Assembly Programed Railway Gate

PROJECT REPORT ON

ECE3003-MICROCONTROLLER AND ITS APPLICATIONS

Submitted by

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CERTIFICATE

This is to certify that the project work entitled "**ASSEMBLEY PROGRAMED RAILWAY GATE**" that is being submitted **by "Manjari Jain" ,** and "**Shree Mehta**" for **Microcontroller and It's applications (ECE 3003)** is a record of bonafide work done under my supervision. The contents of this project work, in full or in parts, have neither been taken from any other source nor have been submitted for any other CAL course.

Place: Vellore

Date:

Faculty

Prof. Shanmugasundaram Sir

ACKNOWLEDGEMENT

We would like to thank VIT University for providing us an opportunity to carry out this research project. We would also like to thank lab assistant sir in helping us to carry out our project work. We also thank Prof. Shanmugasundaram Sir to be our project guide and guiding us at various stages in completing the project.

Without his support it would have been very difficult for us to complete our project successfully. We would like to pay our gratitude to sir for sharing his pearls of wisdom with us during the project.

Manjari Jain

Shree Mehta

ABSTRACT

We are all aware with the fact that the number of accidents at railway crossings has been increasing numerously day by day, more precautionary measures are needed to be undertaken. These accidents generally occur due to physical absence of people in the control room or absence of crossing gates or due to impatience and carelessness of people. Many places in India are there without any crossing gates which becomes an open threat for the normal people, vehicles and animals passing by. Sometimes carelessness of the guard in local room leads such type of accidents. Basically in today's scenario the incoming of the train to the particular railway crossing is informed by the nearby railway station master. So, if communication fails or no guard is present on that control room, it will create havoc and dangerous accident will occur.

So our project aim is to make the gate totally automated so that no human labour is needed and accidents count comes down abruptly in the coming years. Automated Railway Gate Control is generally controlled by 8051 micro controller and is more reliable since there is no human intervention in this process. It becomes more feasible and efficient mode of guarding. In our project we used IR sensors to sense and convey the information of the incoming train as well as the outgoing of the train as well. We used servo motor to open and close the gate which takes input from the IR sensor through micro controller.

To simulate this project e used Keil Micro vision and simulated on Proteus software too. The demonstration was done with railway tracks and a train.

INTRODUCTION

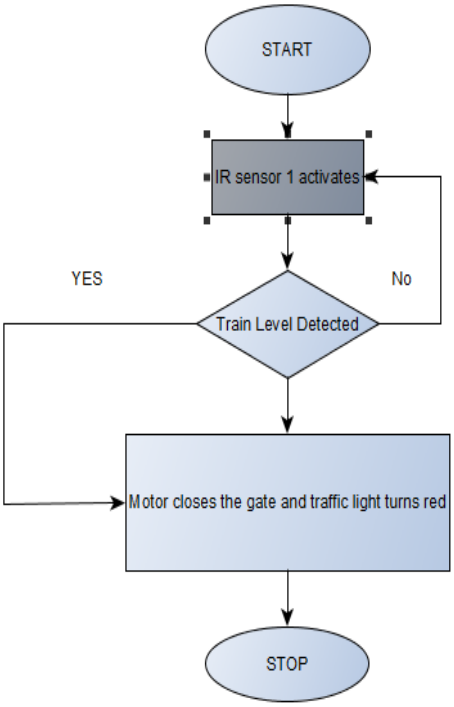
In general, Railway gates are opened or closed manually by a gate keeper. Sometimes, the person might not be present and will result into vital accidents which happened many times in last 10 years. One of them is shown in the picture above. The information about arrival of train for opening or closing of door is received from nearby station. May be some railway crossings are totally unmanned especially in village areas and many railway accidents occur at these unmanned level crossings. To avoid the human intervention at level crossings completely, we need to automate the process of railway gate control.

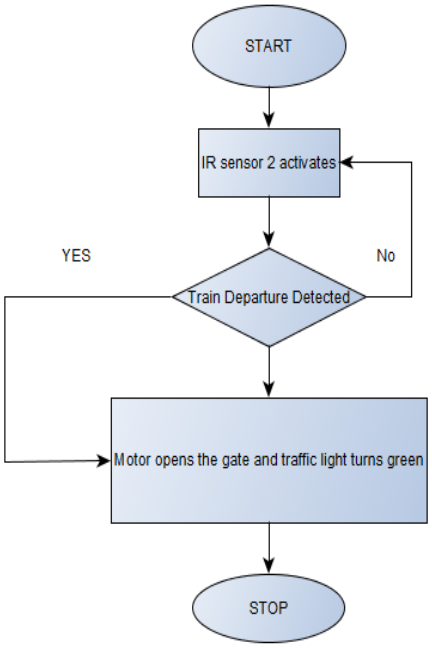
The system is therefore designed using 8051 micro controller to avoid such accidents.

