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RAILWAY ACCIDENT AVOIDING SYSTEM

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Abstract: The aim of the paper is to prevent collision between trains, obstacles on track and human negligence. Railway is the most popular and convenient transportation system in the world. Train is widely used for comfortable and safe journey in a affordable fare. People from different occupation can effort it. But consistently, the train is facing unpredictable circumstances in travelling because of wrong signal, erroneous track switching, unmanned level crossing etc. for which collision have been resulted. As a result, lot of damages and harm has been done in financial sector with lot of fatalities which affect our country's development progress. But we can avert this unpredictable collision and take prevention from the accident by using the collision detection technology which can be made by ultrasonic sensor, arduino micro controller radar module, motor driver unit with a special enclosed system. By using this technology we can detect the obstacles, train on same track and cautiously slow down the speed by automatically applying the air brake to stop the train before the collision takes place.

Keywords: Ultrasonic Sensor, Arduino UNO, Radar Screen, Monitoring Object, Object Detection

I. INTRODUCTION

The Indian Railways has the world's fourth longest railway network on the planet is owned and operated by government of India, after that of the United States, Russia and China. The Railways transit carry over 20 million passengers and 2 million tons of freight daily. Indian Railways not only transports passengers and goods, but it also connects the entire nation into a common thread. But till now railway transportation system are not safe. Because of huge Indian railways network, detecting a fault is biggest issue and implementing a new technology comprises with high cost, efforts and time. Not only in India, a lot of countries railway faces many collisions during travelling in every year as a result happened lot of damages, harm and mortalities. But if we add Anti Collision Technology (ACT) in railway then we can prevent any types of collision. It is an modern technology which can be detect collision obstacle from particular distance of train and prevent collision energetically and efficiently by using aurdino microcontroller, ultrasound sensor radar module motor driver with embedded system. The railway accident is one of the most hazardous accidents ever. The usual reason of the railway collisions are malfunctioning train signals or lights, failing mechanics, unmanned railway gates, crossings that are unprotected, negligence of train loco pilot and lack of literacy of people.

II. DESCRIPTION OF COMPONENTS

The proposed system is an enhanced technique for monitoring the obstacle which uses arduino microcontroller, ultrasonic sensor, and radar module. The radar will obtain the distance from the obstacle and ultrasonic sensor will ensure to avert the accidents that may occur by the collision between the train and obstacle. Ultrasonic sensors work by emitting sound waves at a frequency too high for humans to hear. They then wait for the sound to be reflected back, calculating distance based on the time required. This is similar to how radar measures the time it takes a radio wave to return after hitting an object.

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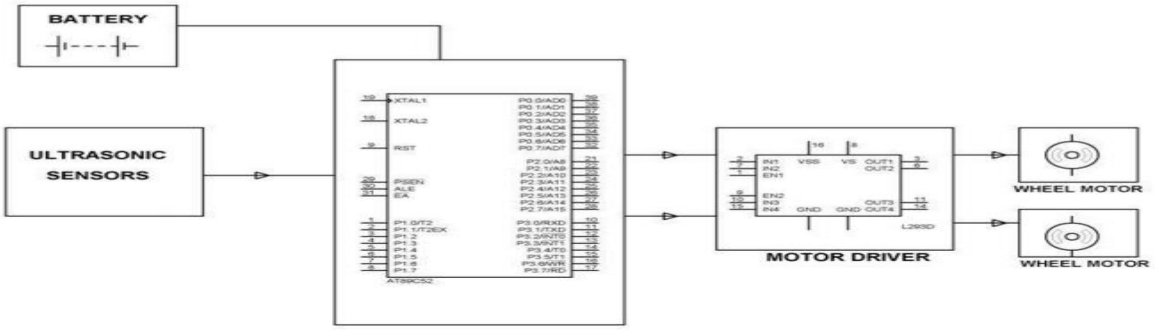

Fig.1: Block Diagram of Railway Accident Avoiding System

AURDINO MICROCONTROLLER

Arduino is an open supply microcontroller which can be simply programmed, erased and Reprogrammed at any instant of some time. Supported straightforward microcontroller boards, it's an open supply computing platform that is used for constructing and programming electronic devices. It is also capable of acting as a mini PC a touch like alternative microcontrollers by taking inputs and dominant the outputs for an expansion of natural philosophy devices. It is also capable of receiving and causation data over the online with the help of various Arduino Shields, that mentioned throughout this paper. Arduino uses a hardware named because the Arduino development board and code for developing the Code named because the Arduino IDE (Integrated Development Environment). Designed up with the 8-bit Atmel AVR microcontroller's that area unit factory-made by Atmel or a 32-bit Atmel ARM, these microcontrollers area unit typically programmed simply the C or C++ language among the Arduino IDE.

