The main objective of this project is to design and build a system that controls the operation of a railway gate automatically using Arduino. A railway gate is now under control of a person. The efficiency of operation the railway gate will surely depend upon the efficiency of the person. That is a simply a drawback of the system. So, here we are introducing the Railway Gate Automation system with high efficiency and security. In this system, couple of IR sensors will continuously check the condition of the railway track. A yellow light indication will be provided for the traffic every time. The system is capable of check the presence of the train and take proper action when a threat or risk situation is coming. If a train is coming towards the level cross in normal situation, the green light on the track will be turned on that represents the normal situation of the track and the cross will be closed for traffic. If an object found on the track before train comes, that means a threat is found on the track. Then, a short buzzer alarm will continuously happen to alert the gate operator to clear the track before train comes. Also, the green light on the track will be turned off and the red light will be turned on to alert the train that it is not safe to cross the track. When there is a threat found and the train is coming at that time, that means there is not only a threat is present, but also a risk is found! Then the level cross will close for the traffic and the train will be stopped along with a long buzzer alarm which alert the gate office that a train is stopped at his level cross. All the information related to the operation of the railway gate will be displayed on an LCD screen for the person who supervise the railway gate.

We build this project on Arduino Uno - an open-source electronics platform based on easy-to-use hardware and software. Arduino board senses the environment by receiving inputs from many sensors, and affects its surroundings by controlling various actuators. The Arduino board is programmed by writing code in the Arduino programming language and by using the Arduino Integrated Development Environment. Unlike most other programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board - you can simply use a USB cable.

The main components used in this project are:

* **Arduino Uno Microcontroller board** based on the Microchip ATmega328P microcontroller is used in this project. This board also consists of other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, a Power barrel jack, an ICSP header and a reset button.
* **Servo Motor** is low speed and high torque motor. It has four main components - a DC motor, a gearbox, a potentiometer and a control circuit. It is controlled by sending a series of pulses through the signal line.
* **Liquid Crystal Display (LCD):** The JHD162A 16×2 LCD module used here is based on the HD44780 driver from Hitachi. It can display 2 lines of 16 characters each. The JHD162A has 16 pins and can be operated in 4-bit mode or 8-bit mode.
* **IR sensor** is an electronic device, that emits the light in order to sense some object of the surroundings. An IR sensor can measure the presence of an object as well as detects the motion.