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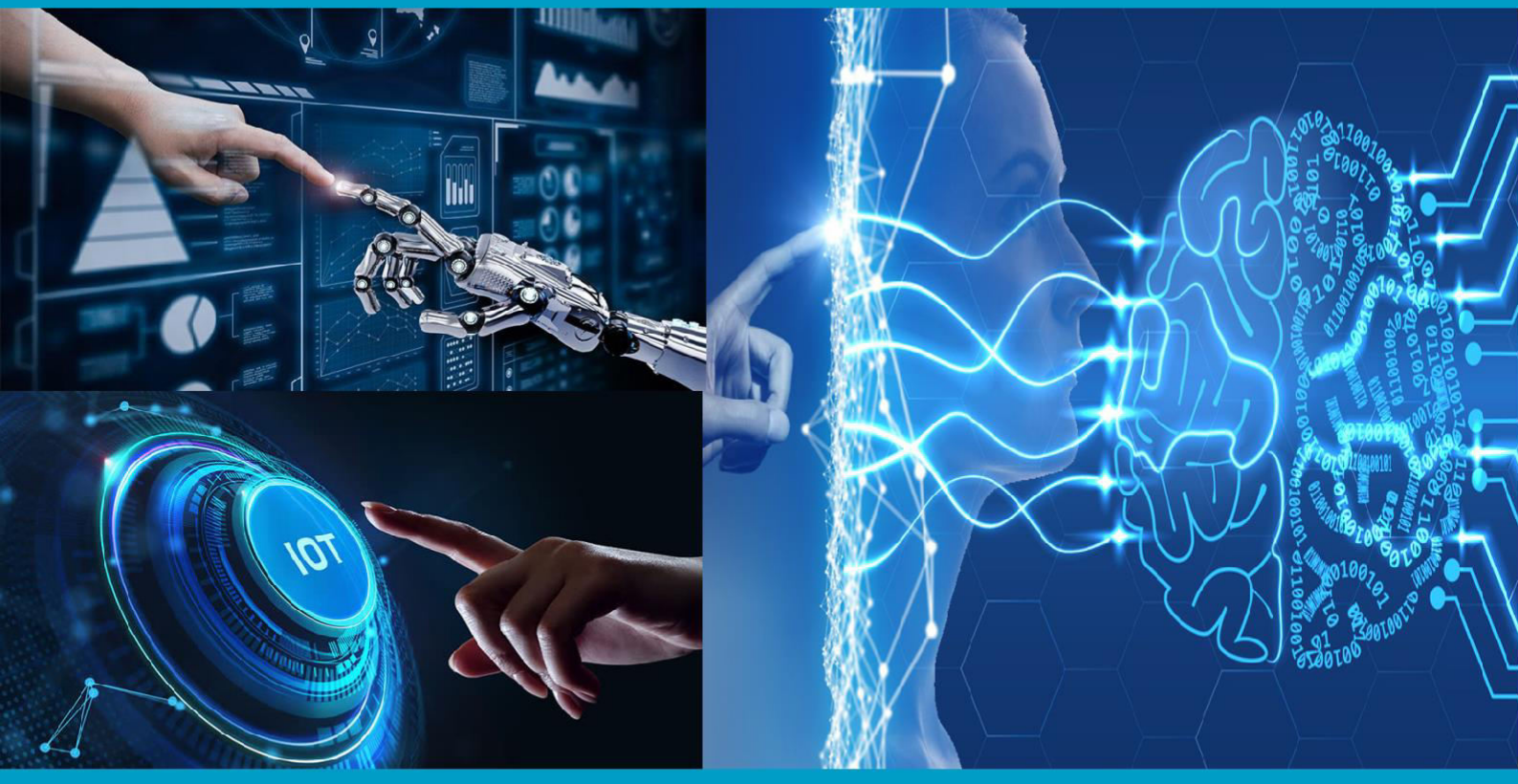

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Intelligent Traffic Control System for Ambulance Tracking Using RFID

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ABSTRACT*:* In this study, the issue of traffic congestion poses a significant hurdle for emergency response teams, especially for ambulances rushing through congested roads to reach urgent medical cases promptly. To address this challenge, researchers propose an Intelligent Traffic Control System (ITCS) leveraging Radio Frequency Identification (RFID) technology. This system aims to streamline ambulance navigation and prioritize their movement through traffic. The ITCS incorporates RFID tags installed on ambulances and at crucial intersections, enabling real-time tracking and communication between ambulances and traffic control infrastructure. When an emergency call comes in, the ITCS identifies the closest available ambulance and adjusts traffic signals dynamically to facilitate its swift passage through intersections, thus reducing response time. Moreover, machine learning algorithms are employed to forecast traffic patterns and optimize ambulance routes for efficient navigation. Through both simulation and real-world deployment, the proposed ITCS shows promising outcomes in curtailing ambulance response times, bolstering emergency medical services, and potentially saving lives during critical situations.

