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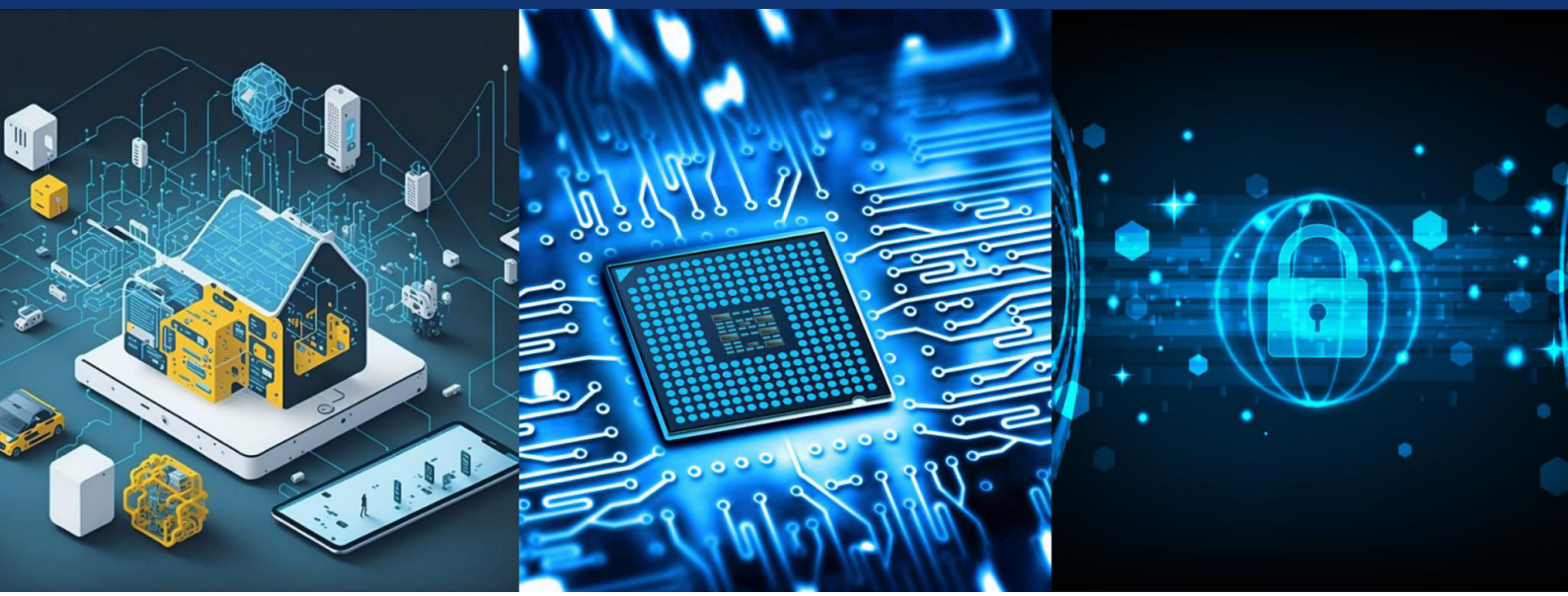

