

School of Electronics and Communication Engineering

Research-based Project Synopsis

Team No: 07		Team Name: IMPEDANCE		
Sl. No	SRN	Full Name	Section	Student Signature
1	R23EN060	Joel Jo	B	
2	R23EN042	Darshan T K	B	
3	R23EN059	Imdad Aqueel	B	
4	R23EN083	Manmohan Kumar	B	
Project Title: Smart Traffic Management System Using Vehicle-to-Everything (V2X) Communication				
Project Category: <input type="checkbox"/> Industry-Relevant/ Industry Problem statement <input type="checkbox"/> SIH Problem Statement <input checked="" type="checkbox"/> Innovative/Research-Oriented Statement				
Remarks by Guide: 			Guide Signature 	

Abstract:

Urban traffic congestion and delays in emergency response are major challenges. This project presents a Smart Traffic Management System using V2X communication, where vehicles, infrastructure, and pedestrians share real-time data. The system dynamically controls traffic signals, prioritizes emergency vehicles, and improves safety. Expected outcomes include reduced congestion, faster emergency clearance, and a framework for smarter urban transportation.

Problem Statement:

Urban areas face severe traffic congestion, delays in emergency response, and rising road accidents. Traditional traffic light systems operate on fixed timers, failing to adapt to real-time traffic conditions. There is a need for an intelligent traffic management system that dynamically adjusts to vehicle density, prioritizes emergency vehicles, and ensures safer road usage.

Methodology:

1. *Data Collection:* Vehicles, pedestrians, and infrastructure exchange information through V2X communication.
2. *Traffic Control Algorithm:* Real-time traffic data is processed to optimize traffic signal timings and prioritize emergency vehicles.
3. *Simulation/Prototype:* A model intersection is developed to test vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I), and vehicle-to-pedestrian (V2P) communication for dynamic traffic management.
4. *Performance Evaluation:* System effectiveness is assessed by comparing congestion levels, waiting times, and response times with conventional systems.

Expected Outcomes:

1. Reduced traffic congestion and improved flow efficiency.
2. Faster clearance for emergency vehicles.
3. Enhanced safety for vehicles and pedestrians.
4. Real-time traffic monitoring to support smart city applications.

Research Objectives:

1. To design a Smart Traffic Management System that dynamically adjusts traffic signals based on real-time vehicle density.
2. To implement Vehicle-to-Everything (V2X) communication between vehicles, infrastructure, pedestrians, and networks.
3. To prioritize emergency vehicles for faster response and safer passage.
4. To reduce traffic congestion and overall waiting times at intersections.
5. To enhance road safety for vehicles and pedestrians by preventing collisions.
6. To analyse the effectiveness of V2X-enabled traffic management compared to conventional systems.
7. To develop a scalable framework suitable for integration into smart city transportation networks.