

Embedding Intelligent System on Ambulance & Traffic Monitoring

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ABSTRACT

Ambulance service is one of the crucial services that should not get delay. To overcome this situation this paper describes a solution that “embedding Intelligent system on Ambulance & Traffic monitoring” which includes alerting and tracking mechanism with traffic light regulating such that the ambulance can achieve a free way as fast as possible. An algorithm is used to control the traffic signals automatically based on the key pressed by the driver from keyboard in the ambulance. The information reading the current as well as future location of ambulance is sent from the ambulance itself. This information is used to optimally control the traffic. The performance of the embedding intelligent system on Ambulance & Traffic monitoring is compared with the Fixed Mode Traffic Light Controller. It is observed that the proposed model is more efficient than the conventional controller in respect of less waiting time, more distance traveled by average vehicles and efficient operation during emergency mode and GSM interface. Moreover, the designed system has simple architecture, fast response time, user friendliness and scope for further expansion.

KEYWORDS: *Intelligent Ambulance, microcontroller, Traffic Control, Embedded system, Traffic intelligent, Health monitoring system, light management*

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INTRODUCTION

Present fixed system based Traffic Light Controllers are designed with microcontroller and microprocessor. These have limitations because it uses the pre-defined hardware, which is functioning according to the program that does not have the flexibility of modification on real time basis. The monitoring and control of city traffic is becoming a major problem in many countries. As the number of road users constantly increases, and resources provided by current infrastructures are limited, intelligent control of traffic will become a very important in future. The problem of traffic light control can be solved by RFID based system. With this system, we can consider the priority of different type of vehicles and also consider the density of traffic on the roads by installing RF reader on the road intersections. Radio frequency identification is a technique that uses the radio waves to identify the object uniquely. RFID is a technique that is widely used in the various application areas like medical science, commerce, security, Electronic toll collection system, access control etc. For traffic controlling purpose RF communication is used. Traffic density is also considered while designing the algorithm to control the traffic lights. Embedding of health Monitoring system and traffic controlling system may lead to save one precious life. The various performance evaluation criteria are average waiting time, average distance traveled by vehicles, switching frequency of green light at a junction, efficient

emergency mode operation and satisfactory operation of SMS using GSM Mobile.

Related Work

In this paper taking e.g. of emergency vehicles as ambulance. In this paper, the first aim is to collect the information of moving emergency vehicles using GSM, GPS, ARM to provide them clear path. This system can do the following, i) Minimize long waiting time, ii) Achieve smart automatic traffic signal control without human interrupt, iii) Wirelessly monitor patients health parameter through GSM technology, iv) Less chance of accident due to red light violation it gives priority to vehicles like ambulance, Fire brigade, VIP vehicles etc. On signal there will be two RFID readers which will detect traffic density on two roads. When ambulance is detected on any road signal for that side will be green. And traffic on that road and other roads will be sent to ambulance through another GSM. ARM is a 32-bit reduced instruction set computer (RISC) instruction set architecture (ISA) developed by ARM Limited. It was known as the Advanced RISC Machine, and before that as the Acorn RISC Machine. This has made them dominant in the mobile and embedded electronics market as relatively low cost and small microprocessors and microcontrollers. In this project there would be two RFID systems used in the project. The RFID tag would be used to detect the ambulance. The RFID

systems will be connected to microcontroller using serial protocol. The Tag will be attached to the ambulance when the ambulance passes through the reader the Tag would be read and the traffic Light will be made Green Signal. We are

using GPS to track the position of ambulance, emergency vehicles so it will help us to direct the ambulance to reach the hospital as early as possible and also reach the vehicle to their destination.

