RESEARCH ARTICLE

LIFE

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ARTICLE INFO	ABSTRACT
	In India there are more than 1300 accidents happening each day and more than 400 people are losing their life. In which many people are dying just because they can't reach the hospitals at time. It is mainly because the emergency vehicles like ambulance get stuck in traffic signals for a long time, which costs life. So to avoid this problem, we have come up with an idea to design an advanced system that controls traffic signals during emergency situations and provide easy passage for emergency vehicles. When an emergency situation comes, the module contained in the emergency vehicles will send an emergency signal to the traffic control unit at a particular distance away from the signal. Upon recieving this emergency signal, the traffic control unit identifyes the distance betwen the vehicle and the traffic signal and also the path in which the emergency vehicle is coming. Then the traffic control unit turns grenn light on the path in which the emergency vehicle is coming and turns red on other paths. So that, by the time the emergency vehicle reaches the signal, the path will be clear and it can pass through the signal easily thereby saving lives. This is the main working procedure of the system.

INTRODUCTION

India has a great record of having the most road accidents in the world, over China. We can find many causes for this increased number of accidents like high traffic density, bad roads, careless driving, violation of traffic rules etc. As the number of accidents increases, there shuld be a proper mechanism to prevent it or atleast to avoid the loss of life in these accidents. Most of the times death is hapening in accidents only beacause of the late coming to hospital. Our traffic signals are a major reason for this late admission of patients. Because most of the times, an ambulance gets halts in traffic jam which makes it to be late to reach the hospital and the loss of patient. So if we can provide a traffic free passage to the emergency vehicles like ambulance, fire engine etc, we can reduce the amount of accident deaths upto a limit. We are introducing our project, "LIFE" as a solution to this problem. Through this project we are implementing a system that will allow easy passage for the emergency vehicles in traffic signals. When an emergency signal has been issued by the emergency vehicle, the system will track the location of the vehicle.

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At a particular distance away from the upcoming traffic signal, it will give an emergency signal to the control unit of the traffic signal. Then the traffic control unit will block the traffic on other routes within a short time and turn green light on the path in which the emergency vehicle is coming. So that by the time the vehicle approaches the signal all vehicles in that path will be gone there by giving a clear path for the vehicle. So that the emeregency vehicle gets an easy passage through the signal. This will help to save a lot of precious time, which will increase the chance of saving the life of the patient. We are using arduino uno to implement our project. It is the cheap and durable chip, and also we use gps and gsm modules, which will perform signaling and tracking functions. One of the major advantages of our project is that cost effective.

MATERIALS AND METHODS

The proposed system has an signaling, tracking and controlling system for traffic signal management. The gsm sends the distance of the vehicle along with an emergency signal. The gsm unit placed in the traffic control unit receives the emergency messages and identifies the path and distance of the vehicle. Then the control unit truns red light in other routes. But this can't be done at a sudden because, it will lead to accidents in the signal. So it will give a small time limit and

after that time the light will turn red. Then the light on the path of the vehicle turns green. This lets the vehicles in that routes to go pass through, thereby clearing the path. This light stays green until the emergency vehicle passes through the signal. After that the control unit turns the state back to normal.

The system mainly contains two modules.

- Emergency vehicle module
- Traffic control unit

Emergency Vehicle Module

This module contains a GPS GSM tracking shield. The gps module is used to continuously analyse the location of the emergency vehicle. Then this module repeatedly checks the distance from the nearest traffic signal. Then at a particlusar distance away from the traffic signal an emergency signal is sent to the traffic control unit by using the gsm contained in the module. This distance can be determined based on several factors like traffic intensity, speed of the vehicle etc. Also this distance can be changed later easily by a small change in the program code.

