Innovative Journal for Opportunities and Development in Science & Technology,
Volume 4, Issue 2, March. 2024
Paper Id: – IJ2023V4I2 -12 A-F
ISSN 2582-6026

AUTOMATIC RAILWAY SECURITY CONTROL SYSTEM

[1]Akshay Vilas Shinde, [2]Mayur Tanaji Bhusare, [3]Mayur Rajendra Pagar, [4]Aditya Pundlik Kaloge, [5]Subhodh Satish Kedare, [6]Snehal Shivaji Uphade

[1]UG Scholar, Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.
[2]UG Scholar, Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.
[3]UG Scholar, Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.
[4]UG Scholar, Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.
[5]UG Scholar, Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.
[6]Asst.,Prof., Dept. of Electrical Engineering , Sanghavi College of Engineering Nashik.

ABSTRACT- Today's trains have permeated the other means of transportation as the prime mode between several countries. However, rail road related accidents are also more perilous in damage and loss of lives. Therefore, in common railway security systems, more strivings are required for strengthening the safety. Furthermore, manually watching the tracks is unreliable and impractical.

Therefore, the purpose of this paper is to establish an automated railway security prototype model using advanc ed electronic circuits, a communication module, and the proposed mobile interfaces in order to prevent collision s and enable better communication between the train, central control headquarters, and passengers.

It is implemented on an integrated Arduino Uno platform to introduce automatic control crossing gates, switching train tracks and detecting line cracks with the aid of electronic sensors like ir sharp sensor, ultrasonic sensor, and gyroscopes. Moreover, by employing the web camera, the operator of the control room could get real status updating and have a continuous behavior monitoring during the train journey. Thus, the railway gate could be highly controlled so the road traffic will be wholly prophesied. Especially on dangerous trips, the train is supported by the developed dummy car which can detect and monitor any causes of risks on the railway lines and send that fault to the concerned authority. To offer different services for drivers and passengers, the proposed android applications are responsible for obtaining the sensed data through the bluetooth module and broadcasting urgent data to the control room.

Keywords— Railway Gate, Level Crossing, Infrared (IR) sensor, Track switching, Train control unit, Crack detection

I. INTRODUCTION

In India, taking the train is a simple and affordable way to travel, with many individuals choosing to travel large di stances.Unfortunately, derailments, inadequate infrastructure, and most frequently, cracks in the tracks, account for a substantial portion of railway accidents in the nation.

According to recent assessments, rail cracks may be the cause of up to 90% of railway accidents in India.

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 4, Issue 2, March. 2024
Paper Id: – IJ2023V4I2 -12 A-F
ISSN 2582-6026

It is essential to implement innovative technology to identify and address this issue in order to decrease the frequency of accidents and improve everyone's safety. In the past, cracks on the tracks were detected by human observation, which was a time-consuming process. Even when detected, the information had to be relayed to nearby stations, a process that could take too long, and if a train travelled on that route before the problem was rectified, it could lead to danger. In response to this issue, propose the use of a robot based on embedded systems. The robot is capable of detecting cracks and gaps on the railway tracks and transmitting the longitudinal degrees and exact location of the problem via Radio frequency communication to nearby stations. When the information is received, a buzzer will ring at the station where the Radio frequency receiver is located, and railway authorities can rectify the issue quickly. This technology can decrease the number of accidents that occur and save lives and property. Poor facilities and unattended cracks on the railway tracks are significant factors contributing to railway accidents in India, with derailments being a common outcome that leads to loss of life and property. By implementing advanced technologies like the embedded systems-based robot proposed here, can detect, and resolve track issues in a timely manner, minimizing the risk of accidents, and ensuring safer travel for all.

.

II. METHODOLOGY

The first thing to consider while building a train system is the performance requirements.
It is crucial that trains handle high power requirements while maintaining safety because they operate at far higher voltage and power output levels than buses.The WPT system's voltage and frequency are crucial to its operation and should be given careful thought as they have a direct impact on intensities of magnetic flux densities in the system. EMF criteria for WPT railway systems are explained in detail in the next sub-section due to its paramount importance. In this section, power supplies and power outputs of some high speed trains are held up as an example.

III. BLOCK DIAGRAM

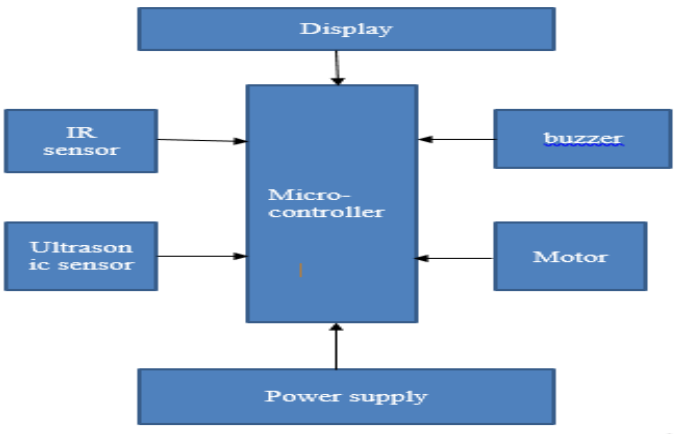

Fig 1- Block Diagram for Automatic Railway Security control System

Innovative Journal for Opportunities and Development in Science & Technology,
Volume 4, Issue 2, March. 2024
Paper Id: – IJ2023V4I2 -12 A-F
ISSN 2582-6026

