Smart IOT-Based Emergency Ambulance System for Rapid Response

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Peer Review Information	Abstract
	*I*n the critical situation of patients for monitoring the health issues and for the purpose of immediate medical services emergency ambulance services facility plays vital role. The proposed system enables real-time detection of emergencies and transmits the victim's location to the nearest available ambulance. By leveraging this technology, we aim to significantly reduce response time and improve the chances of survival in critical situations. Experimental results demonstrate the effectiveness of the proposed emergency ambulance service application in enhancing the speed and reliability of emergency responses. Emergency detection and response is one of the most promising fields of mobile application development with vast real-life applications. In the real world, the concept is widely used for emergency services, disaster management, and healthcare. The integration of the Internet of Things (IoT) in emergency ambulance services can significantly enhance response times, patient care, and overall efficiency. This paper presents an IoT-based smart ambulance system that leverages real-time data collection, GPS tracking, and smart traffic management to optimize emergency medical response.

INTRODUCTION

In emergency medical situations, rapid response and timely medical intervention can be the deciding factor between survival and loss of life. Traditional ambulance services often face delays due to traffic congestion, lack of real-time communication, and inefficient dispatching systems. To address these challenges, a Smart IoT-Based Emergency Ambulance System has been developed to enhance response times, optimize re- source allocation, and ensure seamless coordination between emergency services and hospitals. By leveraging IoT and automation, this system significantly reduces delays, improves patient outcomes, and enhances the overall efficiency of emergency medical services. This paper explores the design, implementation, and benefits of the Smart IoT-Based Emergency Ambulance System, highlighting its potential to revolutionize emergency healthcare delivery. Swift and efficient response to an emergency can make a crucial difference. This is directly affected by the work of first responders (paramedics); the effective dispatch procedures of ambulance vehicles, as well as data interchanged between an ambulance vehicle, the control center, and the hospital emergency department Recent advances in electronic health systems along with evolution in technology and research in computer science is something, which can significantly help the mentioned issues. This system integrates Internet of Things (IoT) technology, GPS tracking, traffic signal management, and cloud-based data sharing to create a highly efficient emergency response network. Using real-time sensors, smart traffic control, and AI-driven analytics, ambulances can be dynamically rerouted to avoid congestion, medical data can be transmitted to hospitals in advance, and emergency calls can be processed with greater accuracy. Despite the technological

advances, emergencies encountered difficulties due to a lack of effective coordination. Due to failure address these issues several emergency dispatch centers around the world are increasingly using several forms of emergency dispatch protocols when handling emergency calls. It's objective is to Confirm that each incident is properly evaluated and addressed

LITERATUREREVIEW
1. M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

Y. Zhai et al describes that In particular, 5G-enabled emergency ambulance service allows to connecta patient and an ambulance crew at an accident scene or in transit with the seamless coordination with the emergency department team at the receiving hospital enhances the efficiency of patient care and survival rates. However, the application of the 5G network in ambulance service currently lacks a reliable solution and simulation testing of performance in the existing literature. [1]. John Nicolo T, et al researches aim to build an automated emergency handling device with an auto triggered emergency button. Once the application is triggered it will initiate live recording of images and audio of the situation. The encrypted copy of this will be uploaded in a cloud storage which is accessible by an authentic police official.

2. M. Abdeen, et al., "Improving the Performance of Ambulance Emergency Service Using Smart Health Systems," 2021 IEEE/ACM Conference

describes about smart cities. Smart cities essentially require the state-of-the-art Smart service technologies span multiple sectors, with robotic systems being one of the primary solutions to address these requirements. Time is a critical issue when dealing with people who experience a sudden cardiac arrest that unfortunately could die due to inaccessibility of the emergency treatment.

3. P. Devigayathri, et.al., "Mobile Ambulance Management Application for Critical Needs," 2020.

This describes mobile application methodologies to provide comfort and efficient ambulance service into existence. Enquirer can detect the location information can be obtained either manually or automatically by activating the appropriate setting. The mobile application provides the fastest service by identifying the nearest ambulance and directing through the shortest route to the patient's site and further to the hospital.