# International Journal of Innovative Research in Computer and Communication Engineering

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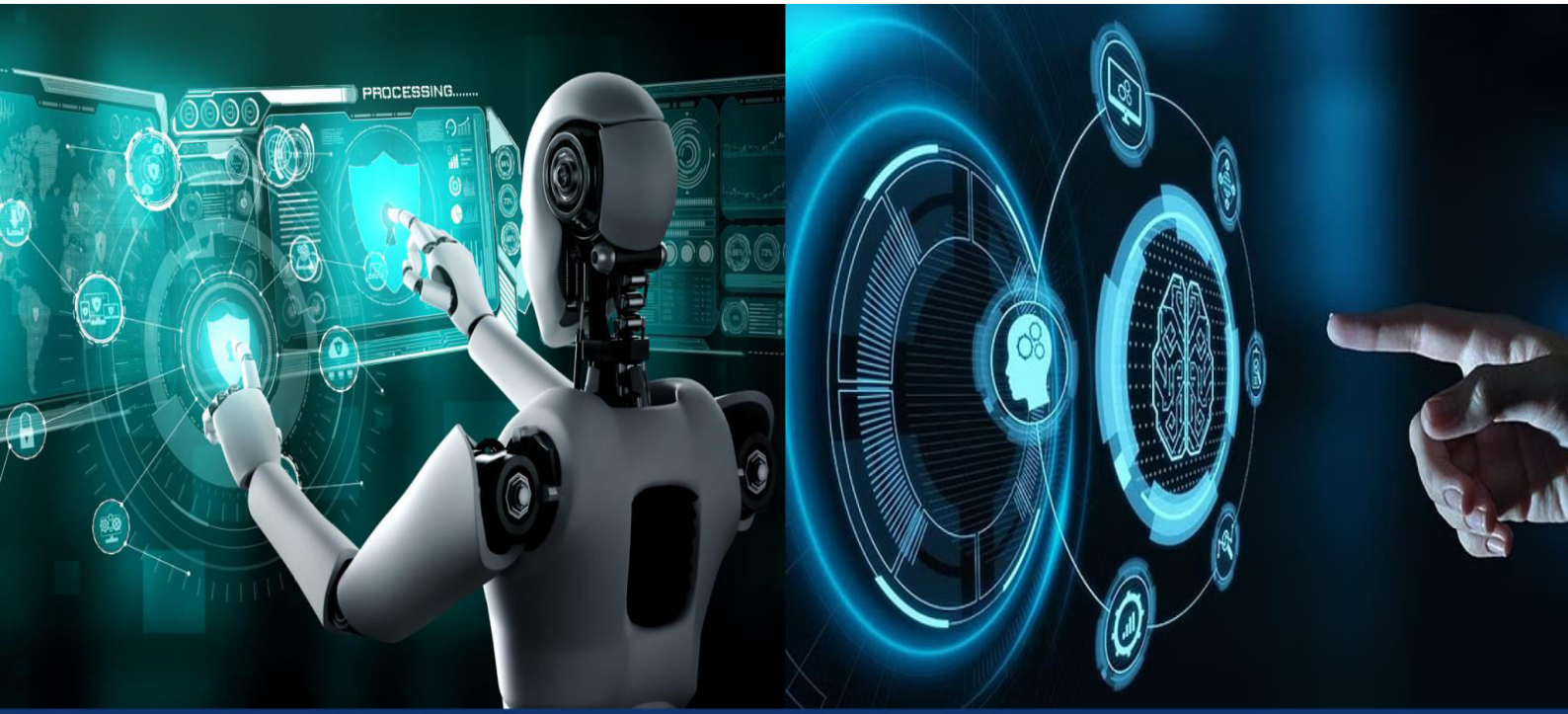


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International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

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# Smart Ambulance Controlling the Traffic Signal with Remote

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**ABSTRACT:** A Raspberry Pi-based Smart Ambulance system that remotely controls traffic signals to reduce emergency response times, ensuring priority passage and enhanced safety. This project proposes a smart ambulance system that utilizes a Raspberry Pi based remote control to manipulate traffic signals, ensuring expedited andsafe passage through congested roads. By leveraging real-time traffic data and IOT technology, our system optimizes ambulance routes and reduces response times, ultimately saving lives.

## I. INTRODUCTION

Emergency response times are critical in saving lives. However, traffic congestion often hinders ambulances from reaching destinations quickly. Our Smart Ambulance system addresses this challenge by enabling remote traffic signal control.

