

Automatic Trains and Advanced Platform Systems

Abhijeet Shukla¹ Abhishek Varshney² Aishwarya Awasthi³ Vardhman Singh⁴

^{1,2,3,4}SRM Institute of Science and Technology, India

Abstract— This project uses the concepts of embedded system to design an automatic system for train that will allow it to function without the intervention of loco pilot. A microcontroller is used for the functioning of train along with some sensors. In this project, we are also designing an advanced platform system that will cut down the rush that occurs when the train arrives.

Keywords: Automatic Trains and Advanced Platform Systems

I. INTRODUCTION

Indian Railways are fourth largest in the world with almost twenty thousand passenger trains running every day. Most of these trains are manually operated requiring man power, fuel consumption and locomotive engines. This human interface system is prone to accidents due to carelessness and obvious human error. A country like India which is accommodating a thousand million people have a lot of rush and commotion in railway stations in spite of some longest platforms all over the world. With increasing technology in the present ages there is a shifting from manual interface to automatic interface in many applications. This shifting through automation removes loco pilots and brings in automatic trains which do not require any human driver. Moreover, automation will also provide with advanced platforms having a proper queuing and passenger count system and both of these taken together will give us Automatic Train and Advanced platform system. Automatic train will reduce the number of accidents such as collision and trains running out of the railway track by removing the human error and so removing carelessness and the advanced platform system will reduce commotion on the platforms and moreover avoid rush on the trains. Applying sensors like ultrasonic, infrared and passive infrared sensors will provide some other benefits such as incrementing power efficiency. Ultrasonic Sensor has a great range and it can even be used to measure distance and hence it is applied in front of the train so that it can detect the obstacles in front of the train and inform its distance that is the information about how far away is the obstacle from the train so that preventive measures can be taken in order to avoid any accident. On the other hand the infrared sensors are not having a great range and hence they cannot inform about the distance. These infrared sensors are applied in order to inform about the arrival of the train at the platform. The passive infrared sensors are optional and these are able to detect humans and are applied on the reading lights of the train so that the light glows only when a person is situated on the chair and otherwise not thereby contributing towards power efficiency.

II. LITERATURE SURVEY

WANG xishi, NING Bin, LIU Yun [1] emphasized that the current Moving Autoblock System (MAS) can be enhanced by increasing the carrying capacity of the railway transport system. They analyzed various advantages of MAS which includes dispatching of different trains with different speeds,

weight, density, capacity of coach carrying and the station capacity.

Deng Pan, Yingping Zheng, Chuansheng Zhang [2] studied that automatic block system of railways have no track circuit and there is no ground signaling between the two neighboring stations and increase the requirements for a self-governed intelligence of train, station and between train and station, as well as increasing the efficiency and safety of train operation. They developed a multi-agent systems(MAS) theory which can be used to make intelligent models of train and station. To ensure that every intelligent agent can work well with others and to make colony intelligence as well thus to ensure that trains can run with efficiency and safety. The results were quite helpful for the application of the advanced technology of intelligent automatic train control and the station capacity.