WORKING - In the given system the 328p controller is used to as a heart of the system i.e all the sensior and system is attached with the controller so that it is then send and receive data from the specific sensor the ir sensor is attached to the controller which senses the crack present in the track so that the it reflect back and display msg on screen crack is detected. The ultrasonic sensor detect the obstacle and send a msg to the controller that ,there is a obstacle detected so that loco pilot can control speed of railway and it saves a many lives .

B. Hardware Implementation

MICRO-CONTROLLER UNIT: The heart of the whole project is the Micro-controller unit. For this project the Micro-controller was used. It is a low power general purpose micro-controller with good processing speed, small physical dimension, that is durable and cheap.

2) LCD DISPLAY: this is 16*2 display which shows the process output like ,crack detection ,obstacle detection

*3) IR SENSOR :*We use ir sensor for detecting any faults in railway track.

4) THE POWER SUPPLY UNIT: Now days, almost all electronic equipment includes a circuit that converts ac supply into dc supply. The part of equipment that converts ac into dc is called DC power supply. In general at the input of the power supply there is a power transformer. It is followed by a rectifier (a diode circuit) 1a smoothing filter and then by a voltage regulator circuit.Here In our system we were design a 5v and 12v power supply for our electronic device .

5) dc motor : for the rotation of wheel.

6) ultrasonic sensor : used for the detection of the obstacle in front of the railway so it could be avoided and save the life .

IV. CONCLUSIONS

To sum up, the security and safety of railway transport systems are essential to guaranteeing the welfare of both employees and passengers.

Serious repercussions from accidents might include fatalities and unpleasant experiences. Our cutting-edge object detection and radio frequency communication railway security system is a big step in the right direc tion towards preventing mishaps and guaranteeing everyone's safety who depends on it. on railway transportation. By implementing this system, we can create a safer and more secure railway transportation system that prioritizes the well-being of its users.

V. FUTURE SCOPE

we can do addition of open channel communication with its train so train could be more secure. Also door control system using motor drive, fire alarming system using Gas sensor and water pump, and lightening system based on

ultrasonic sensors have been applied. The proposed system could reduce the problems of; weak control in switching point, weak control in gate, poor detecting of obstacles.

REFERENCES

[1] A. H. Badr-El-Din and R. A. Fathy, "Egypt National Railways: ICT Can Save Egyptian Lives," IBIMA Bus. Rev., vol. 2015, no. July 2015, pp. 1–17, 2015.
[2] A. K. Shrivastava, A. Verma, and S. P. Singh, "Distance Measurement of an Object or Obstacle by Ultrasound Sensors using P89C51RD2," Int. J. Comput. Theory Eng., vol. 2, no. 1, pp. 2–6, 2010.
[3] J. Banuchandar, V. Kaliraj, P. Balasubramanian, S. Deepa, and N. Thamilarasi, "• Railway Crossing," Int. J. Mod. Eng. Res., vol. 2, no. 1, pp. 458–463, 2012.
[4] E. Resendiz, J. M. Hart, and N. Ahuja, "Automated Visual Inspection of Railroad Tracks," IEEE Trans. Intell. Transp. Syst., vol. 14, no. 2, pp. 751–760, 2013.
[5] N. Ramasamy, "AUTOMATIC OBSTACLE DETECTION IN RAILWAY NETWORK USING EMBEDDED SYSTEM," Int. J. Ind. Electron. Electr. Eng., vol. 2, no. 6, pp. 39–41, 2014.
[6] S. Chouhan, T. Engineering, and M. Pradesh, "Railway Anti-Collision System using DSLR Sensor," Int. J. Eng. Sci. Res. Technol., vol. 3, no. 3, pp. 3–6, 2014.
[7] A. Imtiaz, Q. Taskin, I. Masud, Z. F. Chowdhury, and K. Rahman, "Automated System for Bangladesh Railway," Glob. Sci. Technol. J., vol. 3, no. 1, pp. 25–40, 2015.
[8] M. H. Prabhu and R. Hemalatha, "Automatic Railway Security System Using Multisensors," Int. Electr. Eng. J., vol. 7, no. 1, pp. 2130–2135, 2016.
[9] P. R. Tulasi and J. Geetha, "Automatic Railway Track Inspection for Early Warning Using GPS / GSM System," Int. J. Eng. Sci. Comput., vol. 7, no. 9, pp. 14780–14785, 2017.
[10] P. Fraga-lamas, T. M. Fernández-caramés, and L. Castedo, "Towards the Internet of Smart Trains : A Review on Industrial IoT-Connected Railways," Sensors, vol. 17, no. 1457, pp. 1–44, 2017.