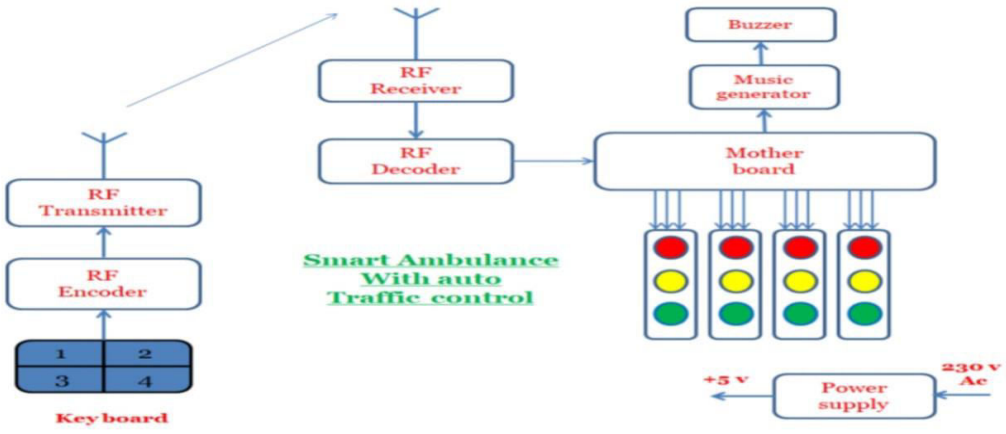
The Smart Ambulance Traffic Signal Control System is designed to prioritize emergency vehicle passage by dynamically controlling traffic signals. This system ensures swift and safe transportation of patients to medical facilities.

## II. LITERATURE REVIEW

The Smart Ambulance's traffic signal control system revolutionizes emergency response, integrating IoT andAI to minimize travel time. This innovation saves lives by optimizing ambulance routes through congested city streets

With its profound social impact, technical expertise, and creativity. Highly recommended for technologists, policymakers, and emergency response professionals seeking innovative solutions to real-world problems Khattak et al. (2016): TSP systems reduce ambulance response times by 15-30%. Liu et al. (2015): GPS-enabled TSP systems optimize ambulance routes and traffic signal timing. Xu et al. (2017): Dedicated Short-Range Communication(DSRC) enables real-time communication between ambulances and traffic infrastructure

## III. BLOCK DIAGRAM



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## IV. HARDWARE REQUIRED ARE

**Ambulance:**

1. Microcontroller (Raspberry Pi/Arduino)
3. Cellular modem (4G/5G)
4. Wi-Fi module
5. Sensor suite

**Traffic Signal Control Unit:**

1. Microcontroller
2. Cellular modem (4G/5G)
3. Relay module

**Remote Control Unit:**

1. Microcontroller
2. Cellular modem (4G/5G)
3. User interface

A smart ambulance system requires specific hardware to control traffic signals remotely. Onboard, the ambulance needs a microcontroller, cellular modem, Wi-Fi module, and sensor suite. The Traffic Signal Control Unit requires a microcontroller, cellular modem, and relay module. A remote control Unit consists of a microcontroller, cellular modem, and user interface. These components communicate via cellular networksand Wi-Fi access points. This setup enables real-time communication between the ambulance, traffic signals,and control centers, prioritizing emergency vehicle passage

## V. HARDWARE DETAILS

***Ambulance Components***

1. Microcontroller: Brain of the system, controlling and coordinating actions.2.GPS Module: Provides location information for ambulance tracking.
3. Cellular Modem: Enables communication between ambulance and control center.
4. Wi-Fi Module: Allows local connectivity for data transfer.
5. Sensor Suite: Monitors ambulance conditions (speed, direction, etc.).

***Traffic Signal Control Unit***

1. Microcontroller: Controls traffic signal changes.
2. Cellular Modem: Receives instructions from control center.
3. Relay Module: Switches traffic signals on/off.

***Remote Control Unit***

1. Microcontroller: Processes user input.
2. Cellular Modem: Sends requests to control center.
3. User Interface: Displays information and receives input.

## VI. SOFTWARE DETAILS

1. Operating System: Manages system resources (Linux/Arduino).
2. Programming Language: Used for coding (Python/C/C++).
3. Communication Protocol: Enables data exchange (MQTT/HTTP).

## VII. ADVANTAGES

1. Reduced emergency response time.
2. Increased patient safety.
3. Improved traffic flow.
4. Enhanced communication between emergency services.

