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Self Operating Railway Gate With Safety Alarm

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Abstract— Our paper deals with the process of automatic working of opening and closing the railway gate by using sensors and PLCs to make the process easy. We have also added an additional safety alert system in order to save the people who accidentally or wontedly get trapped into the gate when the train arrives by alerting the people nearby using an alarm system to inform them and come to save the people.

Keywords— PLC, Automatic Railway Gate, Sensors, WPLSoftware, Safety Alarm

I. INTRODUCTION

In India we have a lot of accidents that occur in railway crossings. To prevent these accidents we have introduced a system using PLCs and sensors that reduces the human errors and also can be used in unmanned railway crossings. We have proposed this system hoping we can reduce the accidents happening in railway crossings.

II. LITERATURE REVIEW

In[1], In this paper they have enhanced the communication techniques by using IoT, for effective communication to avoid fatal accidents in railway crossing. Whereas in our paper we have provided a solution for the full automation of the railway gate with more well built gates to ensure safety and to prevent people getting trapped into the crossings before the accident happens.

In[2], This paper highlights the point about he safety in unmanned railway crossings. They have used GPS positioning

for the train and IR sensors that is similar to ours as a solution. We have also included the safety system for unmanned places also where we also use sensors an gates as an automated working system which can be built in unmanned railways crossings.

In[3], This paper has taken up the system of Object detection for railway crossings where they use Arduino along with IR Sensor, IR LED, Flame Sensor, Servo Motor, Ultrasonic sensor, DC Gear Motor and USB UART Board. The main objective of their proposed project is to ensure the efficient quality, time management, and most importantly public safety, using wireless based communication network for the development of the railway industry.

III. METHODOLOGY OF THE SYSTEM

A. USE OF PLC

For our project we have used PLC systems as it is easy to program and the can also be changed and modified if needed for future use. The programming in the PLC, we have used, is easy to program and simple. We have used Delta PLC in our project which uses the software WPL Soft. We have used ladder logic in our PLC program as it is easy to program, edit, modify and use.

B. IMPROVED GATES

We have also improved the quality of our gates as peoplecannot cross the gates. Some people go under the gates inunmanned or unmonitored places. Improving the quality of the gates where we can prevent people from carelessly crossing the gate and getting themselves caught into railroad accidents. This modified gates helps in reducing the unwanted accidents that occur because of people ignoring the rules of railway gatecrossing.

C. TRAIN BUZZER

This buzzer is used to indicate the people that the train isapproaching the gate and the people should move away from the railway gate and leave way for the train to cross. This way the people will be alerted before and will help them know if thetrain is approaching and clear the way for the train.

D. SAFETY ALARM

We have added a safety alarm which allows the surrounding people know that someone has got stuck into the railway crossing gate which helps them to be saved by the people near the railway crossing. The officials and the helpers get alarmedif anyone got stuck into the gate when a train is on its way and allows them to get help from the officials nearby.

E. SENSORS

In our project for observing the upcoming trains we have used proximity sensors which helps identify the train that crosses thesensor that is kept at a particular distance. The sensor is keptfar away as to alert the people about the train before a certain amount of time in order for them to get ready before the gate closes.

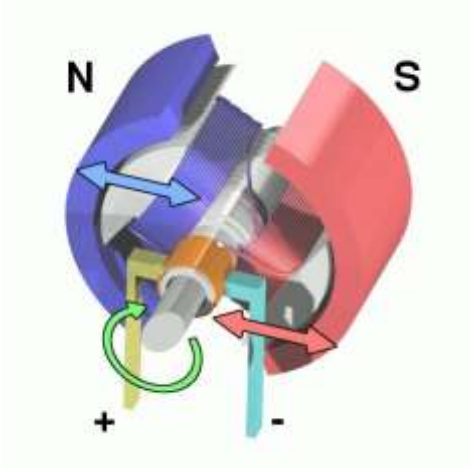
We have added another vision sensor that identifies anyone who got stuck into the gates while the train is arriving which senses them and alerts the people around to help save them.

F. LADDER LOGIC PROGRAM

We have used Ladder logic programming for the simple understanding of the program and easy correction of the program for future uses. The software we have used for the ladder logic execution is WPL Soft which is a programming software that is used in the Delta PLC which we have used to interface with the sensors and the motors of the gates. We have used Timers of the functioning of the gate. We have kept specific time limits for the train to ensure that the train has crossed the gate fully and it is safe for the people to cross the gate. This program helps in the simple and efficient way to make the manned and unmanned railway crossings gates secure.

G. MOTORS

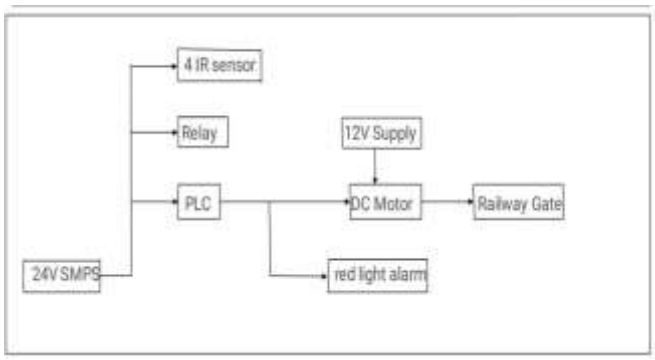
We have used simple DC motors for our project which help us open and close the gates efficiently and can also be monitored for any faults. This DC motor can be easily interfaced to the PLC and the communication can also be simple and precise. The DC motor is not directly connected but VFD is used to convert the signal strong enough to make the DC motor work.



H. BLOCK DIAGRAM

The process flow of our project starts with the sensors which are kept at a distance where the train passes by and the sensors gets the input which is then transmitted to the PLC.

