TRAFFIC CONTROL SYSTEM FOR EMERGENCY AMBULANCE

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Abstract— Nowadays, Traffic Congestion problems are increasing day by day. There exists an emergency situation where we require the movement of ambulances to reach its destination on time. Due to bad traffic situations this event fails to happen. During Emergency, the transfer of patients to the hospital should be in fast and safe manner to increase the rescue and survival rates. Thus, the ambulance has to take the short and safe way to the emergency department at a hospital. To satisfy this, our project tackles the problem of system and aims to solve this problem by making use of Zigbee Transmitter in Ambulance and Zigbee Receiver in Traffic Signal. Whenever, the Traffic signal receives the signal from certain kms, it clears the signal accordingly by turning the traffic signal to green color using 8051 Micro controller in order to provide a path for the emergency Ambulance. In addition to this the Ambulance staff can directly inform about the case to the Police, if the patient is met with an Accident and if there is a need for blood they can inform the Blood Bank saying that a particular group of blood is needed and if the patient is dead while reaching Hospital itself, we can alert Hospital Authority about this by a single click of a Button

Keywords— *micro-controller 8051, Zigbee transmitter and receiver, GSM (Global System for Mobile Communication)*

INTRODUCTION

In our day to day life we witness an increase in population thereby a sudden increase of vehicles on roads causing major traffic jams and delays. There is a delay seen in the movement of ambulances to reach its destination on time. The solution for hassle free movement of ambulance is achieved by introducing a Dynamic traffic signal which changes the signal to green. Till ambulance/emergency vehicle passes through the signal; the signal will be green and after it will turn normal. Our system aims at fitting the Zigbee Transmitter in the ambulance which transmits the signal. The received signal at Zigbee Receiver activates the system giving indication and message to give pass to the ambulance.

According to the past news and research the death rate of people is increasing day-by-day due to traffic jams which caused the delay in Ambulance reaching the Hospital. Our objective is to reduce the road traffic and clear a way for Emergency Vehicle. Our system also aims to produce certain additional facilities and they are as follows;

Our System provides 3 buttons in Ambulance each for the following reasons. [1] The Ambulance staff can directly inform Police about case i.e., if the patient is met with an Accident. [2] When there is a need for blood they can inform the Blood Bank saying that a particular group of blood is needed. [3] If the patient is dead while reaching Hospital itself, we can alert Hospital Authority about this by a single click of a Button. Hence, the delay time faced by the above scenarios can be minimized and will even reduce the time required to arrange the pre-requirements before patient reaches the Hospital. Therefore our effort to save time may save the life of the people.

LITERATURE SURVEY

In existing system, the traffic is controlled manually by police officer. They decide when the vehicle has to cross the road and also provide importance to the emergency vehicle. These are the literature survey papers which we have considered as reference. When Li-Fi is used to solve this Traffic Congestion Problem certain drawbacks were observed i.e., the vehicle head and tail lights were kept on even during the day.

Li-Fi works efficiently when the transmitter and receiver are placed in Line of Sight, Deviation leads to miscommunication. Next approach was based on VANETS, drawback here is Node creation for each of the vehicles is time consuming and costly. When M2M communication was used, drawback was Time Consuming and Implementation cost was high. Considering all this limitations, our project aims to overcome this and to aims at providing a clear way for Ambulance by tracking the Ambulance information from certain kms and adding additional functionality such as message to Blood Bank, Police Station and to the Hospital on a single click of a button.

DESIGN

The main components involved in our project are:

1. Zigbee sensors.

2. 8051 Microcontroller.

3. GSM

A Zigbee: This is low cost and low powered mesh network widely deployed for controlling and monitoring application where it covers 1kms range. The functionality of this project is once the emergency ambulance enters the area that is 1km away from the traffic signal. The Zigbee transmitter will transmit the signal to the receiver installed in the traffic control signal. Once it receives the signal, the traffic light is turned green.

Figure 3: Zigbee Sensor

B 8051 Microcontroller: The 8051Microcontroller is one of the most popular and most commonly used microcontrollers in various fields like embedded systems, consumer electronics, automobiles, etc. 8051 is an 8 – bit Microcontroller i.e. the data bus of the 8051 Microcontroller (both internal and external) is 8 – bit wide. It is a CISC based Microcontroller with Harvard Architecture (separate program and data memory).The basic layout of a microcontroller includes a CPU, ROM, RAM, etc

Figure 4: 8051 microcontroller

*C GSM:*Global System for Mobile Communication (GSM) is used with digital cell phones, connecting the devices to cellular service. Each cellular network is assigned a unique

code or codes, called the MCC/MNC, which identifies the phone to that specific GSM network.