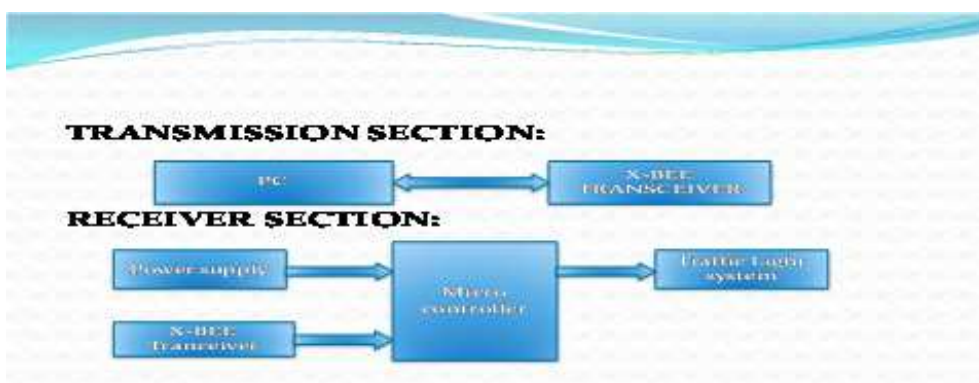


Fig.1. Block diagram of proposed model

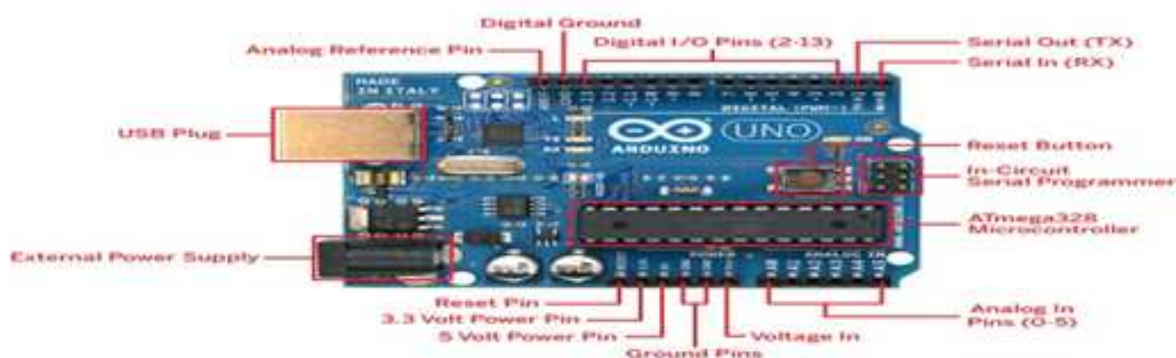


Fig2. Associated microcontroller Arduino Uno. on this model

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins, 6 analog inputs



Fig3. ZigBee structure

ZigBee is primarily used for two-way communication between a sensor and a control system. It offers connectivity up to 100 meters

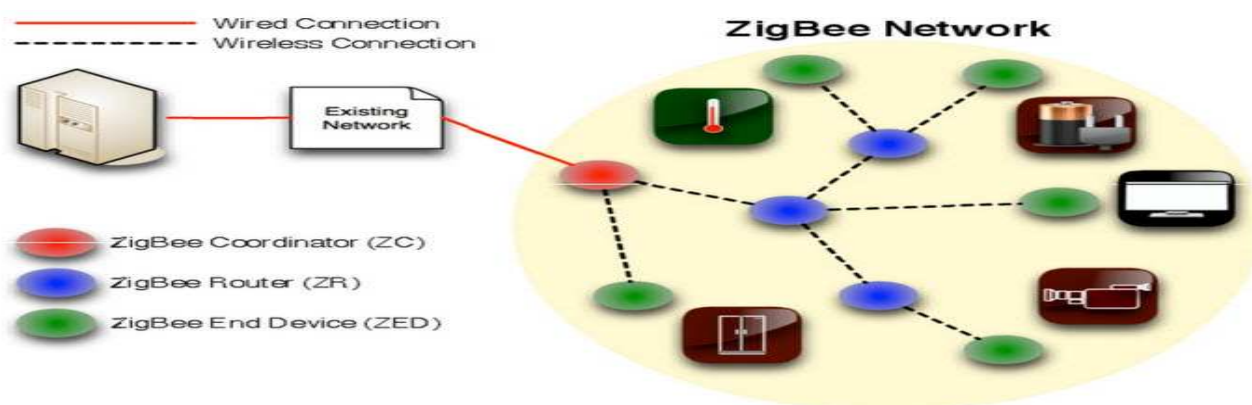


Fig4. Application modeling of of zigBee

When a vehicle on a side road arrives at the intersection, a Zigbee will detect it and cycle the lights to allow traffic on the side road to pass through proposed framework is capable of providing its customizable best route identification based on multiple possible optimization factors such as travel time, fuel cost, and distance. The dynamic time management scheme operates in real time and emulates the judgment made by a traffic policeman on duty. This system aims at saving a large amount of man-hours caused by traffic problems and accidents, where prevention can save lives and property. It is able to manage priority emergency tag vehicles. It offers a valuable detailed database records and preference to planner and investigators