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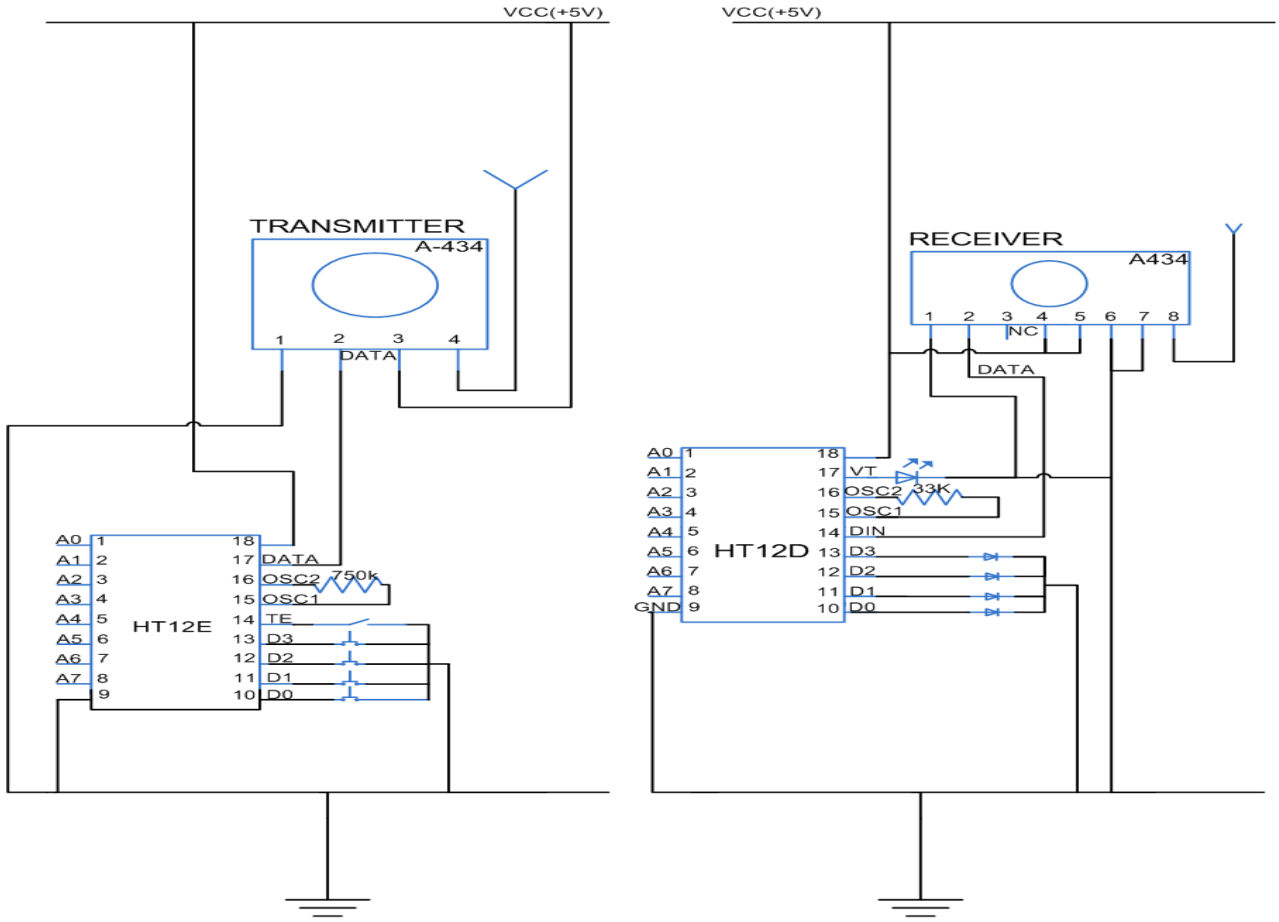
## VIII. CONCLUSION

The integration of smart technology in ambulances has revolutionized emergency medical services (EMS). Byremotely controlling traffic signals, smart ambulances significantly reduce response times, enhance safety, and improve patient outcomes. This study highlights the effectiveness of Traffic Signal Priority (TSP) systems,GPS-enabled routing, wireless communication, and AI-powered optimization

## CIRCUIT DIAGARAM

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