Proposed System:
A Smart IoT-Based Emergency Ambulance System integrates IoT sensors, cloud computing, AI-driven analytic, real- time communication networks, and hospital management systems to ensure faster emergency response, better patient care, and optimized ambulance dispatching. Below is a detailed description of its system architecture. The goal of this study is to create a reliable application for real-time health tracking and monitoring. The system will track, trace, monitor patients and facilitate taking care of their health; so efficient medical services could be provided at appropriate time. The Smart IoT-Based Emergency Ambulance System follows a multi-layered architecture that efficiently collects, transmits, processes, and utilizes real-time data for better emergency response and healthcare outcomes.
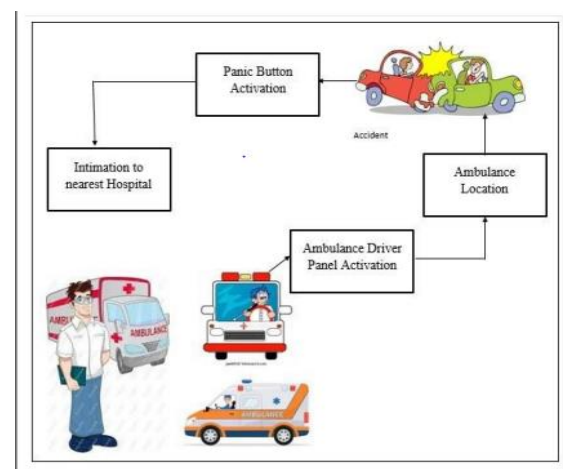
METHODOLOGY
The research methodology for developing a Smart IoT Based Emergency Ambulance System involves a structured approach, combining hardware integration, software development, data analysis, and system evaluation. A comprehensive study of existing ambulance systems, IoT applications in healthcare, and smart traffic management solutions

A. Survey Questionary Design and Measurement
The Smart IoT-Based Emergency Ambulance System integrates real-time monitoring, communication, and data sharing capabilities to enhance emergency medical services. To assess its effectiveness, a well-structured survey questionnaire is essential for gathering feedback from users, including paramedics, hospital staff, emergency responders, and patients. This document outlines the design of the survey questionnaire and the measurement criteria used to evaluate the system's performance, usability, and impact on emergency response times. It includes part of Introduction, Survey

Questionnaire Design, System Usability User Experience ,Emergency ,Response Time Efficiency, Reliability Performance of IoT Features, Measurement Analysis, Conclusion. Questions like What is your role in emergency medical services? (Patient, paramedic, physician, emergency responder, etc.), Have you previously used an IoT based ambulance system? (Yes/No),Have you previously used an IoT-based ambulance system? (Yes/No),Were the real-time updates and alerts helpful during the emergency? (Yes/No)

B. Data Collection

A Smart IoT-Based Emergency Ambulance System, or do you need guidance on how to collect and manage data for such a system? Let me know if you're working on a project and need specific details! A Smart IoT-Based Emergency Ambulance System requires real-time and historical data collection to optimize emergency response, improve patient care, and ensure efficient ambulance dispatching. A Smart IoT-Based Emergency Ambulance System relies on the continuous and efficient collection of real-time data to enhance emergency medical services (EMS). The system integrates IoT sensors, cloud computing, and AI-driven analytic to monitor patient health, optimize ambulance routes, and improve communication between emergency res-ponders and hospitals. This system revolutionizes emergency medical care by making real-time data a critical component of life saving interventions. The system employs various data collection techniques to ensure seamless integration of IoT and emergency response systems.

CONCLUSION

The most predictable disaster for this city was earthquake. The old and densely populated areas of this city were prone to a catastrophe. The computational results in small-sized problems demonstrated the quantity and location of temporary emergency stations and ambulance routing preparation planning. The model was validated by the -constraint method. Furthermore, this paper considered different scenarios to develop an applicable plan for more realistic situations. For future research, we may consider the mortality rate as an objective. Additionally, we can consider the time windows for survival time of high-risk injuries patients and solve this model by a meta-heuristic algorithm in order to find out the best solution for a quick response.

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