I. INTRODUCTION

In today's world, traffic congestion poses a significant challenge to emergency response services, especially when ambulances need to navigate busy roads to quickly reach critical medical emergencies. To tackle this problem, researchers have come up with an innovative solution called Intelligent Traffic Control System (ITCS), which uses Radio Frequency Identification (RFID) technology. The system is designed to optimize ambulance navigation and prioritize their passage through traffic. By placing RFID tags on ambulances and major intersections, ITCS enables real-time tracking and communication between ambulances and traffic control infrastructure. When an emergency call comes in, ITCS identifies the nearest available ambulance and adjusts traffic signals in real-time to help it move quickly to the intersection, thereby reducing response time. Additionally, advanced machine learning algorithms are used to predict traffic patterns and optimize ambulance routes for efficient navigation. Through simulations and real-world testing, the proposed ITCS has shown promising results in reducing ambulance response times, improving emergency medical services, and potentially saving lives. in critical situations. This paper explores the details of this innovative system and its implications for enhancing emergency response capabilities.

s The number of deaths has increased to a great extent due to the delay in the arrival of emergency vehicles. So emergency services like ambulances and fire engines should be on time to avoid loss of human life. In the current traffic situation, therefore, it is very important to help the emergency vehicle out of the traffic jam. To solve the above problems. In this paper, we have come up with a 'Smart Ambulance and Traffic Controlling System'. The main purpose of this device is to allow the ambulance to reach a certain location without having to stop somewhere before reaching the destination.

II. LITERATURE SURVEY

1. Paper Name: Intelligent Traffic Signal Control System for Ambulance Using RFID and Cloud
Author: B. Janani Sarada, G. Vijayashree
Description: Traffic congestion is a major problem in bustling cities like Chennai, especially for critical services like ambulance operations. To solve this issue, this paper presents a solution called "Intelligent Automatic Traffic Control for Ambulance Using RFID and Cloud". The proposed system consists of an Android application that links ambulances to traffic signal stations through a cloud network. It leverages RFID (Radio Frequency Identification). technology for implementing intelligent traffic signal control. Here's how it works: If an ambulance stops at a traffic signal, the RFID installed on the signal detects the ambulance's RFID tag and sends this information to the cloud. Once the user (ambulance personnel or traffic control) confirms through the mobile application, the signal turns green for the ambulance to pass. Afterwards, it returns to its regular order. In a fully automated setup, the system detects ambulances, controls traffic lights accordingly, and delivers valuable savings. Time during the crisis. Ultimately, this project could save lives by speeding up the movement of ambulances through traffic jams.

2. Paper Title: Intelligent Traffic Management System for Smart Ambulance
Author: Deepali Ahir, Saurabh Bharade, Pradnya Botre, Sayali Nagane, Mihir Shah.
Description: The growth of industrialization and urbanization has led to an immense increase in population, which always leads to an increase in the number of vehicles on the roads. The resulting traffic jams and congestion are major obstacles for emergency vehicles such as ambulances transporting critical patients as these emergency vehicles are unable to reach their destination on time, resulting in loss of lives. Apparently, to solve this problem to some extent, we came up with an "Intelligent Traffic Control System (ITCS) for Ambulances". The proposed system clears traffic congestion by turning all red lights on the ambulance's path to green, thereby helping to clear traffic and providing a path to the destination. The system consists of an Android application that registers the ambulance in its network. In case of an emergency, if the ambulance stops on its way, the application will send an emergency command to the traffic signal server as well as the direction it wants to go along with the current location using GPS (Global Positioning System). The nearest signal is identified based on the ambulance's current location. That particular signal turns green until an ambulance passes by and later regains its original flow of control. In this way, it works as a rescue project as it saves time in an emergency by controlling the traffic lights.

