Driverless Metro Train using Arduino

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Abstract:
These days the advanced technologies are useful in all parts of our life. Because of this, bunches of improvement are done in the field of transportation. In the earlier years, with the utilization of standard metro train mishaps occur because of different reasons like the blame of the driver, flag mistakes and another serious issue is, the human-worked metro train causes mean error in time which influences the railroad to arrange the board framework. To tackle this issue, we have an idea of "The driverless metro train". Driverless metro train improves the administration as it diminishes human mistakes, expends less power and it gives solace and wellbeing to travelers amid voyaging.

Keywords: Driverless, Metro train, IR sensor, GSM, RFID module, Arduino

I. INTRODUCTION

This project is done to comprehend the innovation utilized in the driverless metro train framework which is used by some other nations like Germany Japan and France. It likewise diminishes the vitality utilization by 30% of the metro train as it additionally utilizes the sunlight based boards on the best to run the extras of the train . It additionally gives precise planning control of the train on station entries and takeoffs.

The activity of the driverless metro train is constrained by a focal processor unit like Arduino controller, 8051 processor or PIC controllers. The train is modified to keep running on a predefined way which has fixed separation of stations and the speed of the train is likewise predefined and it is constrained by the motor driver IC. The stoppage of the train on the stations is additionally predefined.

Grades of Automation-In the driverless metro train framework, there are four Grades of Automation (GoA) available.

GoA-1: The driver is required for beginning and ceasing of the train and furthermore for the doorway activity and in case of any disturbance.

GoA-2: The beginning and ceasing of the train are programmed yet for doorway task and for activity in case of disturbance driver is required.

GoA-3: It is called as the driverless activity of the train. In that, the beginning and halting of the train are completely programmed however for entryway activity and in case of disturbance train chaperon is required.

GoA-4: It is called completely driverless or unattended train activity (UTO). Consequently in this task, every element is automatic. So there is no necessity of driver or operator to perform tasks of the train.

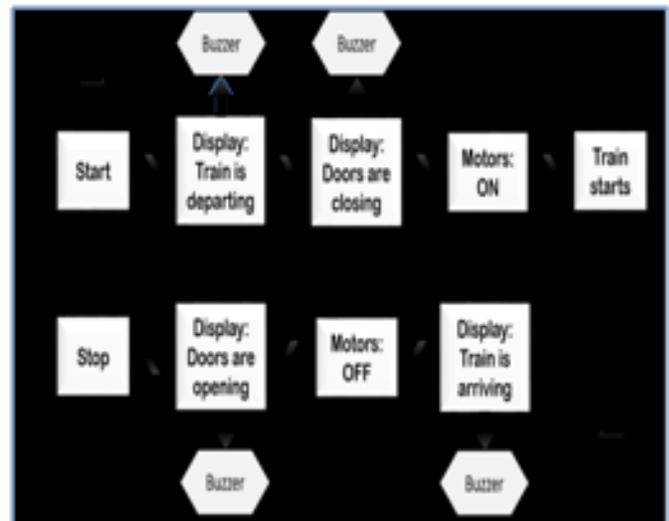**Figure.1. Different Go an available**

STATE DIAGRAM

Figure.2. State Diagram
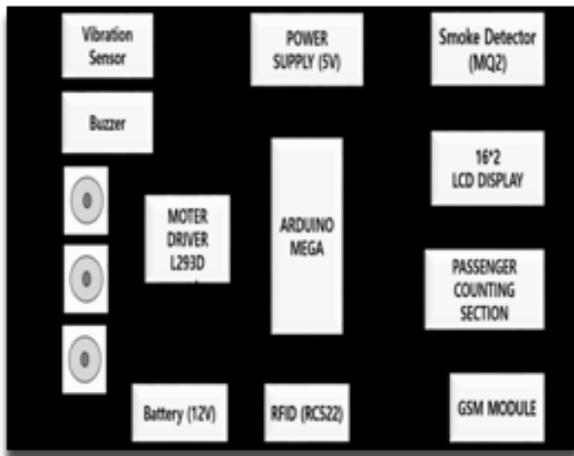
II. BLOCK DIAGRAM

Figure.3. Block Diagram

Implementation– the working of the venture can be comprehended by using the state graph for the entry and takeoff of the train on the station. All the segments which are utilized for the distinctive activity of the train are associated with the Arduino. Here we have utilized the 12V battery for offering supply to the motor driver IC and entryway engine. Be that as it may, before that, the LCD will show the message that "The train will leave from the station in few minutes". The buzzer works for each LCD message and for entryway operation. The passenger counting areas tally the travellers by using IR modules and display it on the LCD. At that point the LCD will show the message that "doors are shutting" with buzzer signal operation. When the train is landing on the station, the LCD will show the message that "Train is touching base in few minutes" with ringer operation. Similarly the IR modules also count the number of passengers leaving the train and diaplays the message "Train is leaving the station". RFID sensor is fixed on the train and RFID labels are fixed close to the station. By location of RFID labels by RFID sensor, the train changes its condition of engines from on state to off state. This venture likewise contains some extra highlights like GSM based SMS facility. We can follow the exact location of the train by availing this service on our mobile phones. This venture additionally incorporates smoke identification by means of the MQ2 smoke sensor. A vibration sensor is also used to detect any vibrations in the track that might cause accidents and halts the train. All the different functions of these components are programmed using the Arduino IDE software which is loaded into the hardware, compiled and run to obtain the results.

III. RESULTS

We have exhibited this task by assembling a model of driverless metro train. We have utilized DC gear engines and associated it to the wheels. A basic CD drive is utilized for programmed doorway task. A DC engine is utilized for entryway task. It is to be noticed that a buzzer will work at each entryway activity. By running this model we got results as getting messages like the name of the station, the number of travelers and entryway position on LCD display. Our driverless metro train venture gives the special highlights like it completely furnishes programmed driverless activity with less voyaging time, less utilization of power, smoke discovery and so on. Driverless

metro framework gives better quality administrations just as exact timings of the train for landing and flight.
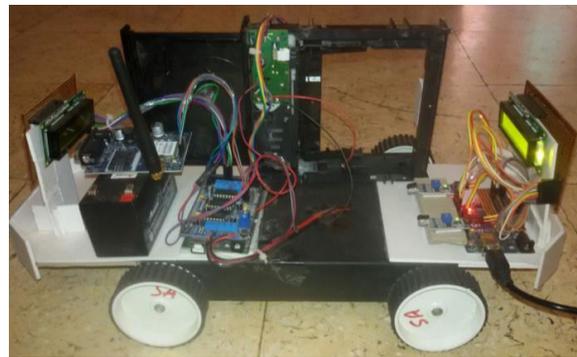
IV. REFERENCE

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