

IoT Based Smart Ambulance Monitoring System with Traffic Light Control

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Abstract: *Smart cities essentially require the state-of-the-art technologies that can provide smart service in various aspects, and robotic systems are one of the key solutions for such requirements. Time is a critical issue when dealing with people who experience a sudden cardiac arrest that unfortunately could Die due to inaccessibility of the emergency treatment. Therefore, an immediate treatment using automated external defibrillator (AED) must be administered to the victim within a few minutes after collapsing. Hence, we have designed and developed the ambulance robot, which brings along an AED in a sudden event of cardiac arrest and facilitates various modes of operation from manual to autonomous functioning to save someone's lives in smart cities. The details of the design and development of such robot are presented in this paper.*

Keywords: Ambulance Monitoring

I. INTRODUCTION

Nowadays, controlling the traffic becomes major issue because of rapid increase in automobiles and also because of large time delays between traffic lights. So, in order to rectify this problem, we will go for density based traffic lights system. This article explains you how to control the traffic based when there is Ambulance. All these sensors are interfaced to the micro controller. Based on these sensors, controller detects the traffic and controls the traffic system. This particular project is designed for the cities with heavy traffic .Eg: In Bangalore the roads are full jammed every time. Most of the time the traffic will at least for 100meters .In this distance the traffics police can't hear the siren form the ambulance .so he ignores this .Then the ambulance has to wait till the traffic is left. Some times to leave the traffic it takes at least 30 minutes .So by this time any thing can happen to patient this project avoid these disadvantages. According to this project if any ambulance comes near when the ambulance at emergency comes to any traffic post the traffic signals automatically stop the signals and give green signal for this ambulance.

In recent years, traffic Jams has become a serious problem across the globe. Current statistics reveals that, an average person spends around 4-6 months of his/her life by simply waiting for green light during traffic. Also when delay increases, it affects the commuters reach their destination so late resulting in severe consequences on day and day basis. In common, traffic can be controlled in several main junctions by incorporating either automated traffic light control system or through manual intervention by traffic police. However conventional traffic light system which involves fixed time slot allotted to each side of the junction is found to be poor efficient since it does not consider the varying traffic density. At certain instances, priority of the traffic system has to be changed dynamically based on more number of vehicles waiting on the road, arrival of VIP vehicles and ambulance vehicles etc. It also includes LED which is turned green on the lane with more number of vehicles. These peripherals were actuated based on the programming logic that is embedded in Arduino Mega platform. Finally, implementation results for the proposed system are provided in this paper

1.1 Problem definition

As compared to other developed country like japan with India, which lack in managing medical emergency, with no emergency system facilities. In our country, we have only the emergency ambulance service telephone number like 108, where there is struggle in reaching the hospital with in time. Because, there is a huge traffic in metropolitan cities of india, with huge traffic there is no zero traffic access to ambulance which makes it delay in reaching hospital. These lack in facilities which may leads to the death of the patient before reaching the hospital on the way.

1.2 Problem Solution

From our project module we will have the ability to sense the traffic light and to guide the ambulance in the hard core city traffic, as ambulance is carrying the diseased to hospital for treatment it is a emergency situation, we need a efficient traffic control system to help the ambulance to reach hospital in right time. This system can be implemented in all the ambulances, so that the traffic control can be done automatically, this module helps patient to reach in proper time. Ambulance Module sends SMS to HOSPITAL module for booking bed once this sms is received bed will be booked based on availability

II. PURPOSE OF DESIGN

This particular project is designed for the cities with heavy traffic .Eg: In Bangalore the roads are full jammed every time. Most of the time the traffic will at least for 100meters .In this distance the traffics police can't hear the siren form the ambulance .so he ignores this .Then the ambulance has to wait till the traffic is left. Some times to leave the traffic it takes at least 30 minutes .So by this time anything can happen to the patient .So this project avoid these disadvantages. According to this project if any ambulance comes near when the ambulance at emergency comes to any traffic post the traffic signals automatically stop the signals and give green signal for this ambulance. And it also has automatic bed booking with gsm technology.

