# EMERGENCY SERVICES ROUTE CLEARANCE SYSTEM WITH SIGNAL DENSITY

Mr. G.Sravan kumar<sup>1</sup> Rakesh varma<sup>2</sup> tejashwini reddy<sup>2</sup> mehal reddy<sup>2</sup> <sup>1</sup>Assistant Professor, Department of CSE, <sup>2</sup>Final year B.Tech. Students, Department of CSE, Sreyas Institute of Engineering and Technology, Hyderabad, Telangana, India

# Abstract

This project describes the use of wireless communications for relieving ambulance from traffic congestion in urban areas. This advanced traffic clearance system can be implemented in any Urban areas quite easily with less time and low cost. In this system the Ambulance is fitted with a RF transmitter and controlled by a microcontroller. The Traffic Light is fitted with a RF receiver and Traffic signals are controlled by a microcontroller based on the receiver data. Whenever the ambulance switches ON the button, the RF transmitter transmits the RF signal. Whenever the ambulance approaches the traffic signal stand, the RF receiver in the stand receives the RF signal and automatically switches the traffic signal to green thus making the ambulance to pass through the road intersections

## **1.Introduction**

Now-a-days the vehicle count is increasing day- by-day as a result of which there is a drastic increase in the traffic jamming on roads. This results in accidents, skipping off the traffic lights and damages to the public properties. With increase in traffic on road, emergency services like ambulance are facing hard task carrying patients to hospital at right time. Reaching required destination on time becomes even more difficult during peak hours. The death due to delay in emergency services is highest in India. A recent survey revealed that every year approximately 18000 patients utilizing emergency vehicles could be saved, if they could reach the hospitals on time. The chances of survival from a heart attack or life threatening injury reduces from 70% to 7% in just 4 minutes due to delay in first emergency medical response. During an emergency situation, immediate medical aid is the fundamental to save a life. So there comes a necessity to advance the quality of the emergency vehicles. Death does strike aboard the ambulance as well but there is no way it is stated as such. Most 'declared dead' and 'died in road' scenarios happen where there is a time waste in moving the patient from one place to another due to traffic congestions, the bane of our country. In general, our roads are not ambulance friendly. The 108 service has assisted many people in various health emergencies like pregnancies, respiratory and cardiac disorders, snake bites, suicides and traffic accidents, and so on. Time is of essence especially when a medical emergency comes into picture. So,

Page | 100

www.junikhyat.com

there comes a necessity to free the path for emergency services and especially in country like India where traffic chaos is attop-notch.

## 1.1.Motivation

Given the definition of embedded systems earlier is this chapter; the first such systems could not possibly have appeared before 1971. That was the year Intel introduced the world's first microprocessor. This chip, the 4004, was designed for use in a line of business calculators produced by the Japanese Company Busicom. In 1969, Busicom asked Intel to design a set of custom integrated circuits-one for each of their new calculator models. The 4004 was Intel's response rather than design custom hardware for each calculator, Intel proposed a generalpurpose circuit that could be used throughout the entire line of calculators. Intel's idea was that the software would give each calculator its unique set of features.

The microcontroller was an overnight success, and its use increased steadily over the next decade. Early embedded applications included unmanned space probes, computerized traffic lights, and aircraft flight control systems. In the 1980s, embedded systems quietly rode the waves of the microcomputer age and brought microprocessors into every part of our kitchens (bread machines, food processors, and microwave ovens), living rooms (televisions, stereos, and remote controls), and workplaces (fax machines, pagers, laser printers, cash registers, and credit card readers).

It seems inevitable hat the number of embedded systems will continue to increase rapidly. Already there are promising new embedded devices that have enormous market potential; light switches and thermostats that can be central computer, intelligent air-bag systems that don't inflate when children or small adults are present, pal-sized electronic organizers and personal digital assistants (PDAs), digital cameras, and dashboard navigation systems. Clearly, individuals who possess the skills and desire to design the next generation of embedded systems will be in demand for quite some time.

## **1.2.Problem Definition**

Cities become the identity for heavy traffic congestion.Cities have appreciable economic development when compared to the development in rural areas. The emergency vechicle needs to pass through several traffic signals in the city.This leads to spend more time in traffic at junctions by emergency vechicles.This may result in loss of life. And even when VIP vechicles

www.junikhyat.com

are passing by a junction, the traffic is stoped for long time till the VIP vechicles pass by. This may give problem to the people also.

