ISSN 2454-8065 International Journal of Applied Theoretical Science and Technology
Volume 20, Issue 06, pp01-03 March 2025

REMOTE OVER RIDE OF TRAFFIC SIGNAL IN EMERGENCY

Mr.J. Venkatesh,Asst.Prof
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

Mr.K.Naveen kumar,Asst.Prof
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

Md. Gandhi Babu
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

P. Navya
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

V. Manoj
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

T. Srinath
Department of Electronics & Communication Engineering
AVN Institute of Engineering and Technology (AVNIET)
Hyderabad, India

***Abstract*—Emergency vehicles such as ambulances and fire trucks often face delays due to traffic congestion at intersections. This paper presents a Remote Override Traffic Signal System that allows authorized emergency vehicles to control traffic lights in real time. Using wireless communication and microcontroller-based automation, the system ensures green signals for emergency vehicles, reducing response time and saving lives.**

Index Terms— Traffic management, remote override, emergency vehicle priority, intelligent transportation systems, IoT.

INTRODUCTION

Traffic congestion is one of the most pressing challenges in urban transportation, often leading to delays in emergency response. Studies show that delayed arrival of ambulances and fire services is a major contributor to preventable fatalities. Conventional traffic lights operate on fixed timers and are not adaptive to emergency requirements.

This project proposes a Remote Override System that enables emergency services to control traffic signals through secure communication. The system prioritizes emergency vehicles at intersections, reducing response time while maintaining traffic safety.

LITERATURE SURVEY

Several intelligent transportation solutions have been proposed to address traffic delays. Existing methods include sensor-based adaptive traffic lights, GPS-integrated navigation systems, and IoT-enabled traffic monitoring. However, these systems often lack a direct and reliable method to prioritize emergency vehicles.

Remote override systems provide a feasible solution by giving direct control to emergency responders. Table I compares different existing traffic management approaches.

Table I. Comparison of Traffic Management Systems

System Type	Advantages	Limitations
Fixed-Timer Signals	Simple, low cost	Inefficient in emergencies
Adaptive Signals (Sensors)	Real-time adjustment	Expensive, maintenance heavy
GPS-based Prioritization	Route optimization	No control on signals

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Proposed Remote Override	Direct control, reliable	Needs secure authorization

PROPOSED SYSTEM

The proposed system integrates the following components:

- **Microcontroller (Arduino/ESP32):** Core unit to process control signals.
- **Wireless Communication Module:** Transmits override commands from emergency vehicle to traffic signal controller.
- **Signal Interface Circuit:** Controls the red, yellow, and green lights.
- **Authorization Mechanism:** Ensures only emergency vehicles can trigger overrides.

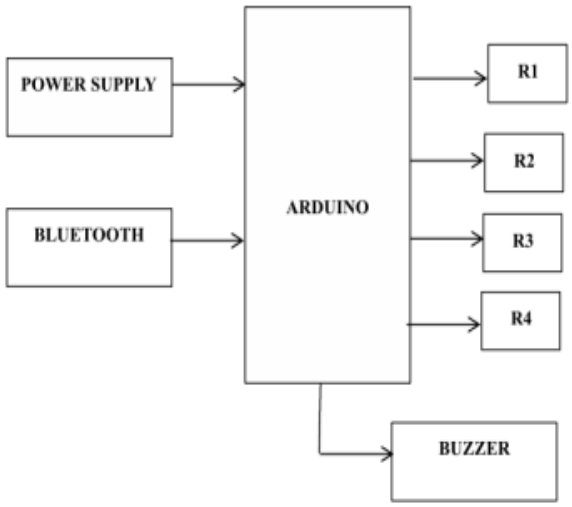

Fig. 1. Block Diagram of Remote Override Traffic Signal System

When an emergency vehicle approaches an intersection, the driver or onboard system sends a secure signal to the traffic controller. The microcontroller overrides the normal signal cycle and immediately provides a green light for the emergency path while setting red for all others. Once the vehicle passes, the system returns to normal operation.

RESULTS AND DISCUSSION

A prototype was implemented using Arduino, RF modules, and LED-based traffic lights. Testing showed that the override system successfully prioritized emergency vehicles without disrupting traffic flow. Response time was under 2 seconds from trigger to light change.

Simulation results indicated that average ambulance travel time across intersections was reduced by nearly 40%. The system proved scalable and adaptable for multiple intersections.

CONCLUSION AND FUTURE SCOPE

The Remote Override of Traffic Signal in Emergency system provides a practical solution to reduce emergency response delays. By enabling real-time traffic signal control, it improves public safety and optimizes emergency response efficiency.

Future Scope: Integration with GPS and centralized traffic management, cloud-based monitoring, and AI-driven priority scheduling for multiple emergency vehicles can further enhance reliability.

ACKNOWLEDGMENT

The authors would like to express gratitude to **Mr. J. Venkatesh, Assistant Professor**, and **Mr. Md. Gandhi Babu, Assistant Professor**, for their guidance and support throughout the project.

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ISSN 2454-8065 **International Journal of Applied Theoretical Science and Technology**
Volume 20, Issue 06, pp01-03 March 2025

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