2.1 Block Diagram

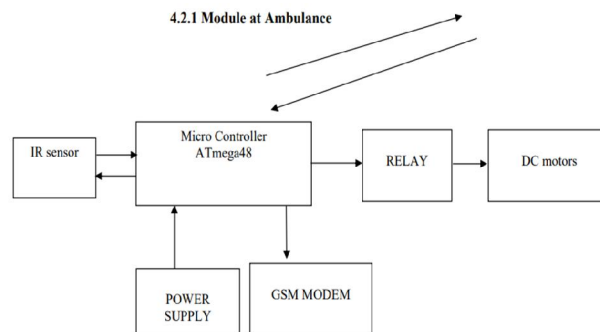


Figure 1: Block diagram of ambulance module

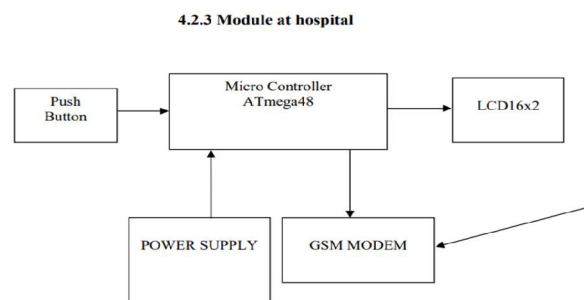


Figure 2 : Block diagram of hospital module

4.2.2 MODULE AT POLE

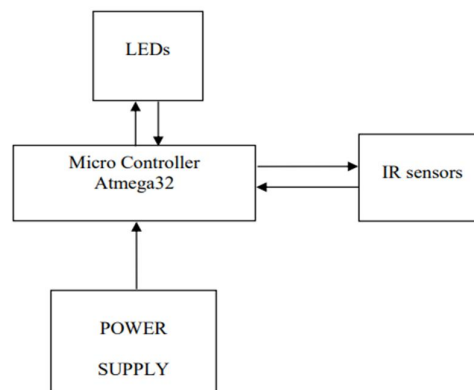


Figure 3: Block diagram of traffic pole module

2.2. Block Diagram Description

What we have to do is we have to attach a IR receiver on pole before the traffic signal. Ambulance will be continuously transmitting signals, these transmitted signal are received by the receiver on the pole after receiving these signal if the red light is (ON) on the way of Ambulance that light will be automatically turned to green and on all other ways the red light will be turned (ON) making way for Ambulance . If there is green light no action will be performed. Our proposed system AVR GSM modem motors on IR sensor on ambulance it has the capability to send automated message to hospital for bed booking. Hospital module consists of GSM modem, AVR, LCD and push buttons upon receiving the message from ambulance module it books the bed automatically if availability is there and it will display on LCD.

III. COMPONENTS

3.1 Hardware Components

The hardware components used in our project is listed below.

1. Atmega48 micro-controller
2. Power Supply
3. LM7805cV (Regulator)
4. IR senso
5. DC motor
6. Relay
7. GSM Modem
8. LCD

3.2 Software requirements

The software components used in our project is listed below.

1. CVAVR cross compiler
2. AVR studio programmer
3. Embedded C

IV. DISCUSSION

4.1 Merits

1. Much easier to get control.
2. Both risk and liability is reduced.
3. It is flexible enough to be used from any location.24 hrs/Day and 7 days a week.
4. It makes life easier.
5. Real time monitoring of ambulance.

4.2 Limitations

Visualization will be difficult over if the rover will be situated in far place

1. The efficient operation of our project depends on the area of module mounted.
2. System fails when central server crash.
3. Internet connection must required

4.3 Applications

1. Used for smart traffic management system.
2. Used for rescuing the patients.
3. Can be used for fire fighting vehicles.
4. Can be used as Information logging for hospital.

V. FUTURE ENHANCEMENTS

The following modifications can be made to present circuit , which lead to still smarter project.

1. The module can be equipped with a faster and more capable microcontroller to integrate control of many more devices at the same time.
2. Another further intended development is to introduce time controlled devices for use in commercial spaces. This, for example could be the control of a large display in a showroom between two different intervals of time, without the intervention of any user or technician.
3. Voice alerts can be used to indicate the various controlling of devices their status of operation.
4. If the numbers of relays are increased from the current relays, the number of devices that can be controlled can also be increased.
5. We can include the touch sensors or pressure sensors in the system so that the security is provided whenever intruders try to break the briefcase. According to the range of communication constraint we can implement GSM Modem to our module.

VI. CONCLUSION

As the saying goes “Necessity is the mother of all inventions”, a need for software which would control process and devices was recognized. The design approach used here has given satisfactory results and the microcontroller is sufficient for measuring the required parameters. The power consumption has been kept as low as possible and the measurements made by the device are quite reliable. Accordingly a highly interactive user friendly module based embedded technology with microcontrollers was developed to solve the problem. The module which is developed will make the job of process easier. The user module has resulted in reducing work of human also makes more comfortable. The module is, therefore functioning as a very good tool. Incorporating the future enhancement as specified earlier would make the software a perfect tool, which would help the user. which is caused at road intersections. The unnecessary traffic congestions which occur due to more number of vehicles floating on the road lanes during prime hours (i.e.) morning and late evening hours are reduced by means of counting the number of vehicles at each lane and giving priority to the lane which has more number of vehicles. In future, sound sensor can be interfaced with arduino platform to detect the frequency of the ambulance heading towards traffic signal. It can be assigned highest priority irrespective of traffic density residing in lanes. This can save the life of human who are in urgent need of medication.

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