The Plc processes the information which alerts the buzzer and the people that the train is coming and output is sent to the DC motors to close the gates. The gates are being opened and vision sensor gets activated to see if anyone is inside the crossing or got stuck, if so warns the people around. Then once the train has safely crossed the level crossing the sensor senses that the train has crossed and tells the dc motor to open the gates again. This happens in a loop and safely for a regular period of time maintaining a safe and less loss of life in places where there are level crossings.



I. RESULTS

We have provided a safe system which will reduce and prevent the accidents that happen in railway crossings every year. These systems can be fit in manned and unmanned placeswhere the system will work effectively. The main aim was to reduce the human errors and the unwanted accidents that occur due to the carelessness of the people. This system is made fully automatic and cal also be improved in the future.

IV. CONCLUSION

We can conclude that our system is a cheap and effective system that will save lives and the cost for the future. This system can be implemented anywhere with less amount of installation cost as we do not have to change the whole system, instead we just have to add some more components and improvise the system such that it looks more advanced and operates with ease. This reduces the cost for the installation and will be easy to maintain too. Hence we have a proposed a system for the development of safe and secure infrastructure that tends to improve the safety and also reduces the risk of failure.

V. REFERENCES

[1]., Taslim Ahmed Department of Electrical and Electronic Engineering Rajshahi Science and Technology University (RSTU), NatoreNatore-6400, Bangladesh taslimeee@gmail.com, Imran Chowdhury Department of Electrical and Electronic Engineering University of Information Technology & Sciences (UITS) Dhaka-1212, Bangladesh last4first@yahoo.com
Into the Binary World of Zero Death Toll by Implementing a Sustainable Powered Automatic Railway Gate ControlSystem

[2]., Kuraish Bin Quader Chowdhury and Moshiur Rahman Khan Department of Electrical and Electronic Engineering,

Independent University, Bangladesh Plot-16, Block-B, Bashundhara, Dhaka-1229, Bangladesh Email: 1530469@iub.edu.bd, 1530568@iub.edu.bd, Md. Abdur Razzak Green Energy Research Center, Department of Electrical and Electronic Engineering, Independent University, Bangladesh Plot-16, Block-B, Bashundhara, Dhaka-1229, Bangladesh Email: razzak@iub.edu.bd
Automation of Rail Gate Control with Obstacle Detection and Real Time Tracking in the Development of Bangladesh Railway

[3]., Gauransh Singh AKTU Lucknow,India gauranshsingh16@gmail.com, Praveen Kumar GCET Greater Noida, India pkm6@hotmail.co.uk , Rishabh Kumar Mishra GCET Greater Noida, India

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Security System for Railway Crossings using Machine Learning

[4]., Aniqa Rehman, Saba Latif, Nazir Ahmad Zafar Department of Computer Science COMSATS UniversityIslamabad Sahiwal Campus, Pakistan
Email: aniqarehman@cuisahiwal.edu.pk Email: sabalatif@cuisahiwal.edu.pk Email: nazafar@cuisahiwal.edu.pk
Automata Based Railway Gate Control System at LevelCrossing

[5]., G.Hemanth kumar, Research Scholar, E.C.E St.Peter's University Avadi, Chennai Hemanthtkumar g@outlook.com , Ramesh G.P Professor, ECE St.Peter's University Avadi, Chennai rameshgp@yahoo.com
INTELLIGENT GATEWAY FOR REAL TIME TRAIN TRACKING AND RAILWAY CROSSING INCLUDING EMERGENCY PATH USING D2D COMMUNICATION

[6]., E Amarnatha Reddy, Ilaiah Kavati, K Srinivas Rao, G Kiran Kumar Department of CSE, MLR Institute of Technology, Hyderabad - 43, India Email: amar.enumula@gmail.com, kavati089@gmail.com ,hodit@mlrinstitutions.ac.in , ganipalli.kiran@gmail.com
A Secure Railway Crossing System Using IoT

[7]., Dr.Velayutham.R, Professor / CSE Department, Einstein College of Engineering, Tirunelveli, Tamilnadu, India rsvel kumar@yahoo.co.uk Sangeethavani.T, U.G.Student, CSE Department, Einstein College of Engineering, Tirunelveli,Tamilnadu, India. sangeethavani23@gmail.com Sundaralakshmi.K, U.G.Student, CSE Department, Einstein College of Engineering, Tirunelveli, Tamilnadu, India. sundaralakshmimarch9@gmail.com
Controlling Railway Gates Using Smart Phones by Tracking Trains with GPS

[8]., B P Pradeep Varna Student, Department of ECE PES University Bengaluru, India bppradeep.varna@gmail.com Anirudha H M Student, Department of ECE PES University Bengaluru, India harveani18@gmail.com Dilip Bhaskar Student, Department of ECE PES University Bengaluru, India dilip.chinmaya@gmail.com V K Agrawal Crucible of Research and Innovation(CORI) PES University Bengaluru, India vk.agrawal@pes.edu **Solution to Unmanned Railway Crossing Using Satelliteand GPS Based Approach**

[9]., Bharti S.Dhande , Utkarsha S.Pacharaney Department of Electronics and Tele-communication Engineering DMCE, University of Mumbai, Airoli, Navi Mumbai - 400708 Email: bhartidhande4444@gmail.com , utk21pac76@gmail.com **Unmanned Level Crossing Controller and Rail TrackBroken Detection System Using IR Sensors and Internet ofThings Technology**

[10]., M.I.M.Amjath, T.Kartheeswaran Department of Physical Science Vavuniya Campus of the University of Jaffna Sri Lanka amjaath21@gmail.com , tkarthees@gmail.com
An Automated Railway Level Crossing System