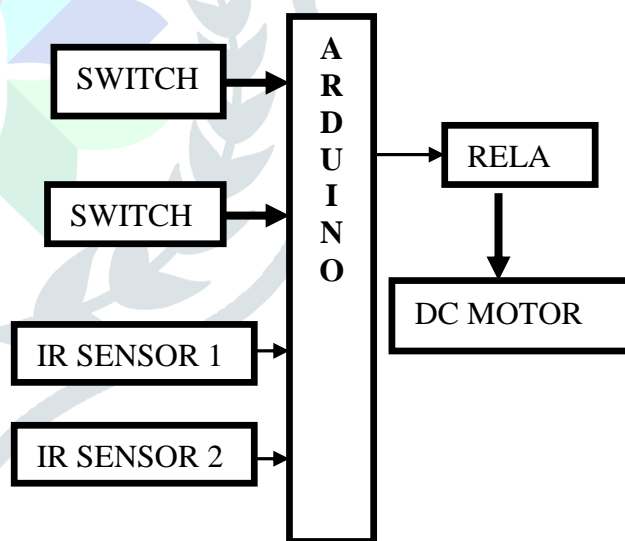- IR sensor
- Relay
- DC Motor
- Switches

- 12 V Battery

Software requirement

- ARDUINO IDE
- PROTEUS

VI. DESIGN AND IMPLEMENTATION

Block Diagram

Block diagram description

Here we are using Arduino as a controller. IR sensor used for detect an obstacle.

Two switches for moving robot forward and reverse.

In our project, here we are using two robots as a train are operated by battery energy

Relay 1 used here this relay connection is given to the D.C. Motor so that the train moves in Forward Direction.

Relay 2 used here this relay connection is given to the D.C. Motor so that the train moves in reverse Direction

One train is controlled by the remote control and another one is automatically moving whenever the switch is in "ON" position.

The battery is 12 Voltage 7AH D.C lead acid batteries. Then it is used to drive the D.C motor.

The IR TRANSMITTER circuit is to transmit the Infra-Red rays.

If any obstacle is there in a path, the Infra-Red rays reflected. This reflected Infra-Red rays are received by the receiver circuit is called "IR RECEIVER".

The IR receiver circuit receives the reflected IR rays and giving the control signal to the control circuit. The control circuit is used to cut the motor supply voltage.

In our project, there are two set of IR sensor units are used to fit the two trains separately.

When both IR pair sense the obstacles then only train stops. Otherwise, it runs continually on track.

VII. CONCLUSION

This paper introduced a low cost, low-power embedded system for railway accidents control system. In this paper, we discuss the design of proposed safety system for railway, using ARDUINO Microcontroller.

Main working is When both IR pair sense the obstacles then only train stops. Otherwise , it runs continually on track. The result shows that this new innovative technology will increase the reliability of safety systems in railway transport. . By implementing these features in real time application railways can avoid accidents up to approximately 70%.

In this design we improved the original reverse warring system by adds an automatic braking system. The original IR sensor braking system can only alert the driver by cutting power supply while the distance between train and obstacle is less than or equal to a distance, it will not doing anything else. This is a new function in our design that could be possible used for all the train. By making it safer, this system will better guarantee train's safety and avoid losses. In the times of fast development in electronic science and technology, there is soaring number of trains. People have higher expectations of trains and need safer, smarter and more comfortable trains. Therefore, the safety system of trains will be better developed

and have more market demands. The train automatic braking system in our design is a basic procedure for future researches. With future study and research, we hope to develop the system into an even more advanced speed-control system for automobile safety. Using this design as the theoretical ground. At the same time, we add new microcontrollers in our design circuit, enabling the train to limited the speed. With the operation of the microcontroller, we can tell if the speed is within the safe zone, thus reminding or forcing drivers to reduce the train speed to keep the distance or stop the train if it's getting dangerous, it can greatly reducing the number of train accidents. By doing so, we maximize the guarantee of life safety of those tired or drunk drivers. We believe that the distance control system can be designed into an updatable system. For instance, we may enter the tire type, weather and road condition to change the preset range of safe driving distance, making the system safer and smarter. This will also give such system bigger market space and more competitive edges in the market. Realizing this certainly requires tons of work and learning, like the programming & operation of microcontrollers and automobile structure.

VIII. FUTURE SCOPE

We can implement this idea along with an alarm system to alert driver so that he can take appropriate action according to the respective situation.

We can also automatized the braking system to save someone life.

We can also implement advanced sensors to implement this idea in real life scenarios.

Sensors such as laser beam, FM frequencies, Etc. Can be used to implement in real life For longer distance.

We also can implement a horn along with the alarm when sensors detect something to alert Driver as well as any person or animal if any Detected by the sensors.

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