Analysis On Smart Railway Gate Control Using Iot

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Abstract

The main aim of this paper represents a model for ARGC (Automatic railway gate control) using Arduino UNO R3. In the existing model has a serious advantage that is it can not only detect train but also other objects (like animals, human) and it doesn't deal with the trespassers who are already into the gate. The proposed model overcomes the inaccurate identifying of objects(train) and also manages the trespassers who are already into the gate. The main advantages of this model:-
a) Reduces human Error
b) saves time and resources
c) cost effective
d) More secure
e) Simple to construct
f) Fault identification is easy.
In this fast moving world, we also can't always expect or blame the manpower for the FATAL ACCIDENTS. Therefore, it is always highly recommended to go for smart way of handling it using (IOT) INTERNET OF THINGS. The proposed model can actually replace Human's negligence and miscommunications.

INTRODUCTION

OVERVIEW
The software AIDE [Arduino Integrated development environment] is used for the model, contains text editor for writing code, a message area, a text console, a toolbar with buttons.
For common functions and a series of menu.

SCOPE
The proposed system only overcomes of detecting the object(train) accurately and also has the scope of managing the trespassers already into the gate during the arrival of the train.The system can be implemented in all countries such as poor developed, developing and developed and well developed Nations.

ASSUMPTION AND DEPENDENCIES
The prototype designed for ARGC connecting with the sensors, Arduino tools runs with the help of AIDE which only runs on windows, Mac OS x, and Linux. This software can be used in any Arduino board based application

USER PRE-REQUISITES
The user should have a strong knowledge about IOT. The user should have worked with Arduino tool UNO R3. The user should have good programming languages skills in c and java as we have to use in AIDE.

SOFTWARE AND HARDWARE ATTRIBUTES:
SOFTWARE ATTRIBUTES
AIDE
Arduino Integrated development environment is a cross-platform application that is written in the programming languages. AIDE is used to writer and upload programs to arduino based.

HARDWARE ATTRIBUTES
IR sensor
IR sensor is an electronic instrument that is used to sense certain characteristics of its surroundings; here we will be detecting the sense of train. It works by emitting or detecting infrared radiation.

Motor driver L293d
A motor driver is an integrated circuit chip, which is usually used to control motors. A motor driver's act as an interface between arduino and motors. Motor driver L293d consists of two H-bridge.

Arduino UNO R3
Arduino UNO is a micro-controller based on AT-MEGA 328 P It has 14 digital input / output pin 6 A USB connections for connecting to AIDE A power jacket

IR LEDS
IR LEDS are used for lighting (solid state) it emits lights in the infrared range of electromagnetic radiation spectrum.