III. SYSTEM ANALYSIS

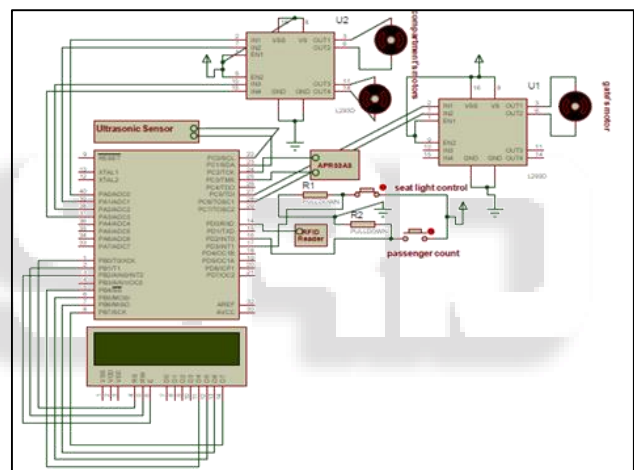


Fig. 1: Train Circuit

Fig. 1 shows train circuit which consists of an Atmega 32 IC along with two L293D IC connected at its Port A and Port C with three DC motors attached with them. An APR33A3 module is also connected with the Port C of the IC which has its main use as a playback IC which speaks out stored commands. An RFID reader is connected to the Port D which helps in reading the RFID Tags laid down on the tracks. AnxLCD screen is connected to the Port B of the IC. An ultrasonic sensor is attached to Port C in front of the train in order to avoid obstacles. Passenger count and seat light control are also operated through Port D and also use pull-up and pull-down resistors along with a switch for functioning.

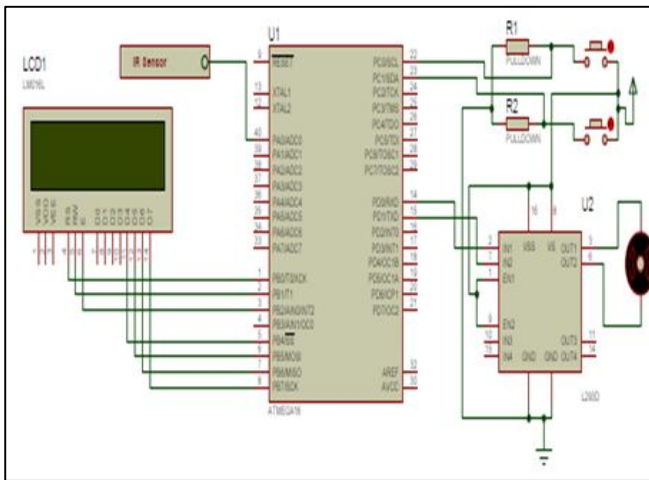


Fig. 2: Platform Circuit

Fig. 2 shows platform circuit which consists of an Atmega 16 IC with an infrared sensor at Port A which detects the arrival of the train at the platform. An L293D IC along with a DC motor is connected with Port D. An LCD screen is connected with Port B.

IV. CONCLUSIONS

Our project “Automatic Trains and Advanced Platform Systems” provides us with the following outputs:-

- The train runs over the track when the system power is activated.
- The train successfully lowers its speed gradually when the platform arrives.
- The name of the station is displayed on the LCD screen of the train circuit.
- The announcement of the name of the station which has to arrive is made successfully through the APR33A3 module.
- The name of the train which has arrived on the platform is displayed successfully on the LCD screen at the platform circuit.
- The announcement of the train which has arrived at the platform has been done successfully.
- The gates at the platform open when the train has arrived at the station.
- The gates of the train close after a fixed number of time the push button has been pushed and also automatically after a fixed amount of time.
- The train starts moving again after the train’s gates have been closed.

V. FUTURE ASPECTS

- Our project “Automatic Trains and Advanced Platform Systems” will provide a great use for the upcoming generations. Especially in a densely populated country like India with one of the greatest railway networks, such systems when used in railways or in metros will lead up to better functioning of the network as a whole. Most of the problems in the Indian railway system is because of the lack of management for so the main problem is due to the rush and commotion caused by the increased number of people. Our project “Automatic Trains and Advanced Platform Systems” along with passenger

count system and installed infrared sensors at the platform provides a proper management system mainly to avoid rush and commotion which is also one of the major objective of this project.

- On the other hand ultrasonic sensors which are connected in front of the train provide us with the indication of clear track or path in front of the train and this is very useful for avoiding accidents. Such an idea can also be used individually and more quickly even before the installation of full system. The idea for installing the human switch for passenger count system is also extended to be installed with the reading lights and this idea can also come into use before the infrared sensors and the passenger count system. The human switch mainly provides the proper functioning of the reading light system which will automatically turn off when anyone is not present using it thus leading to energy conservation and saving improving the networks efficiency. These features of the project can better the railway systems for the future generations.

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