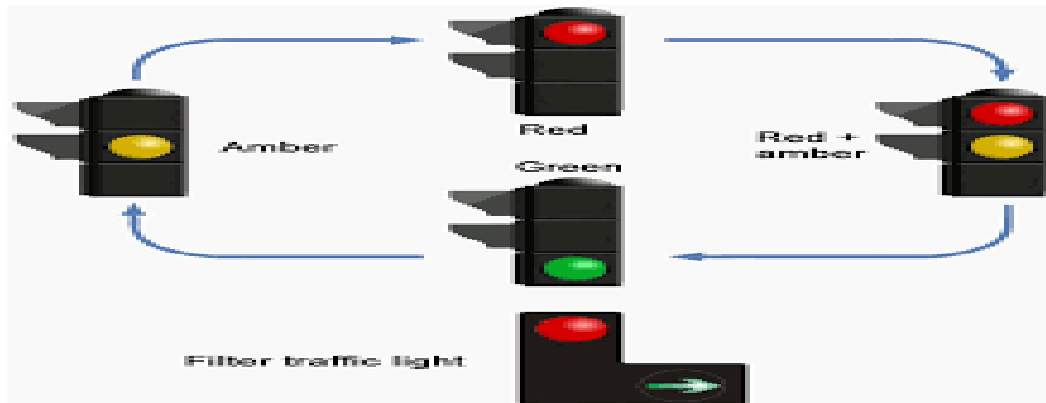


Fig 5. Intelligent monitoring system on traffic control

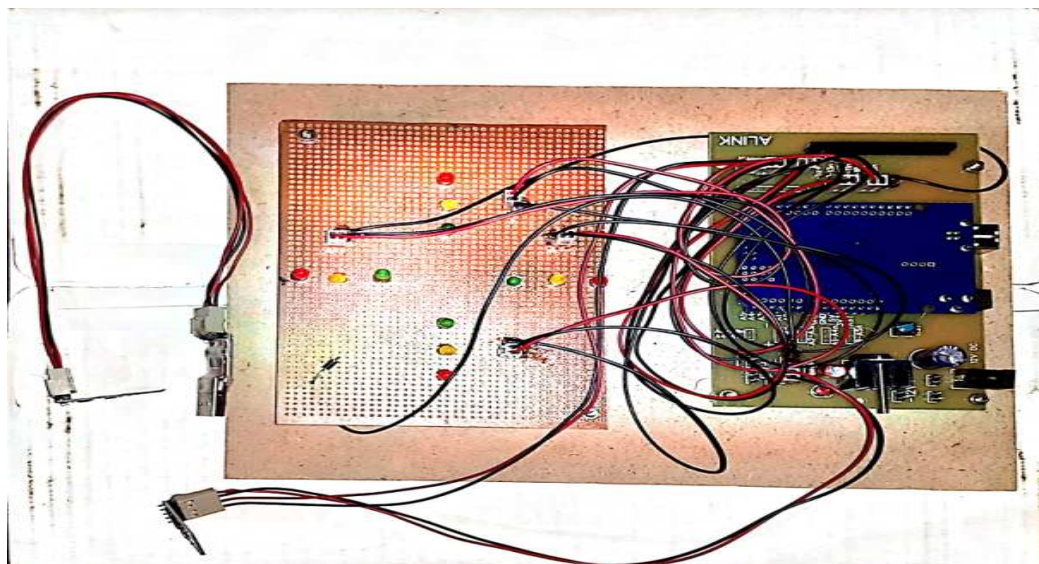


Fig.6 complete hardware structure embedded with intelligent system

The proposed work considers not only the priority of the vehicles but also the density of the vehicles on the road and controls the traffic light sequence efficiently and more accurately and the accuracy of the RFID is more than Camera's so it also improves the performance of traffic light Violation Detection Systematization location of the ambulance to control the traffic lights. This will help in optimization of the time taken by the ambulance to reach the hospital. Also, the monitoring of the patient will help the doctors to give him the necessary treatment for the time being. A network between consecutive signal posts may be established to control high intensity traffic. A possible rerouting feature can be added based on traffic density, by establishing a dialogue between the ambulance and the signal post. In this paper, a system is described which will continuously monitor the patient's health parameters and simultaneously will control the traffic signal. If the doctors do not have sufficient medical history of the patient, they may not be able to give proper treatment to the patient. This system tries to prevent just that. In health monitoring system, the patient's vital health parameters such as ECG, Heart Rate and Body Temperature are monitored. This information is sent to the hospital for analysis.

Conclusion

Many traffic control systems propose an autonomous solution which does not consider the future path of the ambulance. In this paper, the traffic control algorithm considers the current & destination location of the ambulance to control the traffic lights. This will help in optimization of the time taken by the ambulance to reach the hospital. Also, the monitoring of the patient will help the doctors to give him the necessary treatment for the time being. Considering the real time scenario this system can be improved by adding an actual GPS navigation system along with a congestion detecting module for an optimized traffic control algorithm. The congestion detection part may be done using image processing or computer vision techniques. A network between consecutive signal posts may be established to control a high intensity traffic. A possible rerouting feature can be added based on traffic density, by establishing a dialogue between the ambulance and the signal post.

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