

## **INTRODUCTION**

This Embedded system is made to make our current Train journey or Railway more safe and efficient.

In this system we tried to make system more Automated so we can reduce the human error. Because of Automation we can reduce Railway accident.

Our system auto detects The train identity form RFID and using that information to set destination rout of train and our system can also detect is there any obstacle or train are already present on that rout so we can inform to stop the train and this indication is done by using Signal LED. In bad weather condition or in case Signal LED is not visible clear so our system can also use GSM to send SMS to operator of train.



## **PRINCIPLE**

RFID use radio wave to communicate wirelessly or send information

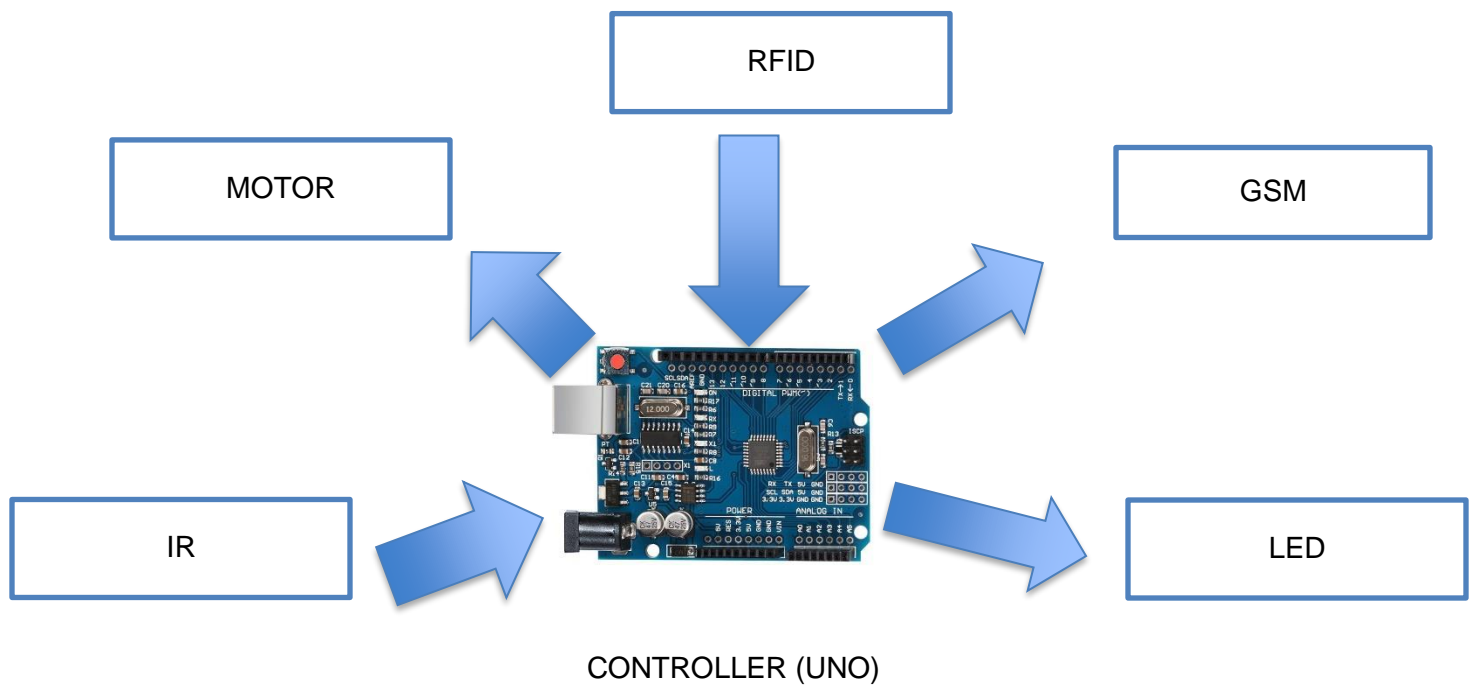
In this Embedded system, GSM communicates with the Arduino as Arduino functions as the core brain of this system. A DC-DC step down is connected in between Arduino and GSM

Servo motors convert the electrical signals to angular motion.

The IR transmitter continuously emits the IR light and the IR receiver keeps on checking for the reflected light.