Two IR sensors are kept at a distance of at least 5 km on both sides of the crossing gate. IR sensor 1 will work as the transmitter. This sensor will send ACTIVE HIGH input to the micro controller. Then the micro controller will send the data to the servo motor which pulls the gate up and down. So, the gate closes as we get input from IR sensor 1 and RED Led glows to stop the pedestrians and vehicles. When the train receives on the receiver side IR sensor 2, it gets input from it and through the micro controller the motor rotates and gate opens and the green led glows.

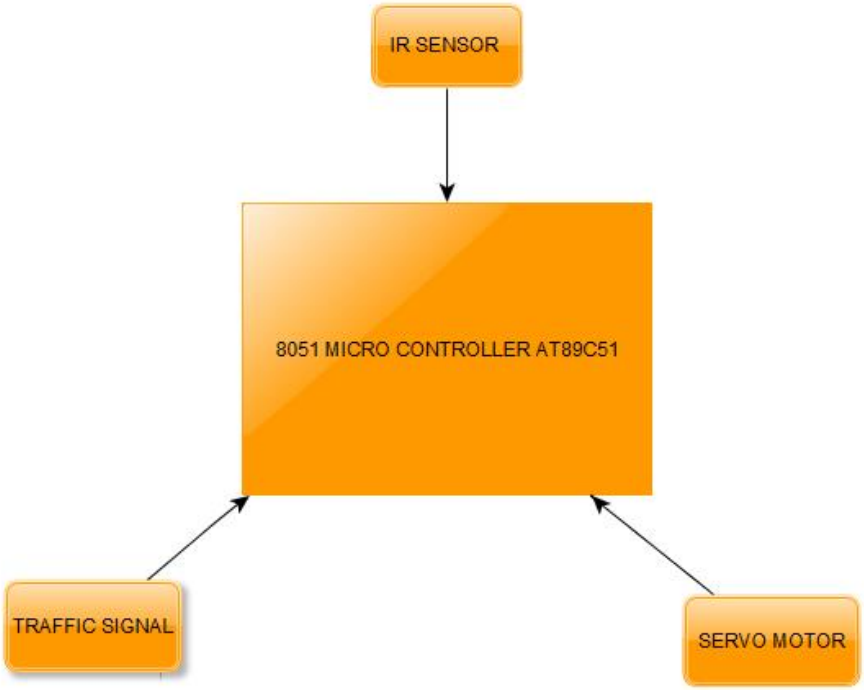
So, a practical approach of serial communication and providing delays was done in this project.