Jumper wires

They are simple wires, which has connection pins at both ends. They are used in breadboards and other prototyping tools in order to make it easy to change a circuit as needed.
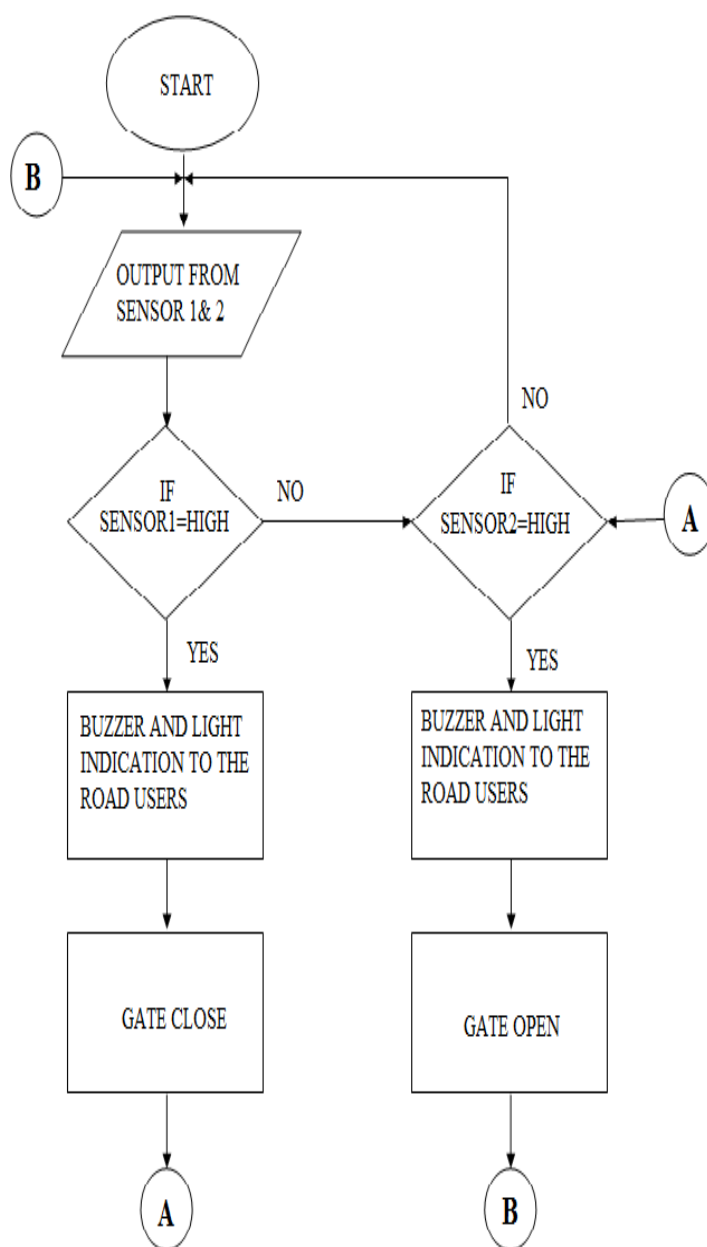
Stepper motor:

A stepper motor is also called as step motor or stepping motor brushes DC electric motor that divides a full rotation into number of equal steps.
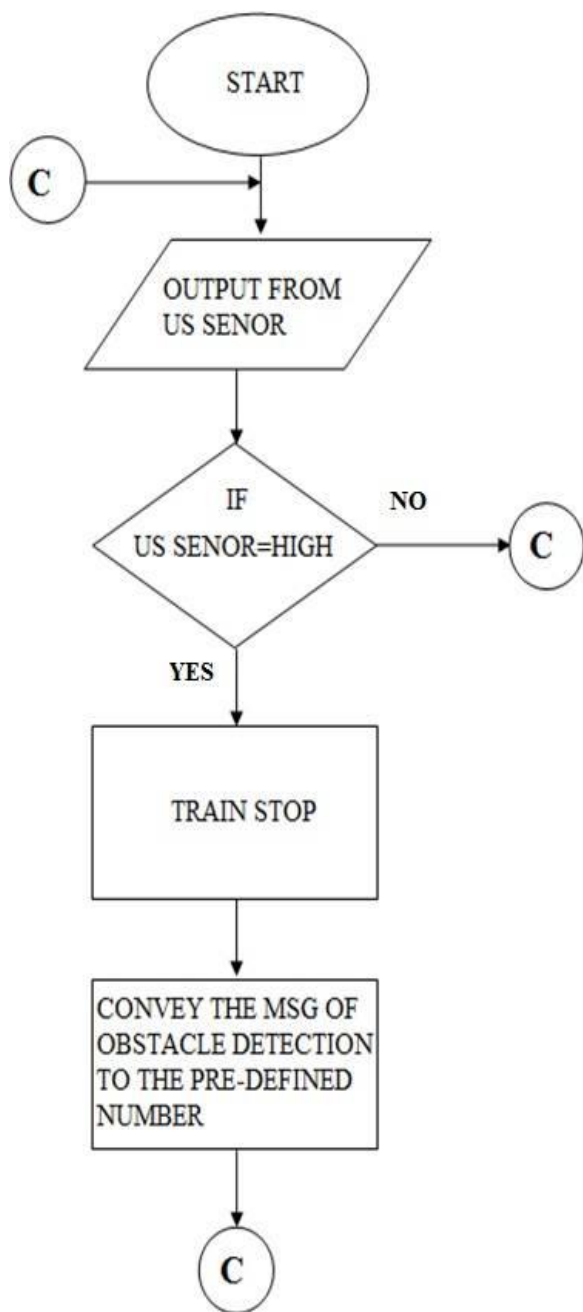
Toy train, track

A toy train is used for this model A track is used for the train to move along a particular direction.

