



Smart Traffic Control System For Ambulance

Prof. Raju Ratan Pawar, Prof. Sourabh Anil Patil

Head Of Department, Lecturer

Brahmdevdada Mane Polytechnic, Belati, Solapur.

1. Abstract:

India is a developing country, and the population of India is significantly growing. India stands within the 2nd place in the world in terms of population. As there will be an increase in population gradually there will be increased in the number of vehicles, due to which the traffic congestion increases and because of which emergency vehicles like ambulances, fire engines, etc. face difficulty in reaching their destination in time. Under these circumstances, a promising system that can clear the traffic signal, especially in peak hours, and thus provide a safe route for emergency vehicles is extremely important. In existing literature, there's less focus shown on the emergency vehicles to clear the trail, to overcome this issue a system is proposed by using this technique we will manage and regulate the traffic signals at the junction which emergency vehicles approach. Thus there'll be easy passing out for the emergency vehicles in traffic congestion. The proposed framework is modeled by means of an experimental setup using Arduino and LED displays which simulate a true-time traffic scenario. These simulation results illustrate the terms of detection still as is providing passing for the emergency vehicle to of holdup in peak hours. Keywords— traffic, emergency vehicle, destination.

2. Introduction:

Unfortunately, about 30% of deaths are caused due to delayed ambulances. In today's scenario the number of accidents per day is increasing exponentially and so is the number of deaths caused by it. Every year, clear statistics state that thousands of people lose the chance to live due to ambulance delays. One of the reasons contributing to this delay is "Road blockage"-Road blockages are a result of poor road management and a huge population of vehicles giving rise to traffic jams on the road. Many nations worldwide have adopted several strategies to combat this, one of the simplest was laying down a different Analytical methodology, encompassing beam theory and torsion analysis, providing lanes for emergency services on the roadway

3. Analytical Insights :

If an ambulance carrying a critical patient or organ for transplantation needs to reach its destination quickly, It requires posses of traffic policemen on the ground to clear its path and provide priority passage so we have a solution for this. When an ambulance equipped with a sensor tracer approaches an intersection, the system will detect its presence. The system will then communicate with the traffic signal controller and request a green light for the ambulance. The traffic signal controller will grant the request and change the light to green, allowing the ambulance to pass through the intersection without delay. In between, it sends a message to the central control system that a particular ambulance is crossing from a particular road. The ambulance driver or a user can log in to the web application where he or she will get the shortest route to its destination from his current location. The user can also fill out the patient information form from the website for patient registration in the hospital at the time of emergency. There is no need to wait for patient registration in the hospital. 1.5.1 Feasibility Study:

1. Technical Feasibility: This project is feasible concerning technology. In this project, the required resources are quite easily available. Hardware we bought from an online store and the Software Development Kit is available on various websites.

2. Financial Feasibility: The Project needs open-source software and some hardware parts like a fingerprint sensor which is easily available. Also, it is available at moderate cost and can be purchased easily

4. MODULES :

Two modules in our web application are as follows: 1. Ambulance operator 2. User 1. Ambulance operator: The ambulance operator can log in to the web application and add his current location and the destination hospital which generates the shortest route to its destination which will save the response time of the ambulance. It will also provide a patient registration form. 2. User: The user can log in to the application and can do patient registration. At the time of emergency, one can easily register the patient. There is no need to wait at the time of emergency

5. PLATFORM USED:

1. Programming Language:

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991. Python is a widely used general-purpose, high-level programming language. It was initially designed by Guido van Rossum in 1991 and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code. In the late 1980s, history was about to be written. It was that time when working on Python started. Soon after that, Guido Van Rossum began doing its application-based work in December of 1989 at Centrum Wiskunde & Informatics (CWI) which is situated in the Netherlands. It was started as a hobby project because he was looking for an interesting project to keep him occupied during Christmas. Python is –

1. Easy to Code Python is a very high-level programming language, yet it is effortless to learn. Anyone can learn to code in Python in just a few hours or a few days. Mastering Python and all its advanced concepts, packages, and modules might take some more time. However, learning the basic Python syntax is very easy, as compared to other popular languages like C, C++, and Java.

2. Easy to Read code looks like simple English words. There is no use of semicolons or brackets, and the indentations define the code block. You can tell what the code is supposed to do simply by looking at it

3. Free and Open-Source Python is developed under an OSI-approved open-source license. Hence, it is completely free to use, even for commercial purposes. It doesn't cost anything to download Python or to include it in your application. It can also be freely modified and re-distributed.

4. Robust Standard Library Python has an extensive standard library available for anyone to use. This means that programmers don't have to write their code for every single thing, unlike other programming languages. There are libraries for image manipulation, databases, unit testing, expressions, and a lot of other functionalities. In addition to the standard library, there is also a growing collection of thousands of components

5. Portable Python is portable in the sense that the same code can be used on different machines. Suppose you write a Python code on a Mac. If you want to run it on Windows or Linux later, you don't have to make any changes to it. As such, there is no need to write a program multiple times for several platforms.