STRUCTURE OF THE PROJECT

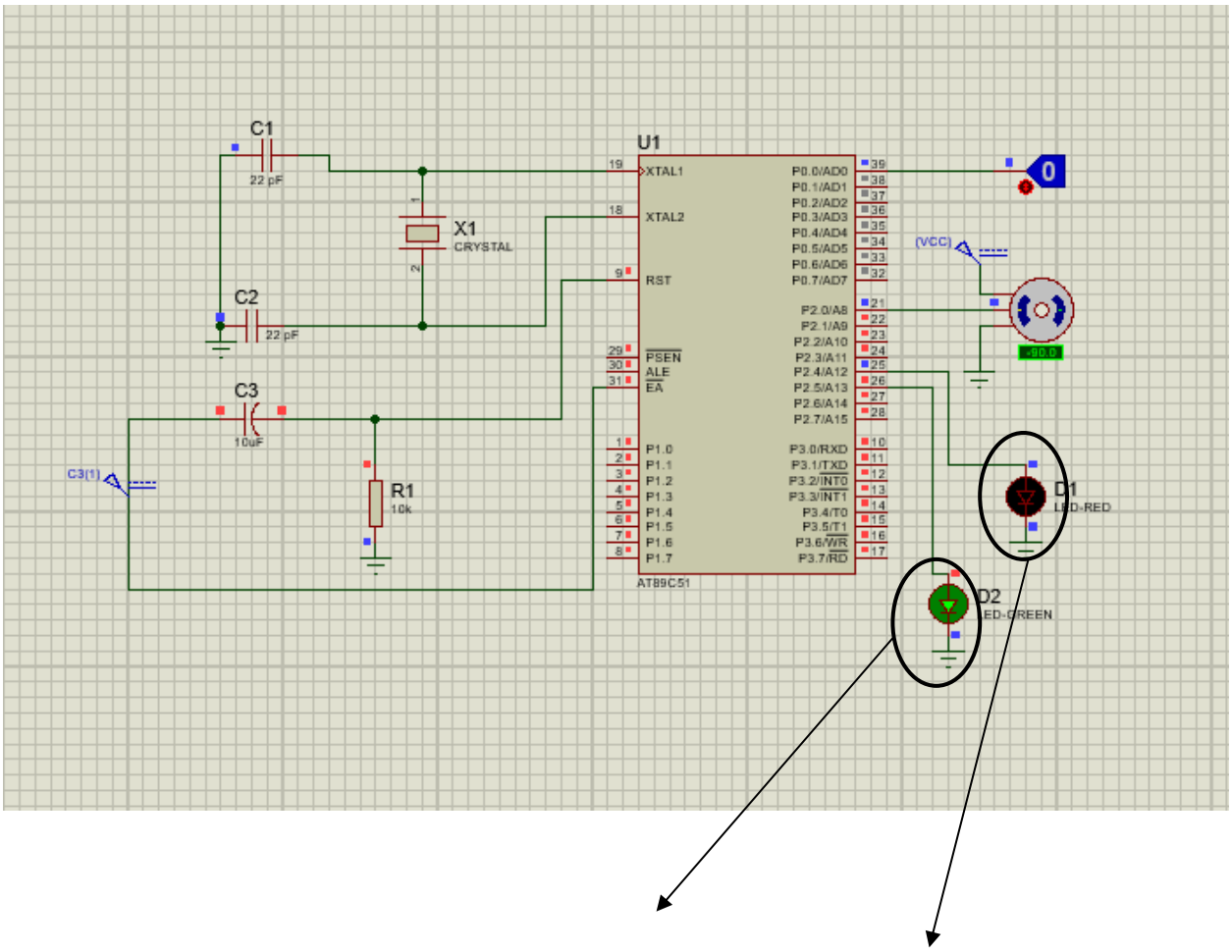




BLOCK DIAGRAM



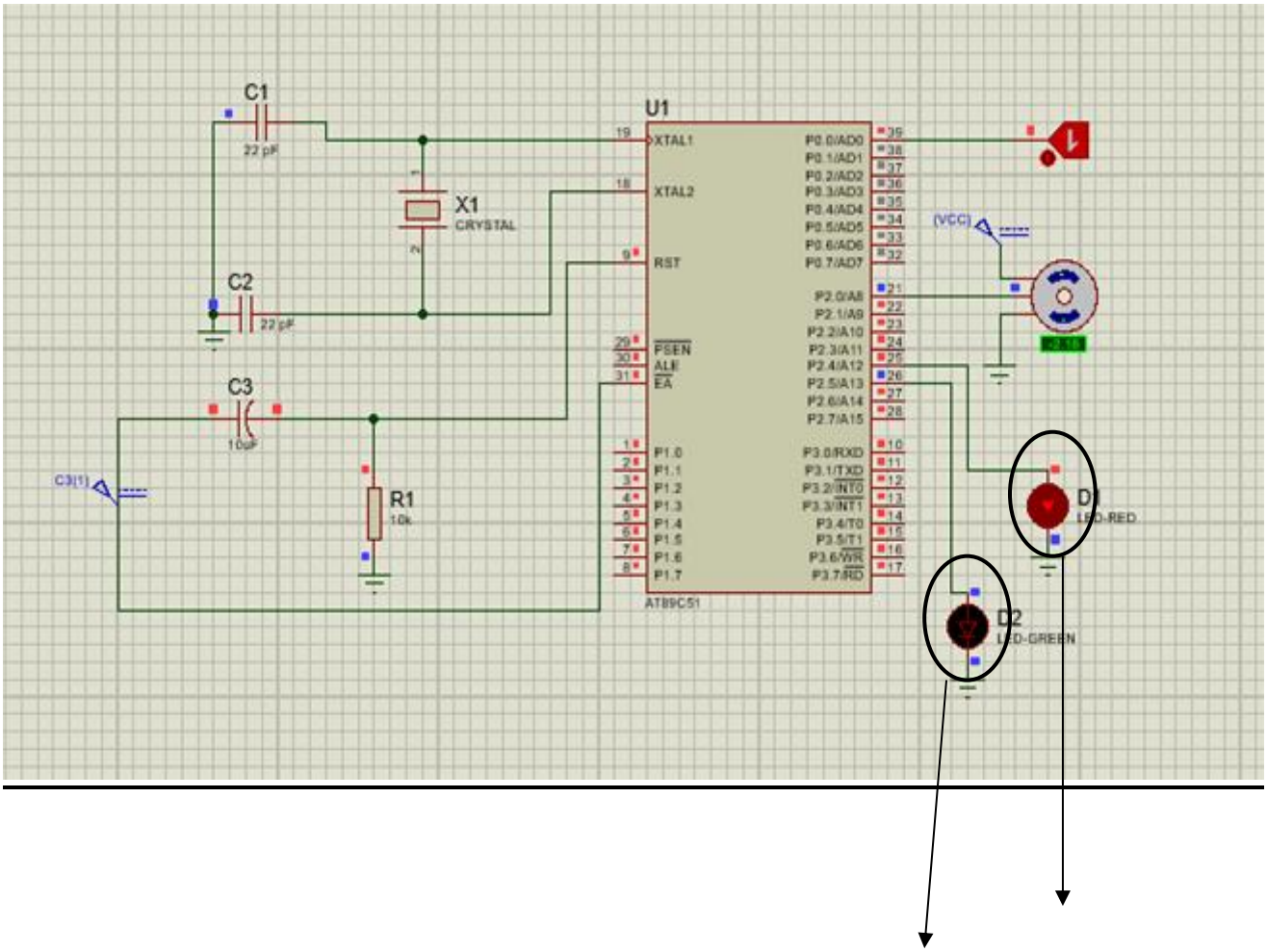
CIRCUIT DIAGRAM-I



GREEN LIGHT GLOWS AND RED LIGHT IS OFF. GATE IS OPEN.

Fig: When no train in coming i.e. normal stage **(or)** when the train passes the gate

CIRCUIT DIAGRAM-II



ACTIVE HIGH INPUT FROM IR SENSOR, SO GREEN LIGHT IS OFF AND RED LIGHT IS ON. GATE IS CLOSED BY MOTOR

Fig: When train is coming and crosses the IR sensor.