## BLOCK DIAGRAM

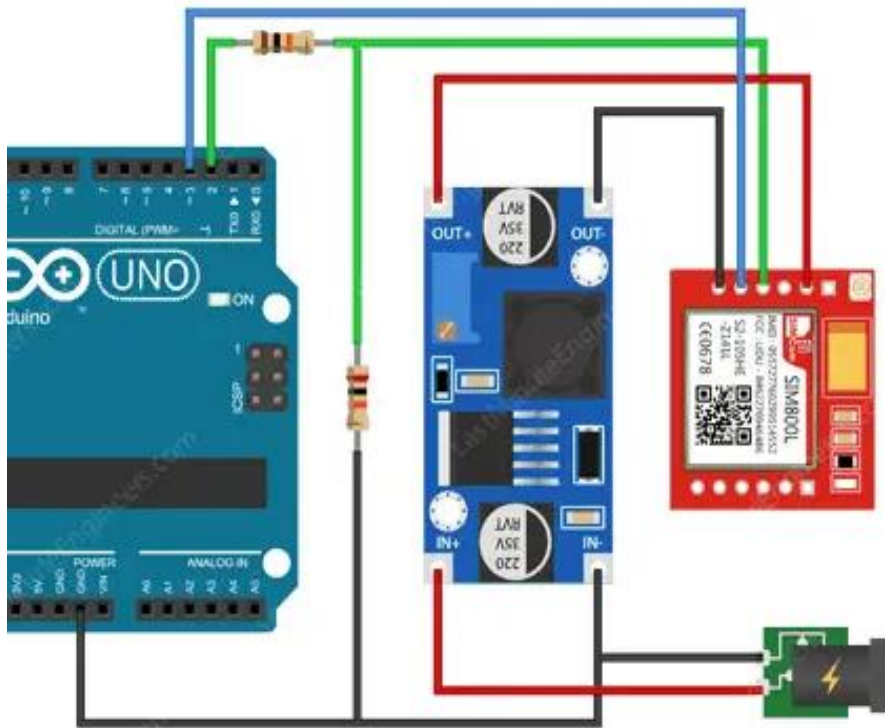


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**Fig 1:** Block diagram of Embedded System