3. Paper Name: A Novel Approach Using Intelligent Traffic Control System for Smart Ambulance
Author: Saurabh Bharade, Pragya Bothre, Sayali Nagne, Mihir Shah
Description: In densely populated cities, traffic congestion is a major headache, leading to traffic jams that can disrupt essential services such as ambulance operations. To deal with this problem, this paper presents a solution called "Intelligent Automatic Traffic Signal Control for Ambulance". This system uses RFID (Radio Frequency Identification) technology to implement smart traffic signal control. Here's how it works: When an ambulance is stuck in traffic, an RFID reader at a traffic signal detects its RFID tag and sends this information to a central controller. The controller, connected via the cloud, communicates with both the ambulance and the traffic signal station via an Android app. Once verified by the app, the traffic signal turns green specifically for the ambulance, allowing it to pass easily. Once the ambulance clears the intersection, the signal returns to its normal order. By speeding up the movement of ambulances in congested areas, especially during emergencies, the project serves as a lifesaver by managing traffic lights efficiently and reducing response time.

4. Paper Name: A Review: Smart Ambulance and Traffic Controlling Systems
Author: Sudhakara HM, Girish HR, Kumara Swamy NR, J. Vinay Kumar and Sachin Kumar. like this
Description: India, being a developing country with a rapidly growing population, faces the challenge of increasing traffic congestion due to the increasing number of vehicles on the roads. This congestion often makes it difficult for emergency vehicles like ambulances and fire engines to reach their destinations promptly, especially during peak hours. In the existing literature, limited attention has been paid to ensuring clear routes for emergency vehicles. To solve this problem, a system based on RFID technology is proposed. The proposed framework is modeled by means of an experimental setup using an Arduino and an LED display that simulates real-time. Traffic view.
5. Paper Name: Energy Efficient Multi-Hop Routing Techniques for Cluster Head Selection in Wireless Sensor Networks
Author: G. Hemant Kumar, G.P. Ramesh and C. Rabindra Murthy
Description: Sensors usually operate on battery power, which limits energy consumption. Energy-efficient optimization algorithms allow nodes to be used smartly without wasting battery consumption. A hierarchical routing protocol is a best-recognized protocol for improving power consumption in wireless sensor networks. LEACH protocol does not take into account the remaining energy of a node when selecting a cluster header, it is possible to select a node with slightly lower energy as a cluster header. Thus, the cluster formed by this low-energy node will terminate prematurely and waste the entire network resource. ILEACH is one of the best measured among them. To improve the service life, sensor nodes with high residual energy and a short distance from a base station (BS) are selected as cluster head (CH) nodes. Then intelligently manage these nodes to form clusters to maximize the lifetime of the WSN and minimize the average energy consumption. TDMA protocol is used for intra-cluster communication. In this article, we propose an improvement of the ILEACH protocol Traffic view.

6. Paper Name: Review of Smart Traffic Management System for Ambulance
Author: Deepika Sarpal, Yatharth Asthana, Dr Malay Kumar Hota
Description: Traffic congestion is a significant problem in major cities across India. It leads not only to the likelihood of accidents but also to delayed emergency responses, resulting in loss of life and property. According to a Times of India report, a staggering number of people lost their lives in road accidents in 2016, with a significant proportion of deaths due to ambulance delays. Moreover, data suggests that more than half of heart attack cases reach the hospital late due to traffic congestion. Despite efforts to ease traffic congestion, the situation continues to worsen, creating roadblocks for emergency vehicles and causing further delays in reaching their destinations. To solve this problem, various techniques have been used to improve the traffic management system for emergency vehicles, to ensure that

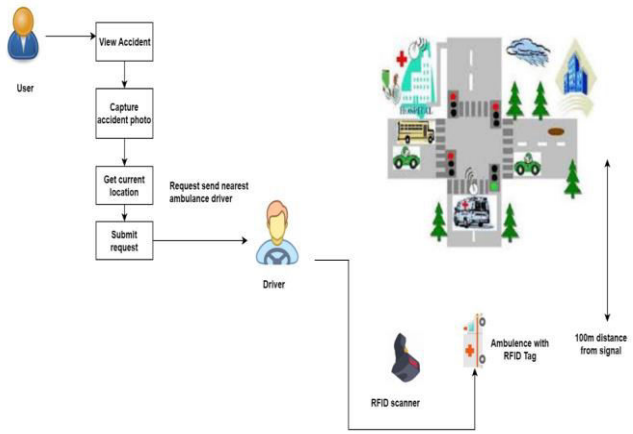
they reach their destination faster. One approach involves leveraging IoT-based systems to optimize routes in real-time, taking into account factors such as traffic flow, road conditions, and emergency vehicle locations. By integrating cloud technology, these systems can provide up-to-date information and suggest the most efficient routes to emergency responders. In addition, advanced algorithms, such as image processing and fuzzy logic, can be used to locate an ambulance in the midst of traffic. These algorithms analyze images captured by surveillance cameras or other sensors to identify emergency vehicles and prioritize passing through traffic. By combining these technologies and strategies, we can increase the efficiency of emergency response systems, reduce response times and ultimately save more lives.

