AUTOMATIC ROUTE CLEARANCE FOR AMBULANCE

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Abstract

For densely populated urban areas like Chennai, traffic congestion becomes a significant problem. One of the key services that is impacted by traffic bottlenecks is the ambulance service. The use of "Intelligent Automatic Traffic Control for Ambulance" is suggested in this article as a means of enhancing ambulance mobility. The suggested method creates an Android application that connects the traffic signal station and the ambulance over a cloud network. Due to the traffic these days, picking up the patient from the scene of the incident and transporting him to the hospital takes a lot of time. There isn't a special system that provides information about the traffic on the way to the hospital. In India, there is a set amount of time between signal changes, and there are no exceptions for emergency vehicles. The ambulance lacks a traffic control system. An ambulance must wait several minutes for clearance whenever it comes to a specific intersection with a traffic signal. Many deaths could result from this in our nation. The focus of this project is finding solutions to this important problem. Therefore, the situation mentioned above will get worse in the future.

1 Introduction

The primary goal of the paper is to provide a smooth flow so that the rescue may arrive at the medical facilities in time, hence minimizing the delay brought on by traffic. When it reaches a traffic control junction, the RFID system with a microcontroller is used to change the traffic pattern, potentially saving lives at a critical moment. Tiny electrical devices used for radio frequency identification are made up of an antenna and a tiny chip. The tiny chip contains information about the patient’s status as well as the current ambulance lane. The RFID locator installed at the rescue is checked out by the RFID viewers at the traffic light. By using a smartphone application registered by the rescue driver, we cross-reference the ambulance’s current location and perseverance problem to...
avoid needless traffic signal changes. In the event of a network failure, RFID assumes total control. This document seems to have a great necessity for making the free circulation of rescue without becoming caught in traffic. Transporting a patient to a medical institution in an emergency case may appear simple in the current context, but it can be very challenging during rush hours. Furthermore, the problem is made worse when emergency vehicles must wait for other vehicles to make a turn at junctions with traffic signals. According to the study, if the ambulance can arrive at the hospital at this time without becoming caught in traffic, 95% of cardiac arrest cases can be treated. Future repercussions could be severe. For this reason, recovery measures must be performed right away. Therefore, there is a real need for this paper for society to facilitate regular transit in light of our overly prosperous environment. With the aid of this paper, emergency vehicles will be less likely to become backed up in traffic and will be able to receive quick relief. To reduce the risk of traffic congestion, mounting the paper has two main objectives: to offer communication between ambulances and various instruments at traffic signals. Road traffic management has truly developed into one of the biggest problems in today's society. One of the biggest problems that cities experience is traffic. The middle class and growing urban population both significantly contribute to the rising number of lorries in the cities. One of the primary problems in cities like India is traffic congestion, which ultimately leads to slow-moving traffic that extends travel times. Rescue vehicles getting stranded in traffic jams has frequently led to fatalities due to a lack of effective traffic administration and control. Because of inadequate road planning and infrastructure, Indian cities cannot imagine having distinct lanes for emergency purposes. The need for the hour can be used as an alternative remedy in cases where people's lives depend on the prompt arrival of ambulances at the medical facility. One drawback of implementing a separate emergency lane system is that it will always be underutilized in addition to being extremely expensive. It is a fixed system, and we don't provide solutions in real-time using fixed approaches. This lane is not always useful, nor is it a sufficient system. Additionally, this approach reduces the width of the route for normal traffic, which will result in inconvenience and traffic congestion. There are numerous instances where rescue was caught in heavy websit and had to wait for anything from a few minutes to several hours to clear the load. A person may die if therapy is not received at the appropriate time. To eliminate this hazard and save many lives, [1] This article recommends a novel design that eliminates the need for the rescue going path and allows for one-course clearance. This situation is made possible by a new technology called the ...
Internet of Points, in which the peripherals are connected to the Internet and may be controlled remotely from some other location. Given that the entity that represents itself digitally elevates itself beyond the items by itself, this is extremely valuable. Due to increased urbanization, automation, and population, managing traffic on the roads has become a major problem in today's culture. There has also been a significant increase in traffic. Many issues come along with a rise in web traffic, including traffic jams, accidents, and breaking traffic laws at busy traffic signals. In turn, this hurts the nation's economy and leads to the loss of life. Therefore, the problem mentioned above will undoubtedly get worse in the future. The management of website traffic involves the use of traffic lights extensively. The signaling devices known as traffic lights are used to control the flow of traffic on the road and are placed at crosswalk indicators. The first traffic lights were established in London in 1868, and today they are seen in many cities all over the world.

The majority of traffic control operations follow a set timing circuit. Even though there may or may not be online traffic, at some point, the lorries on the red-light side must wait for the green signal. It wastes crucial time. In big cities, traffic control at intersections is a source of worry. Numerous tests have been carried out to make the series of traffic lights dynamic so that they respond to the current volume of traffic. Many of them employ sensing units to estimate the amount of website traffic currently present, however, this approach is limited in that it relies on vehicle inspection and addresses an emergency. Automobiles like regular cars have no care for ambulances, fire trucks, or limousines. As a result, emergency trucks waste crucial time and become stalled at traffic lights. Very few systems are currently widely available that are helping rescuers navigate through traffic or road signs.