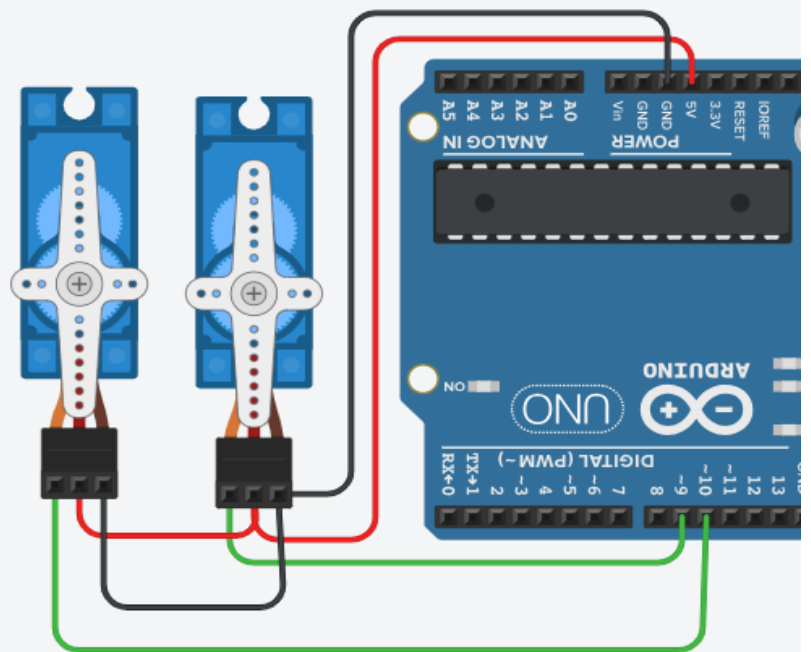


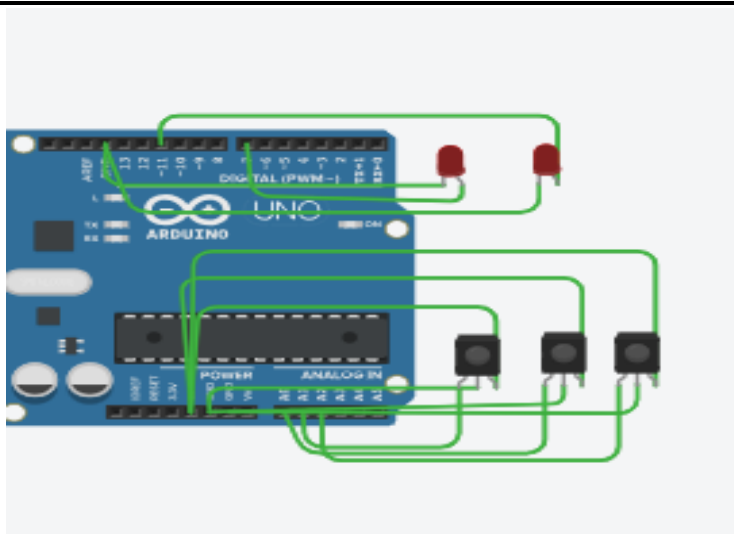
## CIRCUIT DIAGRAM



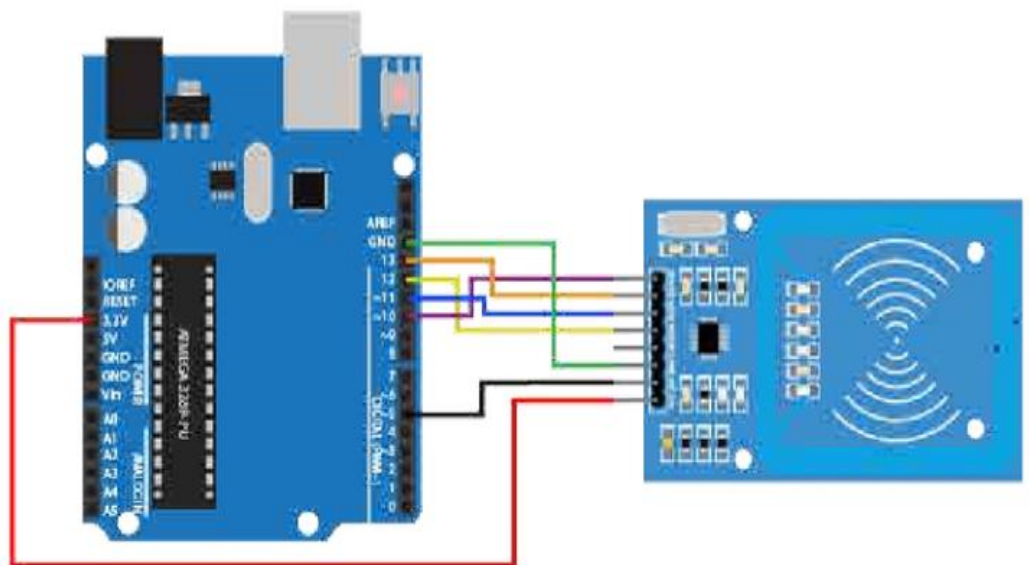
**Fig 2:** Connection of Arduino with GSM module and DC voltage regulator