COMPONENTS USED

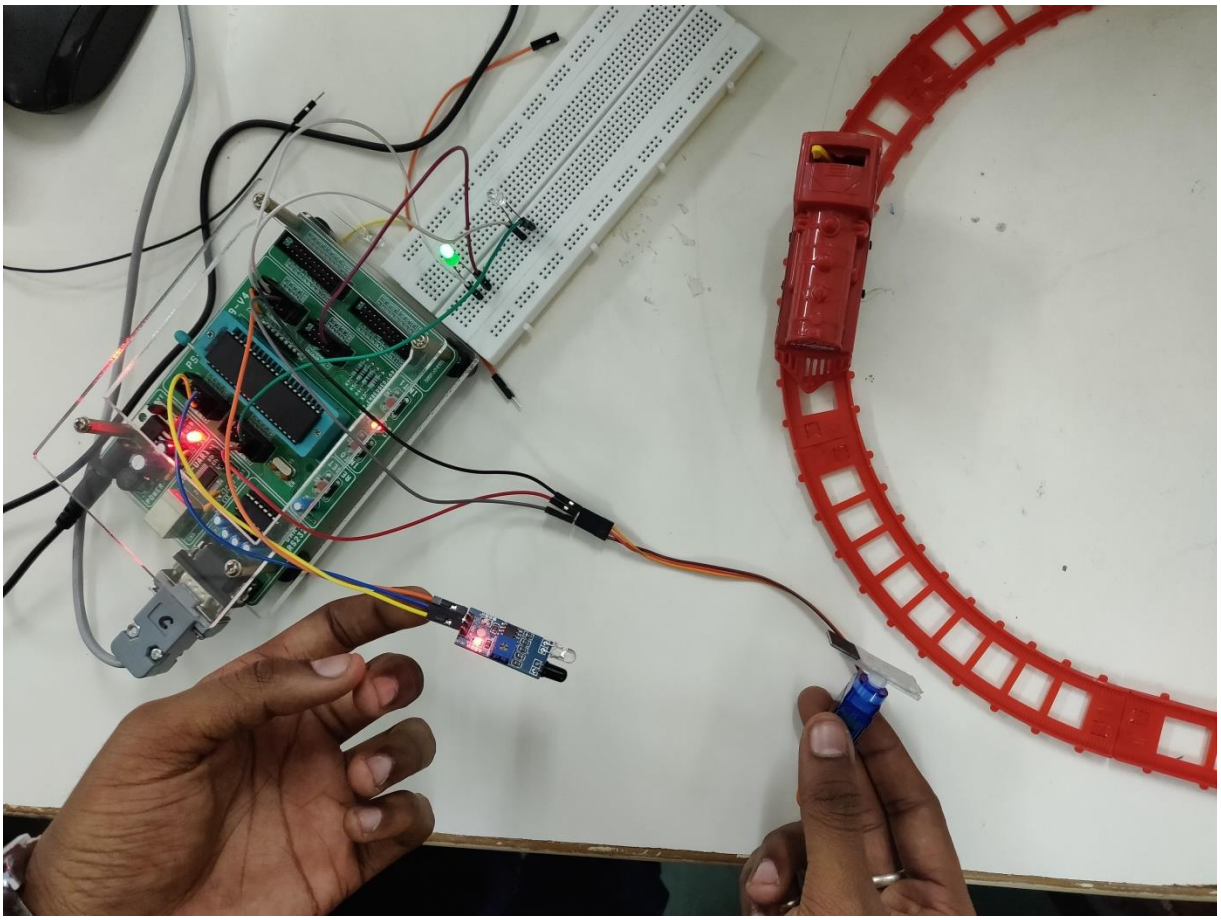
- AT89 **Microcontroller Section**
- C51 MCU
- 11.0592 MHz Quartz Crystal
- 2 x 22pF Ceramic Capacitor
- 1 nF Polarised capacitor
- 10KΩ Resistors x 1
- AT89C51 Programmer Board
- **Sensor and Load Section**
- 2 x Reflective Type IR Sensors
- 2 x 1KΩ Resistor
- Servo Motor
- Red and Green Led.

CIRCUIT DESIGN

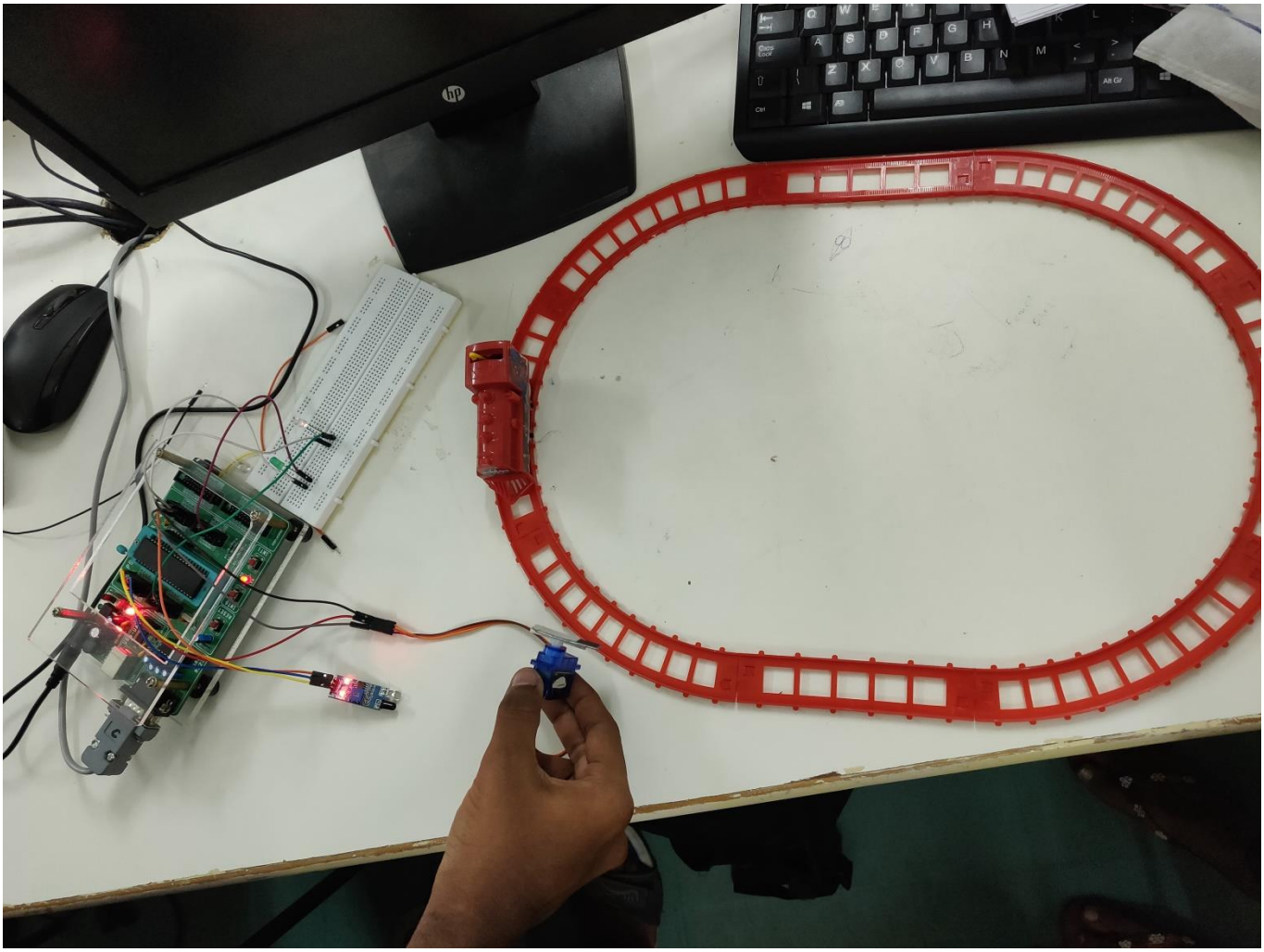
Major components of our project are 8051 microcontroller (AT89C51), Reflective Type IR Sensor, and a servo Motor. The mandatory connections for 8051 MCU include oscillator circuit, reset switch and EA Pin. A crystal oscillator of up to 20 MHz can be used as a source of external clock. In this project, an 11.0592 MHz quartz crystal oscillator is used. To complete the external oscillator circuit, two 22 pF capacitors are used. Finally, the EA pin is pulled high using a 10KΩ resistor. The servo motor input is given to pin 2.0 and another pin is connected to Vcc and the third pin is grounded.

