**Idea Submission For ‘Student Innovation’**

**Idea Title :**

Multiple Emergency Vehicles Detection and Management Using YOLO with Dynamic Prioritization Algorithm

**Idea Description :**

Emergency vehicles often lose precious time waiting at traffic signals or are forced to manually bypass them, which increases the risk of accidents and delays their response. This project aims to enhance urban traffic systems by developing a smart solution that detects the presence of emergency vehicles at traffic signals and dynamically prioritizes which vehicle should proceed, especially when multiple emergency vehicles approach an intersection. By using advanced detection techniques and a dynamic prioritization algorithm, the system minimizes manual signal bypassing, reduces the likelihood of accidents, and ensures faster and safer response times for emergency vehicles.

To implement this solution, cameras will be mounted on all lanes above the traffic signals to capture real-time video feeds. Using the YOLO (You Only Look Once) object detection algorithm, emergency vehicles will be detected in the video stream. The detection data, along with inputs such as traffic congestion, vehicle distance, and the number of approaching emergency vehicles, will be passed to a dynamic prioritization algorithm. This algorithm will then calculate how to minimize the waiting times for all detected emergency vehicles by determining the optimal order of priority. The system ensures that multiple emergency vehicles are efficiently managed, reducing overall delays and improving their response times at busy intersections.

**Abstract Summary :**

Delays at traffic signals often hinder emergency vehicles, forcing them to manually bypass signals and increasing the risk of accidents. When multiple emergency vehicles approach an intersection simultaneously, existing systems struggle to manage the situation effectively. This project proposes a smart traffic management solution that integrates real-time video feeds from cameras mounted on traffic signals and uses YOLO for detecting emergency vehicles. A dynamic prioritization algorithm then determines the optimal sequence for these vehicles to pass, based on factors like congestion, distance, and vehicle type. By minimizing waiting times for all detected emergency vehicles and removing the need for manual signal overrides, this system enhances both traffic safety and emergency response efficiency.

**Technology Bucket :**

- YOLO (You Only Look Once)

- Cameras & Video Feed Systems

- Python / OpenCV

- Edge Computing / IoT

- Traffic Signal Controller Integration

**Idea Template :** PDF, PPT max 5MB

**Other Document(Optional) :**

**Youtube Link(Optional) :**