**Fig 3:** Connection of Arduino with Servo motor



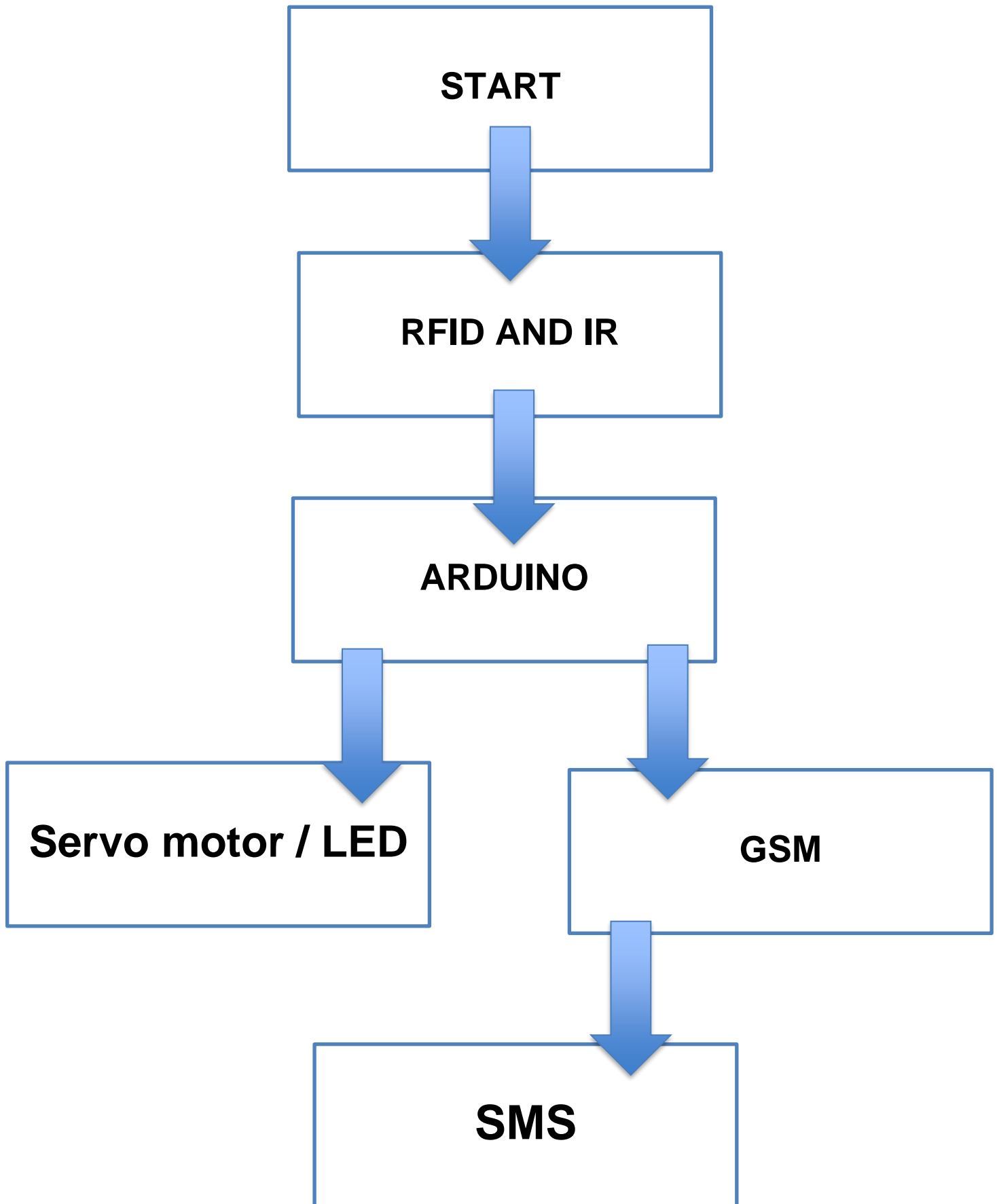


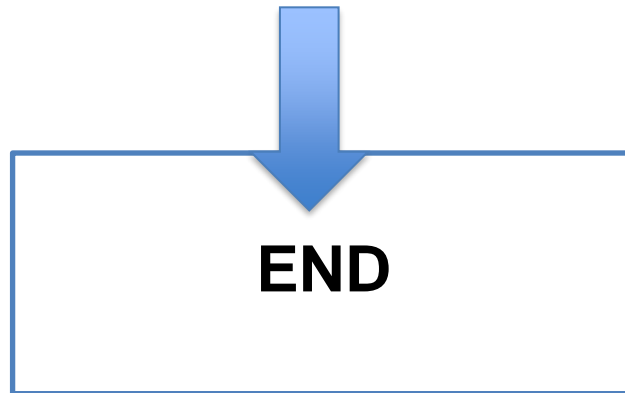
**Fig 4:** Connection of Arduino, sensor (IR) and LED