7. Paper Name: Traffic Control System using RFID Technology
Author: Ameeth R
Description: In highly congested cities like Chennai, traffic jams often hinder the movement of ambulances, potentially delaying critical medical care. To address this issue, a proposed solution called "Intelligent Automatic Traffic Control for Ambulance" has been introduced. This system involves the development of an Android app that connects ambulances with traffic signal stations through a cloud network. It utilizes RFID (radio frequency identification) technology to implement intelligent traffic signal control. Here's how it works: When an ambulance encounters a red light, RFID tags installed at the traffic signal detect the ambulance and transmit this information to the cloud. Once the ambulance is identified, the app notifies the user (the traffic signal operator or administrator) who can then remotely change the signal to green, allowing the ambulance to pass through. After the ambulance has passed, the signal returns to its original sequence. This entire process is automated, meaning the system identifies the ambulance, adjusts the traffic lights accordingly, and saves time during emergencies. By efficiently managing traffic lights in response to ambulance movements, this system aims to ensure swift passage for emergency vehicles, potentially saving lives by reducing response times in critical situations.

8. Paper title: Development of Smart Signaling for Emergency Vehicles
Author: Muhammad Hameed Siddiqi, Madallah Alruwaili,˙Ilhan Tarimer, Buse Cen net Karada ˘g, Yousef Alhwaiti and Faheem Khan
Description: As cities grow and more vehicles hit the roads, traffic jams become a common problem. Traffic lights help control the flow of traffic at intersections, but they also contribute to long lines of vehicles, causing delays and various problems. One significant problem is that emergency vehicles such as ambulances, fire engines, and police cars struggle to reach their destinations quickly, even with traffic priority. Emergency services need to reach their destinations quickly, but traffic jams often impede their progress. In response to this challenge, a solution was developed in this study. It involves creating an app that prioritizes these emergency vehicles and allows them to move through traffic more efficiently. The goal of this solution is to solve the problem of time lost during emergencies caused by traffic jams by providing a way for emergency vehicles to reach their destination faster.

III. SYSTEM ARCHITECTURE

A system architecture is like a blueprint for a building—it outlines how the various components of the system will work together to achieve their goals. It defines the structure and behavior of a system in a way that allows us to understand and reason about how it works. Think of it as a formal description of a system organized in a way that helps us understand its structure and behavior. This description usually includes details about the various components and subsystems that make up the system and how they interact with each other. To make it easier to describe system architectures, efforts have been made to develop formal languages specifically for this purpose. These languages, collectively known as architecture description languages, provide a standardized way to represent and communicate the architecture of a system. They help ensure clarity and consistency when describing complex systems.



➢ **Software requirements**

- IDE: Android Studio
- Database: FireBase
- Language: Kotlin and Java

➢ **Hardware requirements**

- Devices: RFID reader, RFID tags, and Android phone
- Memory: 1 TP
- RAM: 8 GB

IV. CONCLUSION

In summary, an Intelligent Traffic Control System (ITCS) for ambulance tracking is like a smart helper for ambulances in busy cities. It uses a special technology called RFID to keep track of the ambulance as it moves around. This helps the traffic control centers know where the ambulances are and allows them to get through the traffic lights quickly when there is an emergency. There is also a handy phone app for ambulance drivers. It helps them take pictures and track their location, so they can quickly share important details with dispatchers and doctors. ITCS also looks at real-time traffic data to find the best route for ambulances and ensure they don't get stuck in traffic jams. This means that ambulances can reach people in need faster, which is really important during an emergency. Overall, ITCS is like a superhero for ambulances, helping them get where they need to go quickly and safely and ensuring people get help when they need it most.

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