## **1.3.Objective Of Project**

The main objective of the proposed model is to prevent the ambulance struck in the traffic at junctions, to reduce the time taken by the ambulance to reach the destination. Also to prevent the people facing the problem when the VIP persons pass through the junction. This is done by controlling the traffic lights when ever the emergency vechicle or VIP vechicle near the junction i.e, turning traffic light to green to lane in which vechicle is present.

## 2.Existing System

In the present existing traffic light system most of the traffic lights are allocated fixed time slots i.e., same time duration is allocated for both ON and OFF irrespective of the traffic intensity. In this system the traffic lights change automatically depends upon the traffic density on road .Pairs of IR sensors placed near to signal.

This process repeats for three lanes based on the priority of traffic and an algorithm called round robin algorithm is used .So the traffic on each lane is cleared simultaneously by avoiding the waiting time and fuels loss of vechicles.

## 2.1.Disadvantages of Existing System

- IR sensors sometimes may absorb normal light also. As a result, traffic system works in improper way.
- IR sensors works only for fewer distances.
- We have to arrange IR sensors in accurate otherwise they may not detect the traffic density.
- Waiting time is high.
- Fuel loss of vechicles.

## **3.Proposed System**

The main objectives of the proposed model is to prevent ambulance from getting stucked in traffic congestion. If the ambulance gets caught up in traffic congestion, there is a risk of patient death.by using this system, the trtaffic congestion can be prevented.In this paper, we have designed an intelligent traffic management system that can clear the traffic congestion using Wireless Communications Technology.

www.junikhyat.com

The proposed system consists of Arduino module, lcd, transmitter and receiver module. Whenever an Ambulance comes near the road intersections automatically the traffic signal difficulty.

## 3.1. Advantages

- To save the human life
- Road traffic control and management
- Avoid the disturbance and congestions for Special Category Vehicle like Ambulance, Fire Extinguisher, VIP's, VVIP's and so on.

## 4.Architecture

**RECIVER:** 



## Figure 1 : Architecture of RF Module's

POWER SUPPLY BLOCKDIAGRAM:

Figure 2 : Block diagram of Power Supply

www.junikhyat.com

## **5.** Implementation

Due to rapid urbanization there is a need for implementing an effective traffic control systems to avoid heavy congestion. And also to make a better solution for ambulance clearance helps to protect the human life. The idea behind the proposed system is to provide effective traffic control systems by the use of Embedded technologies. This project concentrates on ambulance/Emergency clearance. This makes use of RFID's.

## 5.1. Result Analysis



## Figure 3 : Traffic Management



Figure 4 : Module Kit

www.junikhyat.com



Figure 5 : Module Kit when Power Supplied



Figure 6 :Simulation results for Emergency Vehicle, when Pressed in lane 1



www.junikhyat.com

# Figure 7 :Simulation results for Emergency Vehicle, when Pressed in lane 2



Figure 8:Simulation results for Emergency Vehicle, when Pressed in lane 3



Figure 9 :Simulation results for Emergency Vehicle, when Pressed in lane 4







Figure 10 : Normal Execution

## **5.2. Design of Test-cases**

A test case is a set of rules or conditions to check if the system or one of its feature works in accordance to the requirement. It is a document with a set of details which includes, set of test data, expected results, actual results, environment information and soon.

Test-case	Test-case Type	Test-case	Expected	Actual Value	Result
ID		Description	Value		
1	When no	When ever	The Traffic	The Traffic	Success
	Emergency	there is no	Signals	Signals	
		emergency	Should be	Executed	
		or VIP near	Executed	Normally	
		the Signal.	normally.		

Page | 107

www.junikhyat.com

2	Vehicle Signal	When	The	The	Success
	Request on	Vehicle tries	Receiver at	Receiver	
	Range	to send	Traffic	Receives the	
		signals to the	Signal	signal	
		Traffic	should		
		Signal	Receive the		
			signal		
3	Emergency in	Vehicle	The Traffic	The Traffic	Success
	Given lane	sends the	light to given	light Turns	
		lane number	lane should	to Green	
		which	be set to		
		should be set	green		
		with green			
		light			
4	When Signal	When	The Traffic	The Traffic	Success
	out of Range	vehicle	Signals	Signals	
		crosses the	should be	Executed	
		signal and	executed	Normally	
		moves out of	normally		
		range			
5	Priority of the	When two	Checks the	The Traffic	Success
	Vehicle	different	Priority no.	Light Turns	
		category	Of the	Green for	
		vehicle	vehicle and	highest	
		requests for	turns green	Priority	
		the green	for highest	Vehicle	
		signal at	priority		
		same time	vehicle		
6	Same Category	When two	Turns Green	The Traffic	Success
		same	light for the	Light Turns	
		category	vehicle	to Green for	
		vehicles	which has	First	
		requests for	request first	Requested	
		the green			

