

SMART & DRIVERLESS METRO TRAIN USING FOUR WHEEL ROBO CASE

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Abstract:

This project tells about the technology used in metro train movement which are used in most of the developed countries and cities. The train contains controller it enables the automatic running of the train from one station to another station without a driver so it reduces the errors caused by the human operator.

In this project ARDIUNO UNO is used as a controller whenever the train enters at the station it stops automatically by using IR sensor the IR sensor it can detect the people or objects. Then the doors open automatically so the passengers are can go inside the train.

The train contain the passenger count section it counts the passengers who are entering and leaving the train it contains passenger limit for example five passengers getting into the train the door will be automatically closed.

And we can also make how many minutes the train will stop each and every station it can set in the controller by the programmer so the passenger count and stations are displayed in liquid crystal display (LCD) the motion of the train is controlled

Introduction:

There has been a much develop and advancement in urban railway transmission, the train starting from the engine to the metro trains and to the recently proposed driverless metro train. The driverless metro train is the intelligent and innovative mass transmission solution.

The driverless metro train meets a so many Number of objectives like high speed, regularity

and accuracy and it also reduces the human errors and it also fulfils the idea of new approach to implementation.

Introduction automatic train control as per the definition, the ATC (automatic train control) refers to the whole system which contains different automatic functions. The overall automatic train control system must incorporate the faculties of automatic train operation (ATO), automatic train protection (ATP), and automatic train supervision (ATS) the above mentioned three areas of the automatic train control and these three are shortly described as

- Automatic train operation (ATO): this subsystem plays a major role in automatic operation of control and brake actions to make the trains in movement and halting
- Automatic train protection (ATP): this subsystem plays a major role in protecting the train in hazardous situations and taking the precautions to eliminate the accidents
- Automatic train supervision (ATS): this subsystem plays a major role of centralised administration and authority of train motion includes office management server functions associated with the train protection

This project mainly reduces the human errors and the ARDIUNO UNO is used as a CPU its role is to achieve the automatic operations and also the opening and closing automatically

Literature survey:

By using the existing automatic systems of metro trains controlled by the human existence it causes the loss of the information due to lot of human errors in the system.

This miscommunication may lead to train accidents it is caused by the human error or incorrect decision making through incorrect implementation.

By using the driverless metro train having some advantages including high capacity, speed, regularity and cost the moderate passenger number is mainly done by IR sensor it can detect the person or object

It reduces the human errors and also reduce the train accidents and collisions IR receiver is placed in the train the passengers count and IR sensor output is placed in liquid crystal display (LCD). It also reduces the difficulty range to the passengers.

System models:

In this project we use the different types of components like ARDIUNO UNO is the controller, IR transmitter, IR receiver, liquid crystal display, dc motors, power supply unit, buzzer, L293d driver

ARDIUNO:

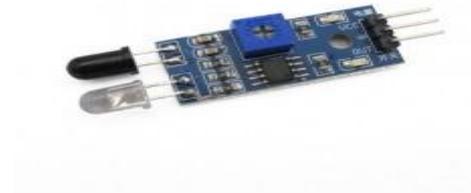
ARDIUNO UNO is the controller used in this project ARDIUNO is the name of manufacturing company it is ATMEGA328P IC it can develop both hardware and software and it is the open source platform we can use it to perform specific task it is easily interface it pin description contains the 0-13 digital output and input pins ,A0-A5 are Analog pins and power pins and 1-USB port and it also contains the 6 PWM pins .its crystal oscillating frequency is 16MHZ



IR Sensor:

IR is nothing but the infrared rays it is used to detect the person or object through infrared rays it has three pins those are VCC,GND and Analog or digital pin the IR

sensor baud rate is 9600 the range in between the threshold these type of sensors measure only infrared radiation rather than emitting it that called a passive IR sensor these type of radiations are invisible to our eyes that can be detected by the infrared sensor.



LCD:

LCD is nothing but the liquid crystal display it is used to display the information it is the combination of two states of matter that is solid and liquid this type of LCD used in digital watches and many portable computers in this project we use 16*2 LCD it is used to display the different strings and it is a 4-bit 16*2 LCD . LCD have common mode and string mode and it have total 16 pins



DC MOTOR:

The basic principle of dc motor is nothing but the whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force when armature windings are connected to a dc supply an electric current sets up in the winding the brushed DC motor is one of the earliest motor designs today it is the motor of choice in the majority of variable speed and torque control applications in this project we are using 4 DC motors

Advantages:

- Easy to understand design
- Easy to control speed
- Easy to control torque
- Simple, cheap drive design

educational purposes in this project whenever the IR sensor is detected then the buzzer give--s the alarm sound



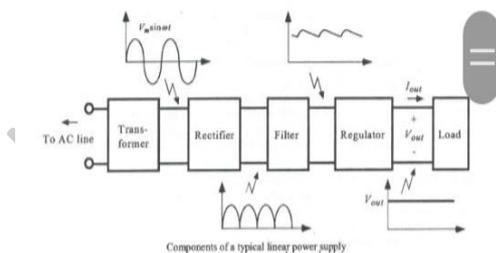
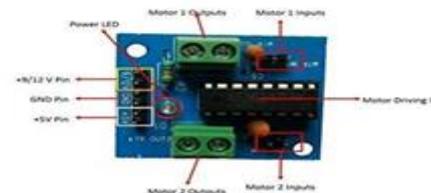
Power supply unit:

In this project we have power supplies +5v and -5v option normally +5v is enough for total circuit and another -5v is used in case of OP amp circuit the block diagram of power supply unit consists of stepdown transformer, bridge rectifier, filter(capacitor), voltage regulator, resistor, LED

We want only 5v to the controller by using the block diagram of power supply unit we get the 5v the step down transformer is used to convert the 230v to 12 ac input to the supply pin of the circuit the ac voltage of 12v is converted to 12 pulsating dc by using the bridge rectifier the output of bridge rectifier we get the some ripples so by using the filters as capacitors we eliminate the ripples then the filter output is given to the voltage regulator by using voltage regulator we get 5v and resistor is used to opposes the flow of current

L293D:

L293D is a dual H-bridge motor driver so with one IC we can interface four DC motors which can be controlled in both clockwise and counter and counter clockwise direction and if you have motor with fix direction of motion the you can make use of all the for input and output to connect up to four DC motors L293D has output current of 600mA and peak output current of 1.2A per channel.

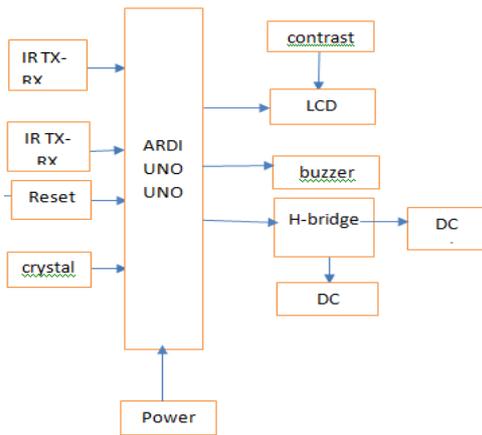


Proposed Systems:

In this project contains the ARDIUNO UNO is used as CPU, liquid crystal display, IR sensor, L293D driver, buzzer, power supply power supply unit and DC motor is as shown in the below figure

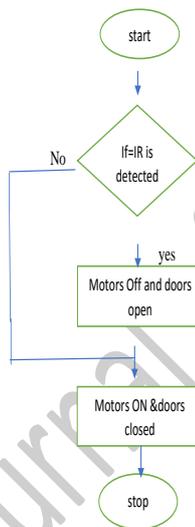
Buzzer:

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical or piezoelectric typical uses of buzzers and beepers include alarm devices ,timers and confirmation of user input it gives the output indication the modern applications of buzzers are novelty uses , judging panels and



The system will display the necessary details about the stations with the help of LCD display at the time of train arrival to the stations it reads the 8 bit data programmed in the IR sensor and the train stops automatically two motors drivers are essential in this project one for the train movement and the other one is for door operation power supply of 5v is necessary for operation,

Flow chart:

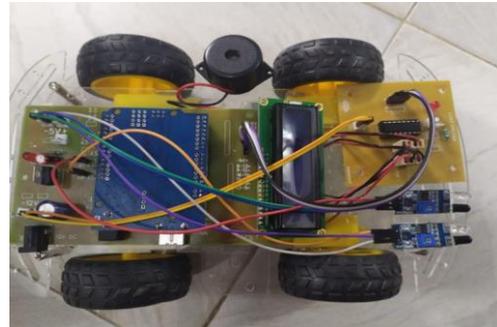


train is in running condition if the IR sensor is detected then the motors off and the doors will open the passengers can go inside the train and if the sensor is not detected the motors are ON condition and doors will closed so the train is again in running condition

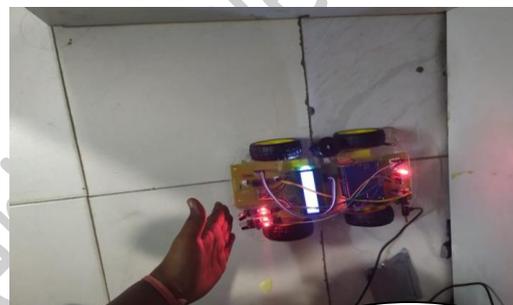
Experiment results:

We have two figures one is the prototype of the project and another one is the output of the project the output of the project is nothing but

the train is in running condition if the IR sensor is detected the train will be off and the passengers enter into the train and if it is not detected then the train is in moving condition



fig(1): prototype



Fig(2):p ff and doors open

Conclusion:

Now a days we seen that many documented failures of automated systems due to several reasons that failures are caused by the operators the main thing of this project is nothing but the processor ARDIUNO reduces the type of failures done in these recent days it also reduces the overloading and time delay the efficiency of the train increases the transportation is easy and less cost mainly this prototype reduces the cumbersomeness by decreasing the human work

Future scope:

This project can be further developed in future by the use of high speed sensors which creates the fast and more efficient operation in the future this type of application is improved by creating high reliable metro trains with the help of new automatic train control and protection it also

reduces the threats which are caused by the human errors

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