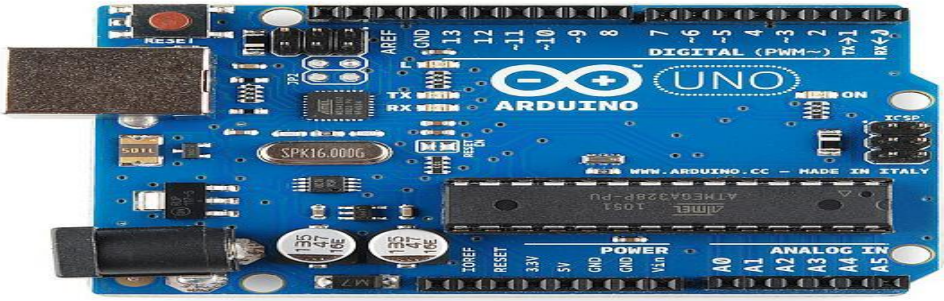

Fig 2. Arduino Microcontroller Pin Out

ULTRASONICSENSOR

Ultrasonic Sensors HC- SR04 is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception.

Fig 3. Ultrasonic Sensor Pin Out

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L298N H BRIDGE MOTOR DRIVER

L298N Based Motor Driver Module is a high power motor driver perfect for driving DC Motors. The L298N is a dual H-Bridge motor driver which allows speed and direction control of two DC motors at the same time. The module can drive DC motors that have voltages between 5 and 35V, with a peak current up to 2A.
The L298N Motor Driver module consists of an L298 Motor Driver IC, 78M05 Voltage Regulator, resistors, capacitor, Power LED, 5V jumper in an integrated circuit. 78M05 Voltage regulator will be enabled only when the jumper is placed. When the power supply is less than or equal to 12V, then the internal circuitry will be powered by the voltage regulator and the 5V pin can be used as an output pin to power the microcontroller

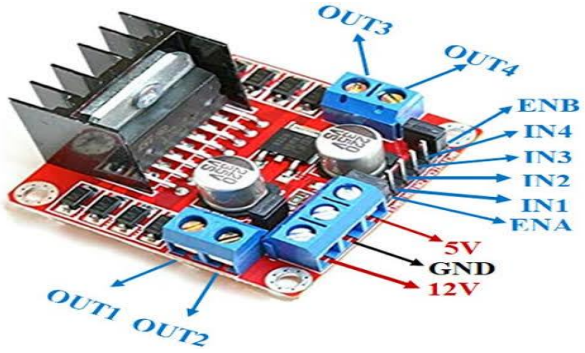

Fig 4. Motor Drive Pin Out

TRACTION MOTOR

Traction motors are energized by electricity and generate the power to rotate the wheels of the train. The turning force produced by traction motors is transmitted to the wheels via the driving gear unit and axle. Traction motors are typically mounted in the trucks where the wheels are housed. The ideal characteristics of an electric motor drive for traction application in an electric and hybrid electric vehicle are high torque at low speed region for fast acceleration. A traction motor is used to make rotation torque on a machine. It is usually changed into a straight line motion. Regularized traction voltages are 750 V DC, 1500 V DC and 3000 V DC.

Fig 5. Traction Motor

III. RESULT

In our proposed project, we are using aurdino microcontroller, ultrasonic sensor, radar module system and motor driver circuit. Ultrasonic sensor operate by sending out a sound wave at a frequency above the range of human hearing. Ultrasonic sensor working principle is either similar to sonar or radar which evaluates the target/object attributes by understanding the received echoes from sound/radio waves correspondingly.
These sensors produce high-frequency sound waves and analyze the echo which is received from the sensor. The sensors measure the time interval between transmitted and received echoes so that the distance to the target is known. If any obstacles are found in the path of the train the message will be conveyed to the monitoring unit of the railway.
The train will slow down gradually by automatically applying air brake so that collision between train and obstacle will be prevented and human life is saved.

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IV. CONCLUSION

This paper is proposed o detect obstacles on track using aurdino microcontroller, ultrasonic sensor, and radar module. If such system is adapted in railways, trains accidentally on the same track, ultrasonic sensor will calculate distance between obstacles (train), radar module will convey such error message to monitoring unit which automatically stop the train. The train collision will prevented and human life is saved. This system is the cheapest and efficient of rest all.

V. ACKNOWLEDGMENT

We are pleased to present “Railway Accident Avoiding System” as our project and take this opportunity to express our profound gratitude to all those people who helped us in completion of this project. We would like to thanks Prof. P.C.Patil.for providing guidance and support, patience and faith in our capabilities and for giving us flexibility in terms of working and reporting schedules. And we also like to thanks Prof Shaikh N. B for providing us with all proper facilities and support as the project coordinator. We are thankful for our college for providing us with excellent facilities that helped us to complete and present this project. We would also like to thanks the H.O.D, staff members and lab assistants for permitting us to use equipment in the lab as and when required.

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