**PROJECT DEFINITION:**

Traffic congestion in cities is a major problem mainly in developing Countries; to encounter this, many models of traffic system have been proposed by different scholars. Different ways have been proposed to make the traffic system Smarter, reliable, and robust. This paper presents the various approaches made to Enhance the traffic system across the globe. A comparative study has been made of Different potential researches in which intelligent traffic system (ITS) emerges as an Important application area. Important key points of each research are highlighted and judged on the basis of implementing them in developing countries like India.A model is also proposed which uses infrared proximity sensors and a centrally placed microcontroller and uses vehicular length along a length to implement Intelligent traffic monitoring system.

**Components and sensors**:

**Infrared proximity sensors :**

In ITMS, Infrared (IR) proximity sensors are employed to detect the presence and movement of vehicles on roads and at intersections.

1. Detection Principle:

These sensors operate on the principle of emitting infrared light and measuring the reflection or interruption of this light to determine the presence of an object (vehicle).

1. Location:

IR sensors are strategically placed along roadways, typically embedded in the road surface or mounted on traffic signal poles.

1. Vehicle Detection:

When a vehicle passes over or interrupts the infrared beam, the sensor registers a change in the received light, indicating the presence of a vehicle.

1. Traffic Data Collection:

ITMS uses data from IR sensors to collect valuable traffic information, such as vehicle count, speed, and occupancy of lanes.

1. Traffic Signal Control:

IR sensors are also integrated with traffic signal systems to optimize signal timing based on real-time traffic conditions, reducing congestion and improving traffic flow.

**RF module :**

It enable wireless communication for data transmission between various components, such as sensors, cameras, and traffic management systems. They facilitate real-time data exchange, making it possible to monitor and control traffic efficiently.

**Bluetooth module :**

Bluetooth modules are used in Intelligent Traffic Monitoring Systems (ITMS) for short-range wireless communication between various traffic monitoring and control devices. These modules enable data exchange between traffic sensors, cameras, and central traffic management systems, allowing for real-time data collection and coordination, ultimately improving traffic flow and management.

**ITS:**

ITS (Intelligent Transportation System) is the backbone of Intelligent Traffic Monitoring Systems. It encompasses technologies and strategies that enable real-time traffic monitoring, data collection, incident detection, and communication. By seamlessly integrating sensors, cameras, and communication networks, ITS enhances traffic management, safety, and provides travelers with up-to-date information, contributing to more efficient and safer roadways.

**DESIGN THINKING:**

**Data Analysis Systems:**Data analytical systems are those systems that take the present or statistical data, process them in the processor, and then act according to predefined algorithm. Like real-time systems, it may collect data in real time, but is unable to take any decision in real time i.e., it must follow the instructions that are provided to it.suggested a scheme of solving traffic congestion in terms of the average waiting time and length of the queue at the isolated intersection and provide efficient flow in global traffic control on multiple intersections with the accordance of real-time data. Thus, the data collected can be used in various ways depending on the perspective of the user.

**Proposed Method:**The proposed model mainly concentrates on the following factors:(i) Unnecessary consumption of the time slice in a certain lane, when there are fewer vehicles.(ii) If any lane has any emergency vehicle such as ambulance, it also has to wait for its turn.(iii) A lane with less or more traffic has to wait for the same time span.Normally, the green signal in the traffic light remains on for a fixed interval for each road. In the existing system, congestion of vehicles may happen if lots of vehicles are waiting in a particular lane and the other lane which has fewer numbers of vehicles is made free.

**The Approach**:

Infrared proximity sensor, AT Mega 2560, and RF modules have been used to design the system. The infrared sensors will be used to collect data from the lane and fetch the collected data to the microcontroller. In each road, there will be four infrared sensors which will be placed at a certain distance from the intersection, placed on either side of the roads in pair dividing the considered length of the road from the intersection into two zones—a high density zone and low density zone. The presence of vehicles in each region is sensed by two proximity infrared sensors placed at either side of the road in the opposite direction.The sensors are placed by keeping a certain distance so that they do not have an intersection point. The use of two sensors eliminates the factor if “vehicles are present along one side only,” i.e., it gives us the real view in what manner the vehicles are aligned along the road. The sensors are connected to the analog pins of the microprocessor and the traffic lights to the digital pins. While placing the sensors, it is to be kept in mind that the range of the sensors does not intersect, which will result in erroneous data read.