**Idea Submission For ‘Student Innovation’**

**Idea Title :**

Smart Signal Priority System for Emergency Vehicles Using Wireless Communication

**Idea Description :**

Emergency vehicles often face significant delays at traffic signals, which can impede their response times and increase the risk of accidents. To address this issue, this project proposes a Wave-Based Emergency Vehicle Priority System designed to enhance traffic signal management and prioritize emergency vehicles effectively.

The proposed system uses wireless communication to transmit crucial data from emergency vehicles to traffic signals. Each emergency vehicle is equipped with a transmitter that sends out information including the vehicle type (ambulance, fire truck, police car), patient condition (for ambulances), GPS location, and lane information. This data is received by traffic signals equipped with receivers.

- Wireless Data Transmission: Emergency vehicles transmit data via wireless waves (e.g., RF or IR). This real-time data includes vehicle type, urgency level, and current lane position.

- Traffic Signal Receivers: Traffic signals are equipped with receivers that capture the transmitted data. This allows the system to identify approaching emergency vehicles and determine the appropriate signal adjustments.

- Dynamic Priority Algorithm: The received data is processed by a dynamic prioritization algorithm, which calculates the optimal signal timing adjustments based on vehicle urgency, type, and lane position. This algorithm ensures that the traffic signal changes in a way that clears a path for emergency vehicles while minimizing disruption to other traffic.

- Lane-Based Signal Management: By utilizing lane-specific information, the system adjusts signal timings to prioritize the lane from which the emergency vehicle is approaching, ensuring a clear route through the intersection.

**Abstract Summary :**

Emergency vehicles frequently encounter delays at traffic signals, impacting their response times and increasing the risk of accidents. Traditional systems primarily focus on detecting emergency vehicles but lack effective solutions for managing multiple vehicles at intersections. This project introduces a Wave-Based Emergency Vehicle Priority System that uses wireless communication to transmit vital information from emergency vehicles to traffic signals. The system incorporates a dynamic prioritization algorithm that adjusts traffic signal timings in real-time based on vehicle type, urgency, and lane information. By providing prioritized signal adjustments and optimizing traffic flow, the system minimizes delays for emergency vehicles and enhances overall road safety. The approach also includes public awareness measures to improve compliance and ensure a smooth integration with existing traffic management infrastructure.

**Technology Bucket :**

- Wireless Communication: RF, IR, Bluetooth

- Data Transmission: Transmitters, Receivers

- Traffic Signal Control: Intelligent controllers

- Data Processing: Dynamic prioritization algorithms