Coming to the programming part, we calculated the delay of 1 ms for the servo motor to remain at 0 degree and 1.5 ms to rotate it to 90 degree and again return back to normal position. So, basically a case study was done on the speed and length of the train and based on that delay was calculated that for how much time gate will be opened or closed. As the IR sensor 1 input is high, i.e. “1” we set a condition to switch on Red LED which becomes 1 and glows and Green LED becomes “0”. The motor rotates and closes the gate. As the train passes the other IR sensor, the Red LED becomes “0” and Green LED becomes “1”. The motor rotates to 90 degree and opens the gate.

HARDWARE PHOTO



OVERALL PROTOTYPE PHOTO



Advantages:

- An Automatic Railway Gate Control is implemented with very simple hardware and easy control.
- No more accidents.
- No more human interventions.
- No more hand labour.

Disadvantages:

- The system can be implemented more efficiently by incorporating more efficient sensor network.
- A combination manual wireless control and sensors based control can be used for better operation.
- IR sensors may fail in detection sometimes.

CONCLUSION

Automated railway gate offers an effective way to reduce the occurrence of railway accidents. In the past 25 years, more than 50 collisions have occurred between trains and vehicles and lots of poor animals died during crossing rails where there is no gate.

With this prototype we can ensure safety and reduce human intervention. This prototype will be beneficial for common people as well as for railway management. Since, the design is totally automated it can be used in village areas where there is no station master and people in control room. Now, a day's automaton is used in each and every sector of applications, since because it is reliable and accurate too.

For better performance, we can add pressure sensor as well as vibration sensor as subsidiary, incase if IR sensor fails, we can operate them. Railway lines start vibrating at a long distance before the train comes due to train's heavy weight and speed.

An LCD monitor can be connected to estimate the distance and visualize it to the people to the both sides of crossing gates. This will help a lot in gaining the idea about the train's position from the crossing.

RESULT

Therefore the above automated railway gate circuit had been implemented in hardware and software and the circuits working was demonstrated.

Software used:

- **Keil u vision.**
- **Proteus.**

REFERENCES

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- Electronics hub.
- Digital library.
- Wordpress.
- Scribd.
- Research paper related articles on railway system.