Traffic Control Unit

This module contains a GSM shield. The main purpose of this module is to cntrol the traffic signal. The gsm contained in this module will continously check for incoming emergency signals. When an emergency signal is recieved, then by analysing the signal it identifies the path in which the emergency vehicle is coming and also the distance beween the traffic signal and emergency vehicle. Then it turns green light on the emergency vehicle path and turns red on all other paths for a particular time. This time can also be determined based on several factors like traffic intensity at the junction, the distance and speed of the vehicle etc. This time can later be adjusted easily by modifying the program code. So by the time the vehicle reaches the traffic signal, all other vehicles in that path will be gone and it gets a clear path to pass through. Then after that time delay the control unit turns the signal back to the previous normal state.
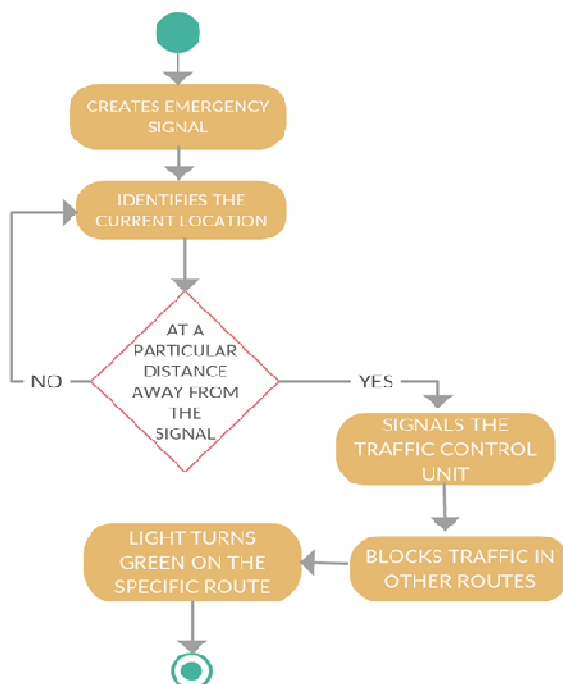

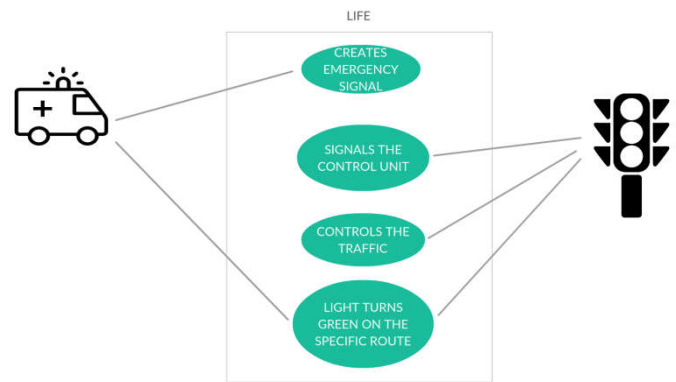**Figure 1. Activity diagram of the proposed system**

Figure 2. Usecase diagram of the proposed system

FINDINGS

In India, each year around 4.5 lakh people are victims of the road accidents. Most of the times these deaths happen just because the ambulance could'nt reach the hospitals in time. "LIFE" is a solution to this problem. Through this project we are implementing a system that will allow easy passage for the emergency vehicles in traffic signals. When an emergency signal has been issued by the emergency vehicle, the system will track the location of the vehicle. At a particular distance away from the upcoming traffic signal, it will give an emergency signal to the control unit of the traffic signal. Then the traffic control unit will block the traffic on other routes within a short time and turn green light on the path in which the emergency vehicle is coming. So that by the time the vehicle approaches the signal all vehicles in that path will be gone there by giving a clear path for the vehicle. So that the emeregency vehicle gets an easy passage through the signal. This will help to save a lot of precious time, which will increase the chance of saving the life of the patient. Still just like any system, it also faces some of the challenges as follows. If emergency vehicles are coming through multiple routes at the same time, it may create a confusion. Vehicles need to be modified at an extra cost. Vehicles in blocked routes may suffer. This system provides an easy passage for emergency vehicles. It is actually a life saver.. The system can also be used in other emergency situations.

Conclusıons

Designed and constructed a traffic controling system named "LIFE", that will allow easy passing of emergency vehicles like ambulnce, fire engine etc through traffic signals. It will help to save the valuable human lives by saving the time to move the patient to the medical facility. We used arduino board and Arduino IDE to prepare the required circuits and programs. It is a major improvement in the conventional traffic controlling mechanisms currently existing and contains a GPS-enabled system that automatically controls the traffic signals.

Future Enhancements

In future, we are planning to extend the functionalities of "LIFE" to higher levels. As our project is highly flexible, more improvments can be made easily. The future enhancements are:

- Improving the accuracy of the system
- Proiding a mechanism for giving live alert to near by hospitals along with the generation of emergency

signal. It will save a lot of time by helping to choose the best hospital nearby.

- Extending the functionality to be useful in other emergency situations like natural calamities where there is chance of traffic congestion.
- Developing a mechanism that will help the person near the accident area to call the ambulance by sharing his location. It will be implemented as an android appicaton.

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