B.M.S. College of Engineering
Department of Information Science and Engineering

Industry Motivated Course
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Automated traffic control system for Ambulance

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Introduction

One of the major problems that world faces today is traffic management. The problem of the ever-increasing population has to an increase in worldwide traffic which in turn has resulted in severe traffic congestion issues all over the world. In India, this is serious in overcrowded metropolitan cities such as Bengaluru.

The negative effects of the poor traffic management are heavy traffic jams, violation of traffic rules, loss of fuel, money and time etc. This problem of poor traffic management and traffic congestion has a serious impact on emergency service vehicles such as ambulances. A recent study conducted by the Times of India showed that about 30% of deaths are caused due to ambulances not reaching the hospital in time.

Problem Statement

Road traffic congestion is a significant problem faced in densely populated metropolitan cities such as Bengaluru. Due to the traffic congestion, emergency service vehicles such as ambulances are severely impacted.

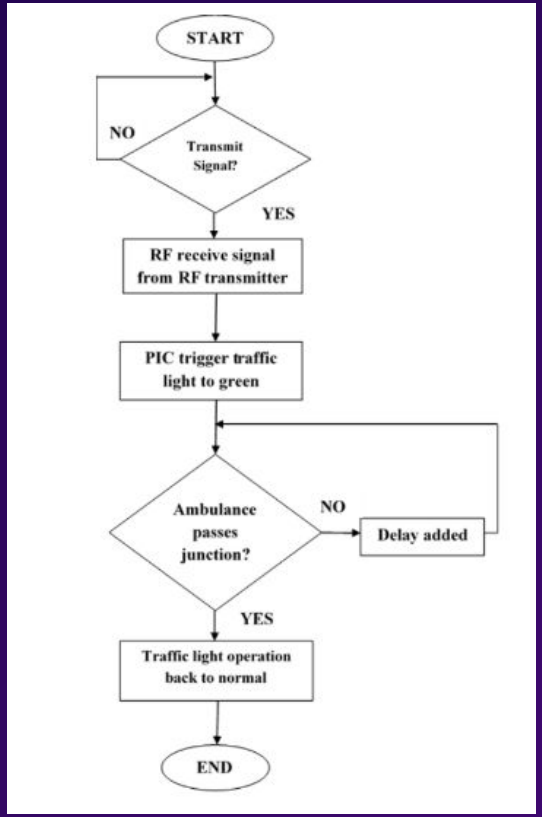
Therefore there is a need for a solution to tackle the above issue. For our project, we propose a system which will intelligently recognise ambulances and automatically control the traffic lights to ensure the smooth movement of ambulances. This system will help the ambulances reach the hospital in the shortest possible time and hence save more lives.

Proposed Solution

We propose to build an automated and intelligent traffic control system which will help in the smooth movement of emergency vehicles, especially ambulances. The primary technologies that will be used are RFID (Radio Frequency Identification) and Cloud. Using RFID, we can identify the ambulance and then we can use cloud computing to communicate with the traffic signal systems along the path of the ambulance to turn green and make way for the ambulance. As a result, the traffic will be cleared and priority will be given for the ambulance to move. Further, we can identify when the ambulance clears a particular junction and then we can communicate with the traffic signal at that particular junction to resume normal behavior.

The system would also use real-time traffic data to optimize traffic flow and reduce delays for emergency vehicles. This would help to improve response times for emergency service vehicles and potentially save lives.

Solution Flowchart



Advantages

- **Improved response times for emergency medical services:** By giving priority to ambulances at traffic intersections, the system can help to reduce the time it takes for an ambulance to reach its destination, potentially saving lives.
- **Reduced traffic delays:** By using real-time traffic data to optimize traffic flow, the system can help to reduce delays for other vehicles, improving overall traffic flow and reducing congestion.
- **Increased safety:** By clearing a path for ambulances to pass through, the system can help to reduce the risk of accidents involving emergency vehicles.
- **Cost-effective:** RFID technology is relatively inexpensive and easy to implement, and cloud computing allows for scalable and flexible solutions that can be easily updated and maintained

Expected Customer Base

- **Hospital and healthcare providers:** They could also be interested in the system, as it would help to ensure that ambulances can reach the hospital quickly and safely, improving patient outcomes.
- **Emergency medical services (EMS) providers:** These organizations would be the primary users of the system, as it would help them to improve response times and save lives.
- **Local and state governments:** They would be interested in purchasing the system to improve traffic flow, reduce congestion and increase safety on the roads.
- **Smart city initiatives**: The system could be integrated into smart city initiatives, which involve using technology to improve the efficiency and sustainability of urban areas.

In general the system would be beneficial for anyone looking to improve response times for emergency services, reduce traffic delays, and increase safety on the roads.

Market Scope

- Ambulance detection at intersections by RFID
- Cloud-based communication with traffic signals
- Real-time traffic data analysis
- Traffic flow optimization
- Prioritizing ambulances over other vehicles
- Support for emergency services
- Remote monitoring and control of the system.

Technology stack used

- Android app with cloud access and GPS provided
- RFID technology
- Cloud storage (AWS, Azure, and Google Cloud Platform)
- Micro-controller unit
- Database(MySQL, MongoDB)

Roadmap for development

- Define the requirements for the automated traffic control system, including all the functional and non functional requirements.
- Conduct thorough market research to identify the existing technology and how we can improve them
- Perform a simulation of the proposed solution and if it passes the solution, proceed to develop prototype
- Test the prototype internally and make changes/improvements
- Obtain the necessary permissions for the concerned authorities
- Start implementing it in some areas of the city
- Make improvements based on feedback
- Deploy the system all across the city

Additional Enhancements

- Suggesting the best route for the ambulance between the location and hospital
- Alerting the doctors in the hospital about the status/condition of the patient
- Feature to store the patient's medical history in a database on the server
- Option to issue alert to nearest traffic police station incase the congestion is very high and police intervention is needed

Conclusion

In today's world, with an ever-increasing population, the problem of traffic congestion will only get worse. The issues faced by emergency vehicles like ambulances will become more severe and due to the traffic jams, there will be great delay in the ambulance reaching the hospital in time.

This urges the need to implement a solution such as ours which will intelligently recognise ambulances and automatically control the traffic signal to ensure smooth and rapid movement of the ambulance. As the entire system is automated, no human intervention is needed.

If our proposed idea is successfully implemented, many lives will be saved and the society will be benefitted. Such a system will be of great benefit in overcrowded metropolitan cities such as Bangalore.

References

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[2] Ahire, Bhokare, Mate, Sankpal, et al. “Intelligent Traffic Controller for Ambulance Using RFID”, IJASRET (2021)

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THANK YOU