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EFFICIENT TRAFFIC CLEARANCE FOR EMERGENCY VEHICLE

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Abstract

In this fast moving world everyone lives a rush life. The circumstances in roads are also not different from this. The number of accidents are also increasing accordingly. It is inevitable for an emergency vehicle to reach on right time, where accident occurred to reduce its intensity. In order to tackle the problems related to emergency vehicle being get stuck in a traffic congestion this paper presents an efficient way of traffic clearance for emergency vehicle.

Keywords: *Traffic clearance, Emergency vehicle, Traffic Signal Control*

Introduction

In this developed era where each individual is having a vehicle, traffic congestion is a normal incident. So it is very difficult for an emergency vehicle to fulfill their service. In turn, when they try to make this possible that may result in another accident or the delay due to this congestion may results in the loss of lives, assets etc. So every time it is essential to make a clear way for emergency vehicles.

. Here we introduce a new module Traffic Signal Control (TSC) which integrates all the traffic signals to a centralized network. So that we can dynamically adjust its signalling to assist the easy movement of Emergency vehicles through the traffic congestion.

LITERATURE SURVEY

Disaster can be natural or man made or a mixture of both. In both the cases the only possible thing we can do is to make sure that proper assistance is given to the victim as soon as possible. The most common problem found here is the delay in decision process by humans as well as the time taken to reach the emergency vehicles. Most cases people become panic and this results into unwanted delay to call assistance. This problem can be solved by using a fog based computer system. Fog system helps to reduce the delay by reducing execution time and

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network usage when it compare with cloud computing[1] [2]. The smartphone-based disaster management system [3] [4], cloud-based accident detection and disaster management system [5] [6] are some of the other solutions regarding the above problem.

WHY WE NEED THIS

The urge to make way for an approaching ambulance or fire truck is the most subtle part of being a socially committed human being . Unfortunately, these days, our roads are clogged with so many vehicles, so much so that we are helpless to make way for the ambulance and other Emergency vehicles. To reduce the delay due to traffic block we need to create an additional module in the design proposed in Emergency Response and Disaster Management System (ERDMS) [1]. This is a challenge we need to overcome. The idea of this study is to impart the kindness of many people on the road into an integrated traffic management system which would deal with this problem on our hands. In this paper, a solution is proposed which logically deals with the issue and tackles it.

PROPOSED METHODOLOGY

The most essential criterion is an Integrated Traffic Signalling System in a given city/locality. The position of all the ambulance or fire truck should be constantly monitored using a reliable system. The central signal controlling system will switch into Emergency Response Mode as soon as an Ambulance enters its signal jurisdiction. The entire implementation is divided into two algorithms depending on the number and direction of travel of the emergency vehicle. A. Emergency vehicle approaching from same road In this scenario, the emergency vehicle approaches an intersection. The given figure, Fig. 1 shows one or more emergency vehicle approaching an intersection in a particular direction. In such scenario the signal is turned green in favour of the approaching vehicle and turn red for all the other roads at the intersection temporarily. When its presence and the route to be taken are analysed by TSC, it triggers switches into the emergency response mode and turns green signal on the path of the vehicle concerned, while obviously stopping all other vehicles from entering the signal. System constantly monitors the current position and scheduled route of each Emergency vehicle using Application Program Interface (API) of Google map. This data set consist of GPS information (latitude, longitude speed) and the live traffic conditions. This shall be implemented by the algorithm in section. V-A B. Emergency vehicle approaching from different roads Consider a situation as shown in the Fig. 2. In this scenario two or more emergency vehicle are approaching an intersection from different directions. Here the proposed idea is to block all the traffic from entering the junction and to alert the emergency vehicles and ask it it cut into their corresponding opposite lane before entering the junction and cross the junction and enter the right lanes once again as shown in the figure. The traffic signalling becomes normal once the vehicle crosses the junction. This shall be implemented by Multi directional algorithm described in section. V-B V. IMPLEMENTATION This paper put forward two algorithms as follows. When an Emergency vehicle enter into the premises of a traffic signal, TSC get a request to clear traffic for the smooth passing from Emergency vehicle. According to the received requests traffic signals are dynamically changed for a while. Also TSC give reply to the request. A.

Unidirectional Algorithm

- According to the GPS data, the Emergency vehicle sends a ”road clearing” request to the TSC.
- TSC activates the Green signal for the vehicles in the same lane as the Emergency vehicle.
- Once all the Emergency vehicles passes the junction, TSC restores to normal state.

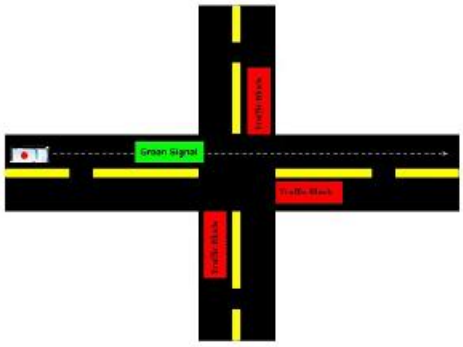

Fig. 1. Example of unidirectional case.

Multi directional Algorithm

• According to the GPS data, the Emergency vehicle sends a ”road clearing” request to the TSC.

• TSC activates the Red signal in all directions and activates Emergency alarm.

• TSC sends a ”Traffic freeze” notification to all the Emergency vehicles.

• Updates the route of Emergency vehicle through the corresponding opposite lane.

• Once all the Emergency vehicle passes the junction, TSC restores to normal state.

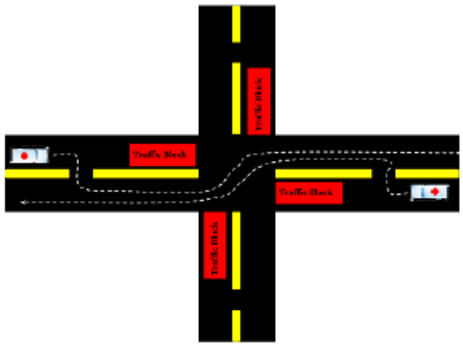

Fig. 2. Example of multi directional case

CONCLUSION AND FUTURE SCOPE

This system is capable to reduce the time delay of reaching the emergency vehicle. This is also time sensitive and capable to handle if more number of ambulances simultaneously reached in a traffic signal. Lower time delay will reduces the intensity and death due to the emergency situation. In the future, we have to implement reinforcement learning to the the integrated traffic system, which helps to dynamically update the kilometer radius (above mentioned is 1Km) depends on the traffic block. We also intend to address potential privacy and security concerns that require consideration before any real-world implementation can be built on our system [1].

EXPECTED RESULTS REFERENCES

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