2 Literature Survey

Anuran Chattaraj, Saumya Bansal, and also Anirudha Chandra, 2009. RFID-based smart website traffic monitoring system. Traffic signals are equipped with RFID tags and RFID tags are installed on vehicles to count the number of trucks. The microcontroller changes the green signal to one of the busiest lanes depending on the situation, thus lowering website traffic. However, the RFID visitor's analysis range limits the system's performance, and it is also without any kind of safeguards for emergencies like the death of a rescuer [2].

2015's "Layout of Intelligent Traffic Control Controller" by J. R. Latha and U. Suman. It is equipped with an input switching matrix, a microcontroller for system management, a GSM interface for communication goals, a serial user interface (SCI), a...
Real-Time Clock 1307, and a clock circuit that detects site traffic based on their signal and also appropriately changes the signal. When determining website traffic, the signal from the sensing gadget is significantly more precise. However, because they stop contrasting website traffic at greater distances, they are less trustworthy.

A New Method for Intelligent Traffic Control System Using Raspberry Pi, P. Nandini Kiran and Suraya Mubeen, 2017. To ensure that online traffic moves effectively, a smart website traffic monitoring system is used. Each car has an RFID tag installed inside it that is designed to be unaffected by removal, damage, or manipulation. To inspect the RFID tags that are installed within the truck, use the on-chip RFID visitor. The system's tracking of the vehicles that pass the signal is used to control network congestion by adjusting the length of the overloaded course's green signal period. However, the RFID Reader does limit its range.

Blue Light Issues in the Design of Metro Area Rescue Wheelchair [4] Marcus Poulton, Anastasios Noulas, and others, 2018. Using information from previous incidents as well as a cosmopolitan model, an improved navigation course is developed. This standard will undoubtedly be used in the ambulance's navigation in the future. This makes getting the rescue squad to the nearby hospital much easier. However, it can only make a small contribution to the rescue effort because it lacks the requisite infrastructure to handle unforeseen spikes in website traffic on the current trajectory.

Tracking website traffic with a smart RFID chipless device [5]. Stevan Preradovic and Nemai Karmarkar, 2011. Additionally, operating in the UWB band, this expensive chipless RFID technology enables the communication between the RFID visitor and its tags, which are chipless and have no other power source than a battery. This program has the potential to improve online traffic flow, navigation, and road safety while doing it efficiently. Nevertheless, the chipless RFID tag could still sustain Electro-Static Discharge (ESD) [6].

Priyanka Nalawade, Prajakta Waghere, and colleagues' RFID Innovation-Based Dynamic Traffic Control System [7] was published in 2017. This strategy makes use of current RFID technology. After the RFID tag has been placed inside the vehicle, the system's RFID visitor will check the RFID tags within the vehicle as it reaches the intersection of internet traffic. According to the data gathered, the signal is controlled by the variety of vehicles in the area and sends out a green signal. This system emits a green signal for emergency vehicles, such as police cars, ambulances, and so on, in the event of an emergency. It is simple to map stolen autos using this technique. However, the altered emergency vehicle signal only becomes active when it is close to the RFID tag reader.

Rajeshwari S., Santhosh Hebbar, and Varaprasad Golla (2015) created a smart traffic...
control system for blockage control, rescue clearing, and stolen car discovery. RFID is used to both turn the signal green and find the rescue squad. This tactic would be futile if the ambulance contained a sign that was farther from the RFID visitor's reading range, even if RFID measurements were more precise. Using RFID and the cloud for intelligent traffic signal control for rescue. 2017 B. Janani Saradha et al. The traffic light that monitors ambulances and has RFID tags implanted was designed to reduce web traffic along the ambulance's route. The user is compelled to ask that a certain signal be temporarily turned more environmentally friendly through the smartphone app. The traffic signals are under the supervision of this system, which greatly helps in an emergency by buying time. As a result, by facilitating the rescue effort, it can successfully save a life. However, it is not automated and depends on human input. 2010 saw the founding of the Intelligent Cross-Road Traffic Administration System (ICRTMS) by Mohamad M. Eassa, Bahaa K. Saleh, and Ahmed S. Salama. To alert of an emergency, this system uses scattered long-range photoelectric detecting devices that are placed close to traffic signals. RFID-based active development is the driving force behind it. It may be set up to work immediately, with or without assistance. Urban Web Site Web Traffic Details Maintained by RFID-Based Tracking [10] 2009; Yaying Zhang. Using RFID viewers installed near and at road crossings, moving passive RFID-tagged trucks can be placed in this system to increase and forecast traffic. It is simple to understand how the city's motorways are organized according to the characteristics of the different vehicles. However, one must prevent the collision of several RFID visitor difficulties to maintain the stability of the website's web traffic evaluation data.