**Fig 5:** Connection of Arduino and RFID scanner

## FLOWCHART

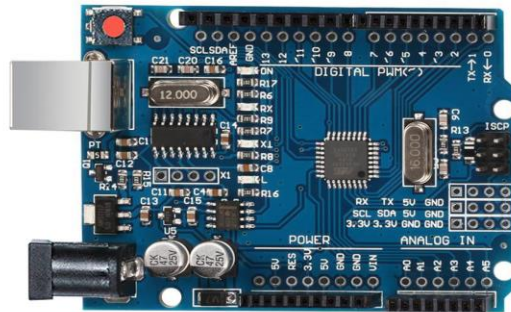




**Fig 6:** Flowchart of automated Embedded System

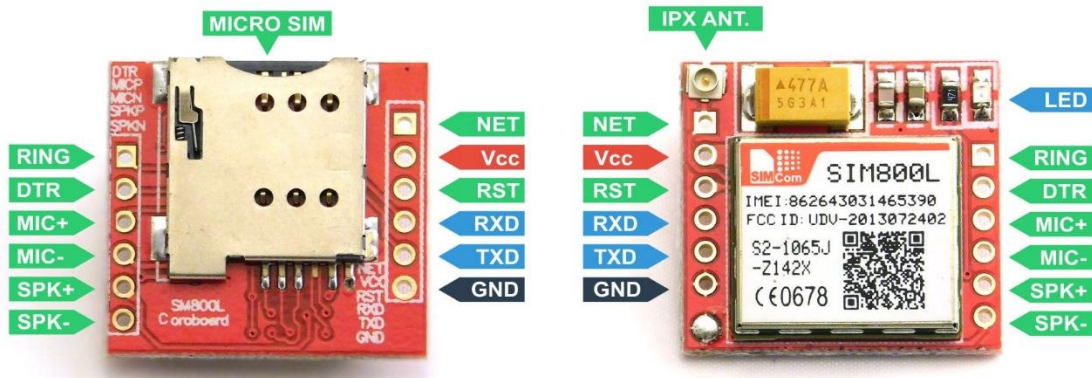
## COMPONENTS DESCRIPTION

**Arduino Uno:** It is used as main controller for our Embedded System.



**Fig 7:** Arduino

**GSM:** It stands for Global System for Mobile Communication. It is used to send command through our mobile rather than giving input on serial monitor.



**Fig 8:** GSM



**Servo Motors:** This device converts electrical signal to angular displacement. Therefore, it is used to change the position of tracks.



**Fig 9:** Servo motor

**DC-DC Step Down:** It is used to step down the voltage given to a device



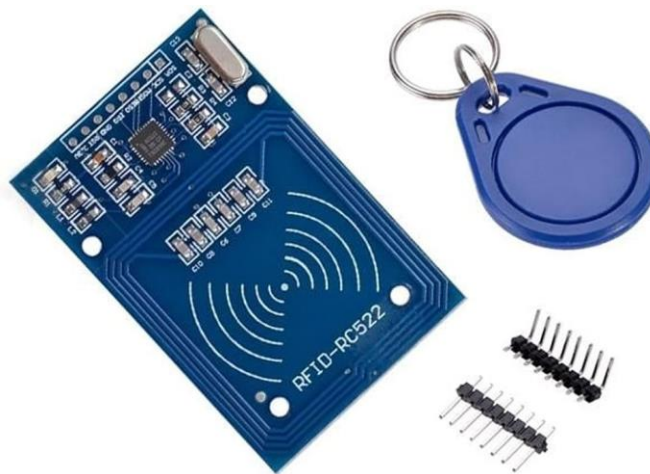
**Fig 10:** DC contorl

**IR sensor:** The IR transmitter continuously emits the IR light and the IR receiver keeps on checking for the reflected light.



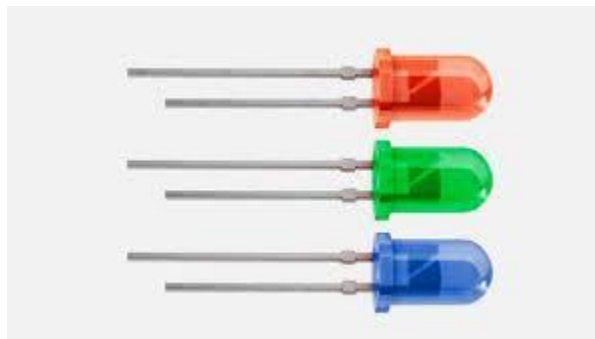
**Fig 11: IR sensor**

**RFID:** RFID use radio wave to communicate wirelessly or send information it contains sender receiver, controller



**Fig 12: RFID**

**LED:** Light emitting diodes which emit visible light.



**Fig 13: LED**

## **ADVANTAGES**

- Automated train systems can change track faster than the manual method.
- It ensures accurate positioning of the tracks helping in reducing train accidents
- It leads to reduce the need of manual labor resulting in potential cost savings of the railway operators.
- It enables higher throughput of trains at a time as it allows continuous and fast change of tracks.
- It also makes system more fast and safe.
- It can alert Train operator about obstacle between destination

## **DISADVANTAGES**

- It can lead to job losses for the manual workers who changed the track manually so it can affect social and economic balance.
- Initial cost of this system is high. So, budgeting should be kept in mind before implementing it.
- These systems require regular maintenance to ensure proper functioning.

## **APPLICATIONS**

- ❖ **Railway systems:** Used to Improve Railway from a software interface rather than using manpower.
- ❖ **Public Transportation Networks:** Can be used in public transport like Metro to automatically operate and also can be one of the smart city initiatives.
- ❖ **Theme Park Rides:** Can be used to create thrilling rides which means can be incorporated in roller coaster so that it can change track automatically according to need.
- ❖ **Package Sorting:** Can be utilized in logistics and distribution centers to sort packages and redirect them to the appropriate shipping lanes based on destination.



# **CONCLUSION**

Therefore, implementing this project in real life will replace the manual method of track changing system resulting in more advanced railway managing systems. By analyzing cost, efficiency, reliability the system is found better than the existing system.