BLOCK DIAGRAM:

At the beginning the IR sensor1 senses for the detection of arriving train and the output of sensor1 goes HIGH, that is when the sensor1 senses the train. Then the buzzer and light will be turned ON for the indication to the road users. And the gate will be closed by rotating the Servo motor. After the sensor2 output goes HIGH, that is the sensor2 senses the departure of train the buzzer and LED will be turned OFF and then the gate will open. The ultrasonic sensor placed at the front of the train will sense for the obstacle on the track. The output of the ultrasonic sensor goes HIGH when the obstacle is detected. Then according to the flowchart the train will be stopped and the message of obstacle will be sent to the nearby railway station so that it can be cleared.

passes the first sensor and when the sensor detects it, a RED LED glows at the level cross indicating the traffic that the gate is about to close and closes the gate with the help of servo motors. When the second sensor senses the departure of the train the LED will turn off and the gates will open. Obstacle detection: Any obstacle on the track is detected by placing an Ultrasonic sensor on the frontend of the train and the presence of obstacle on the track is notified by a signal at the control room. The train movement is then controlled based on the presence of the obstacle on the track and obstacle detection message is conveyed to the nearby railway station through GSM technology.

CONCLUSION

Smart automatic railway gate control system provides a best and the safest way of transportation for not only passengers inside the train but also for the trespassers in and around. The main advantage of this system is its cost effectiveness as it can be used in all countries independent of what area it can be. Automatic railway gate control system is centered on the idea of reducing human involvement for closing and opening the railway gate which allows and prevents accidents near level crossing. The railway gate is a cause of many deaths and accidents. Hence, automating the gate can bring about a ring of surety to controlling the gates. Human may make errors or mistakes so automating this process will reduce the chances of gate failures and reduces the errors made by gate keepers. The accidents are avoided at place where there is no person to manage the railway crossing gates. Here we use the servo motor to open and close the gates automatically when it rotates clockwise or anticlockwise direction to operate the gate automatically.
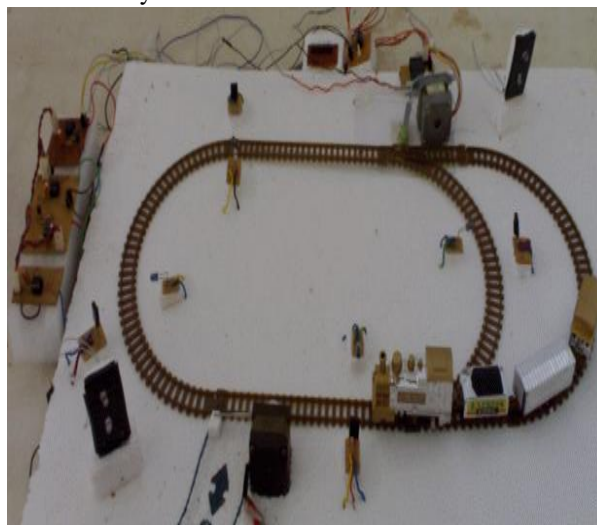

EXPERIMENTAL RESULTS

The proposed system is practically experimented as a working model prototype. The major components used in the model are an 80cm diameter railway tracks, a toy train, two IR sensors, Ultrasonic sensor, a servo motor with which the gate operates, 4 LEDs as the traffic signals, GSM Modem to convey message and buzzer to indicate the arrival of train to the traffic.

Gate operation: An IR sensor is placed at a distance of 25cmon either side of the level crossing. The toy train

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