6. Object-Oriented and Procedure-Oriented A programming language is object-oriented if it focuses design around data and objects, rather than functions and logic. On the contrary, a programming language is procedure-oriented if it focuses more on functions (code that can be reused). One of the critical Python features is that it supports both object-oriented and procedure-oriented programming.

7. Extensible A programming language is said to be extensible if it can be extended to other languages. Python code can also be written in other languages like C++, making it a highly extensible language.

8. Expressive Python needs to use only a few lines of code to perform complex tasks. For example, to display Hello World, you simply need to type one line – `print("Hello World")`. Other languages like Java or C.

9 . Support for GUI One of the key aspects of any programming language is support for GUI or Graphical User Interface. A user can easily interact with the software using a GUI. Python offers various toolkits, such as Tkinter, wxPython, and JPython, which allows for GUI's easy and fast development.

2. Database :

MYSQL MySQL is an Oracle-backed open-source relational database management system (RDBMS) based on Structured Query Language (SQL). MySQL runs on virtually all platforms, including Linux, UNIX, and Windows. Although it can be used in a wide range of applications, MySQL is most often associated with web applications and online publishing. MySQL is an important component of an open-source enterprise stack called LAMP. LAMP is a web development platform that uses Linux as the operating system, Apache as the web server, MySQL as the relational database management system, and PHP as the object-oriented scripting language. (Sometimes Perl or Python is used instead of PHP.) Originally conceived by the Swedish company MySQL AB, MySQL was acquired by Sun Microsystems in 2008 and then by Oracle when it bought Sun in 2010. Developers can use MySQL under the GNU General Public License (GPL), but enterprises must obtain a commercial license from Oracle. Today, MySQL is the RDBMS behind many of the top websites in the world and countless corporate and consumer-facing web-based applications, including Facebook, Twitter and YouTube

3. GUI:

HTML, CSS First developed by Tim Berners-Lee in 1990, HTML is short for Hypertext Mark-up Language. HTML is used to create electronic documents (called pages) that are displayed on the World Wide Web. Each page contains a series of connections to other pages called hyperlinks. Every web page you see on the Internet is written using one version of HTML code or another. HTML code ensures the proper formatting of text and images so that your Internet browser may display them as they are intended to look. Without HTML, a browser would not know how to display text as elements or load images or other elements. HTML also provides a basic structure of the page, upon which Cascading Style Sheets are overlaid to change its appearance. One could think of HTML as the bones (structure) of a web page, and CSS as its skin (appearance). Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language like HTML. CSS is a cornerstone technology of the World Wide Web, alongside HTML and JavaScript. CSS is designed to enable the separation of presentation and content, including layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple web pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content. Separation of formatting and content also makes it feasible to present the same markup page in different styles for different rendering methods, such as on-screen, in print, by voice (via speech-based browser or screen reader), and on Braille-based tactile devices. CSS also has rules for alternate formatting if the content is accessed on a mobile device

6. SYSTEM / INTEGRATION TESTING:

Integration testing will be performed by the test manager and development team leader with assistance from the individual developers as required. No specific test tools are available for this project. Programs will enter into the System/Integration test after all critical defects have been corrected. A program may have up to two major defects as long as they do not impede the testing of the program. The system is developed to autonomously navigate the robot in a confined environment. The robot scans the distances of obstacles around it and maps an efficient path out of it. Thus, we get a map of an arena and plotting is done. The system was tested for accuracy, and tests were carried out to check efficiency. The system must undergo tests to prove that it can stand the test for various operations.

7. ADVANTAGES:

Here are a few advantages of a Smart Traffic Control System

- 1) Reduced response times
- 2) Increased patient survival rates
- 3) Low cost
- 4) Improved traffic flow
- 5) Increased safety
- 6) Easy maintenance
- 7) Tackle the emergency conditions
- 8) Track the real-time location of the ambulance
- 9) Suggest the nearest hospital and optimum route

8. FUTURE SCOPES :

The future of smart traffic control systems for ambulances holds immense promise for saving lives. Here are some exciting possibilities: Advanced routing and prioritization:

- **Dynamic traffic light control:** Traffic signals could communicate with approaching ambulances and adjust light cycles in real-time to create a green wave, eliminating red lights entirely.
- **Multi-modal integration:** The system could consider alternative routes, including waterways or dedicated ambulance lanes, and seamlessly integrate with public transport systems to temporarily clear a path.

9. CONCLUSIONS :

In this world of busy roads, traffic signal plays a vital factor in saving a person's life. In this project, we not only tried to provide a way to the ambulance but also tried to provide a ready situation in the hospital to do the treatment of a patient in time. We implemented two solutions storing the medical history of all citizens, suggesting the nearest hospitals, and giving an optimal path to reach the hospital in time. Citizens can register and store their information with authentication which provides security to them. To suggest the nearest hospital and optimal path GPS and microcontroller technologies are used. This system detects the occurrence of the ambulance and switches the signals to green. The entire system is automated, thus it requires less human intervention. "Smart Traffic Control System for Ambulance" increases the possibility of saving lives.