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Sensors Aided Railway Management System: Towards Automation

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ABSTRACT

In the rapidly growing country like ours, accidents in the unmanned level crossings are increasing day by day. No beneficial steps have been taken so far in these areas. The present work deals with automate the opening and closing of gates at a level crossing replacing the gates operated by the gatekeepers. It deals with two different things, First thing is reduction of time for which the gate is being kept closed and second thing, to provide safety to the road users by reducing the accidents. By employing the automatic gate control at the level crossing the arrival of the train is detected with the help of sensors placed near to the railway gate. Hence, the time for which it is closed is less as compared to the manually operated gates. Automatic gate control is highly micro-controller based arrangements, designed for use in almost all the unmanned level crossing in the train. Thus, automation of the railway gate operations at the level cross is achieved using sensors.

Keywords: Gatekeepers, ATSS, JESS, OGSi, VHF, GSM, MTRC, RFID, Anti-Collision Contrivance, IR Sensors

I. INTRODUCTION

Railway safety is a vital aspect of rail operation over the world. Railways being the cheapest mode of transportation are desired over all the other means. It is the most commonly used transportation mode in India. It is also one of those modes of transportation that faces a lot of challenges due to human errors such as level cross accidents, collisions, etc. Every day we read newspaper, we come across many railway accidents happening at unmanned railway crossings. This is mainly due to the negligence in manual operations or lack of workers. And withal the collision of trains due to the same track. The present work deals with automate the opening and closing of gates at a level crossing replacing the gates operated by the gatekeepers. It deals with two different things, First thing is reduction of time for which the gate is being kept closed and second thing, to provide safety to the road users by reducing the accidents that usually occur due to the negligence of road users and at times errors made by the gatekeepers. To evade the accidents, sensors placed at some distance from the gate detect the departure of the train. The signal about the departure is sent to the microcontroller, which in turn control the motor and opens the gate. Thus, the time for which the gate is closed is less compared to the manually operated gates since the gate is closed depending upon the telephone call from the antecedent station. Additionally reliability is high, as it is not subjected to manual errors.

II. METHODS AND MATERIAL

1. Concept

Now a days, India is the country which having world's most astronomically immense railway network. Over hundreds of railways running on track every day. As we ken that it is definitely infeasible to stop the running train at immediate is some critical situation or emergency arises. Train accidents having earnest consequence in terms of loss of human life, injury, damage to Railway property. The concept of the model is to operate the railway gate utilizing microcontroller or anti-collision technique.

2. Literature Survey

Precedent cognate works are [1], [2], [3] and [4]. Xishi [2] defined the advanced train safety system. They described that in the process of developing ATSS, a fault tolerance method is applied for both the hardware

and the software components. The automation of railway gate is successively implemented since 2000 in Korea.

The implementation of the system efficaciously reduced the contingency rate at the caliber cross and the sensor utilized in the Korean railway gate automation system is magnetic sensors. Magnetic sensors placed under the ground are less affected by environmental changes and recognizes the direction of movements of vehicles. Jeong [3] defined the railway auto control system utilizing OGSi and JESS. The method by which the states of railway cross is estimated utilizing JESS is described in their paper. The different methods with which the locomotive pilots can evade the contingency situations and the safety measures to be taken in the caliber crossings are additionally discussed. In [4], a detailed exordium about the present railway technology is presented. It discusses the disadvantages of manually activated railway signals and the railway caveats at the caliber cross. The train detector acts as the major component in the train automation system.

III. RESULTS AND DISCUSSION

India Survey

The ministry of railways has taken steps to minimize the consequential train collisions accidents and level crossing accidents. Ministry of railways has invested several Crore rupees for modernization and inspires nets of the technologies used in Indian railway. Presently Indian Railways provides some sign and signal to prevent the train accident.

Advance Warning Sign:

Sign authoritatively mandates you to decelerate look and heedfully aurally perceive for the train and be yare to stop at the tracks if a train is peregrinated.

Figure 1. Advance Warning Sign

Mechanical Crossing:

Barriers Mechanical crossing barriers are operated by level crossing staff utilizing hand or electrically powered levels winches or windlasses. In addition mechanical barriers providing consummate bulwark of caliber crossing are connected to manually operate warning signals (light and sound).

Cross bucks Sign:

Cross bucks are situated at all grade crossings on both approaches to the crossing. From an X via the interconnection of two 1200 mm x 200 mm retro-reflective pieces. A cross buck sign supply the last designation to the driver where the crossing is located.

Figure 2. Cross buck Sign

Stop Sign and Line:

Minimum standard stop sign dimensions are 600 mm x 600 mm and sign shape is octagonal. A cessation line painted across your lane of the road shows you where to stop and lock for an approaching train. On a gravel road

with no marking stop at least 15 feet from the railroad tracks.

Figure 3. Stop Sign and Line

Manually Activated Sign:

Manually Activated Signals are control by level crossing staff on instructions transmitted by telephone or telegraph signal from the most proximate station. Automatic Warning Signal need short track circuit or markers which identify trains and activated warning designations are conventionally flashing lights or sounds emitted by bells or claxons or an integration of these two.