## ISSN: 2278-4632 Vol-10 Issue-5 No. 6 May 2020

signal at	Vehicle	
different		
time		

**Table 1: Test Case Scenarios** 

# 5.3.Scenarios

This method can help the ambulance to reach the hospital with lesser time consumption. At critical situations this concept holds good. The algorithm for implementing this process has been tested extensively .Our approach is simple to execute and uses very less operating power, low cost and more advantageous. During the emergency situation the Traffic signal automatically switches to green and allows the ambulance to pass through the road intersections, and the Android application in the mobile phone shares GPS location via bluetooth, can be shared further by GSM mobile services. Using this data the ambulance can get the remote traffic assistance from the traffic control room reducing the time delay. The result shows the efficiency in clearing traffic congestion for Ambulance. This system is more advantageous when compared to other systems.

## 6.Conclusion

This method can help the ambulance to reach the hospital with lesser time consumption. At critical situations this concept holds good. The algorithm for implementing this process has been tested extensively .Our approach is simple to execute and uses very less operating power, low cost and more advantageous. During the emergency situation the Traffic signal automatically switches to green and allows the ambulance to pass through the road intersections, and the Android application in the mobile phone shares GPS location via bluetooth, can be shared further by GSM mobile services. Using this data the ambulance can get the remote traffic assistance from the traffic control room reducing the time delay. The result shows the efficiency in clearing traffic congestion for Ambulance. This system is more advantageous when compared to other systems.

## **6.1.Future Enhancement**

Page | 109

www.junikhyat.com

#### ISSN: 2278-4632 Vol-10 Issue-5 No. 6 May 2020

In this paper, traffic management system has been implemented which provides not only the quickest way to reach the hospital but also developed a method which eliminates the conflict which arises when both the EV arises at the junction same time. This modernized way of controlling traffic system is helpful the traffic police in easy control of traffic.Additional improvements can be brought in this project by removing the conflict when both the EVs have the same priority by merging the destination information, lane density and other factors which can actually help to distinguish among the most critical EV than the other. This project can be further improvised by providing GPS location at the hospitals and hospitals locational for that specific lane which is less dense information can be sent to the EV which will help the driver to reach the destination accurately. Further, multiple EVs at multiple junction can integrated together for analysing multi junction priority based traffic monitoring system.

## References

[1] Syed R. Rizvi, Stephan Olariu, Michele C. Weigle, "A Novel Approach to Reduce Traffic Chaos in Emergency and Evacuation Scenarios" A thesis submitted to the — This paper proposes a novel chaos reducing information dissemination approach for spatio-temporal traffic information related to first responders and evacuation scenarios using Vehicular Ad Hoc Networks (VANETs), 2007 IEEE.

[2] Reidar Hagtvedt "Cooperative Stratergy to Reduce Ambulance Diversion", Proceedings of the 2009 Winter Simulation Conference.

[3] Saru Chandrakar, Mrs. Ani Thomas "Combating ManMade Disaster using Remote Sensing", Second International Conference on Emerging Trends in Engineering and Technology, ICETET-09.

[4] Syed Rashid Ali Rizvi, Stephan Olariu, Mona E. Rizvi, Michele C. Weigle Old Dominion University, Norfolk, VA 23529, Norfolk State University, Norfolk, VA 23504 T "A Traffic Chaos Reduction Approach for Emergency Scenarios", IEEE Communication Magazine, July 2003, pp.142-153.

[5] Tzu-Hao Hsu, Sok-Ian Sou and Chuan-Sheng Lin Institute of Computer and Communication Engineering, National Cheng Kung University, Taiwan, R.O.C. "Architecture and Recipient Selection of Emergency Messaging for Ambulance Traveling", vol. 14, no. 1, pp. 199-213, March, 2013.

www.junikhyat.com

## ISSN: 2278-4632 Vol-10 Issue-5 No. 6 May 2020

[6] G. Derekenaris, J. Garofalakis, C. Makris, J. Prentzas, S. Sioutas, A. Tsakalidis, "An Information System for the Effective Management of Ambulance", A Tutorial, IEEE Communication Magazine, Oct. 2000, pp.42-51.