3 Proposed System

The problem of controlling traffic lights can be solved by an RFID-based system. Using this method, we may take into account the relative importance of different types of vehicles as well as the volume of traffic by deploying RF readers at intersections. A method called radio frequency recognition makes use of radio waves to identify objects. The RFID is utilized as a remote to control the traffic signals if the Rescue encounters any traffic jams along the journey. The specific signal is turned green for a predetermined period, then returns to its original flow of a sequence of signals. Special Radio Frequency Identification tags are installed in every individual car, and RFID readers are used to scan the tags that are affixed to the car. Because the passive tag has a lengthy life, we use the easy tags below. RFID technology analyses emergency and non-emergency circumstances, preventing...
unecessary traffic jams. Transceivers are used to communicate between the ambulance and the traffic signal post. If the invention fails to provide its service, there is no cross-verifiable method or backup system to control traffic signals.

4 Working Methodology

In India, a developing nation, population growth is severely hampered. With an increase in population comes an increase in traffic-related issues, such as accidents, congestion, and moving violations at busy traffic signals. Because of this, in addition to resulting in casualties, this hurts the economy of the nation. Since separate lanes were not constructed in India, all of these things occur. The first traffic signal was introduced in London in 1868, and it started to be utilized with many other city systems after that. To avoid these issues, we have suggested an RFID-based auto system for this work. Using an RFID reader and also transmitter, information from the emergency vehicles is collected and also sent to the signal locations. If your car is stolen, the RFID tags already present in it are compared, and if they match, a red light will blink as the car approaches the signal point, alerting us that the car is taken and also informing the police station of the location of the car and also anyone who emerges from it.

Fig. 1  Block Diagram of RFID-Based System

An RF transmitter is used to send emergency rescue vehicles and cars can go through the traffic lights. An RF transmitter is built for each of the 4 traffic signal approaches. When someone damages one side of an RF transmitter, such as when an ambulance approaches a traffic signal. The traffic light immediately switches to an environmentally friendly signal. The Traffic Signal is followed by the rescue after that. In this project, we proposed a new method to lessen website traffic for assistance at the traffic signal that transcends, runs more quickly, and also is superior. It is proposed to use a creative technique to reduce traffic congestion and unwanted downtime.
which uses both RFID tags and RFID visitors, is one such cutting-edge technology that we used in our assignment. This RFID tag is attached to the ambulance, and there are observers at the traffic control. The audience members look at the tag and gather input information as the rescue gets closer to the traffic signal. Use an Arduino Processor Kit to implement the strategy as well as change the traffic signal from red to green and let the rescue vehicle through while it is green.

5 Result And Discussions

The figure below illustrates the prototype configuration. The traffic clearance system's hardware setup module is visible here. The Arduino module serves as the main central source and receiver in the project, which controls the traffic light. The hardware setup's 5-volt power requirements. The output module LED serves as the traffic signal for the 433 (MHz) radio receiver.

Fig. 2. Traffic Clearance System

The traffic system’s implemented output is powered on. The Arduino Module uses an RF receiver antenna to achieve this and control the traffic lights. In order to demonstrate how the traffic system works, the traffic light is often designed to shift from red to green every 10 seconds. Any traffic light should turn green to provide room for an ambulance or other emergency vehicle once the RF receiver has received the data. Four switches in the RF system’s transmitting area show the information for the ambulance’s traffic signal. This RF transmitter is mounted on an ambulance rescue truck. We maintained four switches as a prototype to demonstrate the four directions of north, south, east, and west. In the RF system, 011 (2023) E3S Web of Conferences 430, 01169 (2023) ICMPC 2023
https://doi.org/10.1051/e3sconf/202343001169
transmitter area, one switch denoted one traffic direction. If we click the first button, data will be sent to the receiver regardless of which traffic light is active, and the associated traffic signal will automatically display green.

Fig. 3. RFID Tags and Visitors

In this variation, RFID tags and visitors can collect data from the rescue when they are fastened to the rescue. This input causes a response in the RFID users at the traffic lights. We use four RFID tags and four RFID Visitors at the traffic lights. When help is needed for the traffic signals, the visitor verifies the input from the tag and also sends it to the Arduino Microcontroller. An Arduino microcontroller (ATmega2560) collects and analyzes this input data before producing the output by switching the LED lights from Red to Green based on the exact road where the rescue vehicle is stopped at the traffic signal.

6 Conclusion

In this work, we're going to build an Arduino-based traffic management system with computerized signal clearance for the emergency vehicle using an Arduino Huge, an RFID Component, and an IR Sensing system. The system could quickly handle the replacement software for the Arduino CPU Set, and the rescue truck could also travel effectively away from the traffic light. The system aims to offer far better adaptability to control web traffic. The Automatic Traffic Signal Control System helps to cut down on urban traffic and the amount of time it takes to travel during rush hour. Additionally, this approach helps the ambulance and rescue vehicles get to the hospital without becoming stuck at a traffic light. When switching the traffic signal to the optimal internet traffic line, where the RFID visitor reads out the Rescue RFID tag, this version encounters a delay. Utilizing portable CPUs with fast processing rates, like the Raspberry Pi, can prevent this. The improvement version must now feature handling two traffic lines when another rescue at the same junction requires traffic clearing.
References


[6] Stevan Preradovic and Nemai Karmarkar, October 2011. ISSN Information: Print ISSN: 1045-9243