Technology Used to Reduce the Train Contingency by Indian Railway:

Walkie-Talkie Set of Crew:

In that 5W walkie-talkie sets have been provided to drivers and sentinels of all the trains for communication in static mode or at low speeds. 25W VHF sets have additionally been provided at stations on board gauge double line multiple line sections so that train crew can communicate with the most proximate station masters in the case of emergencies. This is duplex communication where in both the parties can verbalize simultaneously. The work for provisions of MTRC have been sanctioned on 2,415 km. it will be GSM predicated MTRC system with digital technology as being utilized by cellular networks ecumenical.

Railway Signal:

Hand signals flags, lamps, bells, and whistles, all right signal, guard's signals already signal. Hand signals include signals given by hand, or by flags or lamps utilized by the signalman, drivers, sentinels, or station staff. The all right signals refer to the exhibit of green flag is held in the left hand. The red flag is kept ready to be exhibited in case of a quandary in the right hand. A steady green signal shown by the sentinel is an indication that there is no quandary and that the train can perpetuate on its journey. A green flag or lamp waved truculently up and down however is the signal that the train has split and the driver should bring his portion of the train to a halt. The already signal is given to designate that everything is ready and in order for the train movement for which it is given.

IV. FUTURE SCOPE

As a future scope of work, our system can be implemented in authentic time by fine-tuning the current circumscriptions utilizing incipient technologies. This entire network can be made wireless in the near future. The range of wireless transmission can additionally be incremented to an immensely colossal extent. If this wireless technology is planarity implemented then we will be able to monitor the train throughout automatically. The train name and number along with the exact time at which it has passed is exhibited on the LCD screen and withal recorded on a recollection contrivance for future reference. By utilizing special tags, the direction in which the train is passing is withal detected. Presently for finding the direction, the train ID compared with the predefined data and some other futures scopes are given below:

- ✓ Track transmuting mechanisms can be made automatic.
- ✓ Averting collision of trains (Anti-collision contrivance).
- ✓ The read range and speed of RFID can increment.
- ✓ In future will install warning system and automatic bomb detector.

V. CONCLUSION

Automatic railway gate control system is centered on the conception of reducing human involution for closing and opening the railway gate which sanctions and obviates cars and humans from crossing railway tracks. The railway gate is a cause of many numbers of deaths and accidents. Hence, automating the gate can establish a ring of surety to controlling the gates. Human may make errors or mistakes so automating this process will minimize the chances of gate failures. Automation of the closing and aperture of the railway gate utilizing the switch circuit reduces the accidents to a more preponderant elongate. The impediment detection

system implemented reduces the accidents which are customarily caused when the railway line passes through the forest. Most of the times more preponderant loss has been caused when animals cross the tracks.

The inhibition of this project is the utilization of IR sensors. Hence, any impediment in the way of the sensor will be identified. Another paramount circumscription is that this project does indeed closing and opening the gate but it cannot control the crossing of cars and conveyances. It only controls the gate. To combat these quandary pressure sensors can be utilized as extension to the present work. We are utilizing IR sensors but it is better to utilize load sensors. We have not used load sensors because it was not economically feasible.

VI. REFERENCES

[1]. Pradeep Raj, "Increasing accidents in the unmanned level crossing of the railways", 2012.

[2]. "A new microprocessor based approach to an automatic control system.", International Symposium on Industrial Electronics, pp. 842-843, by Xishi Wang, Ning Bin, and Cheng Yinhang, in 1992.

[3]. "Train Auto Control System based on OSGi", International Conference on Advanced Communication Technology, pp.276-279, by Jeong Y., Choon-Sung Nam, Hee-Jin Jeong, and Dong Shin, in 2008.

[4]. "Automation of Railway Gate Control Using Micro-controller, International Journal of Engineering Research & Technology, pp.1-8, by Atul Kumar Dewangan, Meenu Gupta, and Pratibha Patel, in 2012.

[5]. Fundamentals of Embedded Software By Daniel W Lewis

[6]. Gunyoung Kim, Kyungwoo Kang, "Railway Gate Con- trol System at Railroad-Highway Grade Crossing in Korea".

[7]. Fred Coleman III, Puerile J. Moon (2011) Trapped Conveyance Detection System for Four Quadrant Gates in High Speed Rail Corridors, Conveyance Research Record 1648

[8]. Fred Coleman III, Adolescent J. Moon (2010) Design of Gate Delay and Gate Interval Time for Four Quadrant Gate System at Railroad-Highway Grade Crossings Conveyance Research Record.

[9]. The 8051 Microcontroller and Embedded Systems By Muhammad Ali Mazidi

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[11]. www.howsstuffworks.com

[12]. www.alldatasheets.com

[13]. www.electronicsforu.com

[14]. www.knowledgebase.com

[15]. http://www.ti.com/lit/ds/symlink/l293d.pdf