Figure 5: GSM MODULE

The workflow of the project Traffic Control System involves following steps which is shown in figure 6:
*   Initially turn on GSM, LCD and ZIGBEE device.
*   Capture the input signals towards Traffic Control System.
*   Check for the input signal from ZIGBEE Receiver.
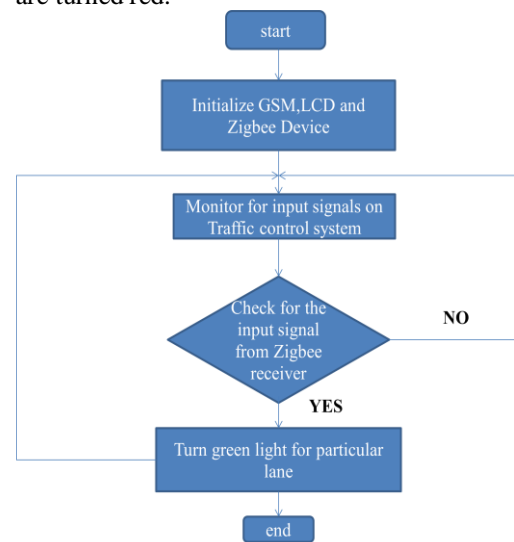*   If found, turn on green signal for that particular lane ensuring all other routers are turned red.

Figure 6: Workflow of Traffic Control System

The workflow of the project Ambulance involves following steps which is shown in figure 7:

*   Initialize Zigbee and GSM devices.
*   If Zigbee is turned on, it generates a unique

Code for traffic control signal receiver.

- **Button 1**:Sends message to Hospital Authority for making pre-requirements based on current status of the patient.
- **Button 2**: Sends message to Police Station for registering Complaint, if that is an accident case.
- **Button 3**: Sends message to Blood Bank for a particular group of blood to be kept ready.

Figure 7: Workflow of Traffic Control System

DESIGN

In our Proposed System we make use of a microcontroller of 8051 family interfaced with Zigbee consisting of both the transmitter and receiver. The Transmitter is installed in Ambulance and the Receiver in the signal junction, as the Emergency vehicle approaches towards signal from certain kms, then the unique id is received from Ambulance and then compared with the database about the Ambulance, if it matches with the entry in the database then it will check the current status of the traffic signal and if it is other than green it will turn the traffic light into green to make a free way for the Ambulance. The system changes the junction timing automatically to accommodate movement of vehicles smoothly avoiding unnecessary waiting time at the junction for emergency vehicles. The ambulance staff can file a case to the Police, if the patient is met with accident. If there is a

need for blood they can inform the Blood Bank saying that a particular group of blood is needed. The current status of the patient will be sent to Hospital Authority for pre-requirements, by a single click of a Button.
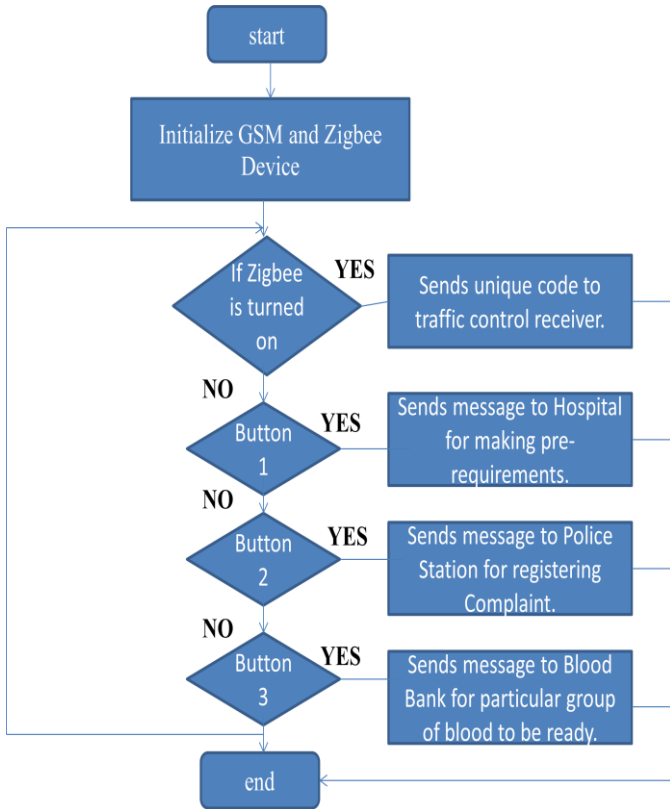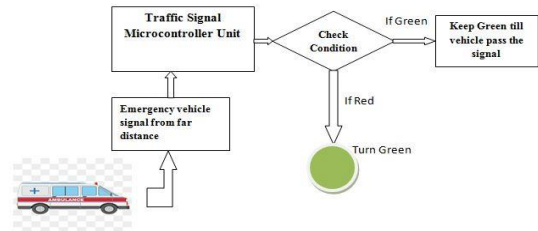

I.Figure 1: Representing how traffic light is turned green for Ambulance

II.   In Figure 1: The Ambulance is approaching towards the Traffic Control System from certain distance. Traffic Control System check, if particular lane is signal is green or not. If not, it'll turn to green until emergency vehicle passes that lane.
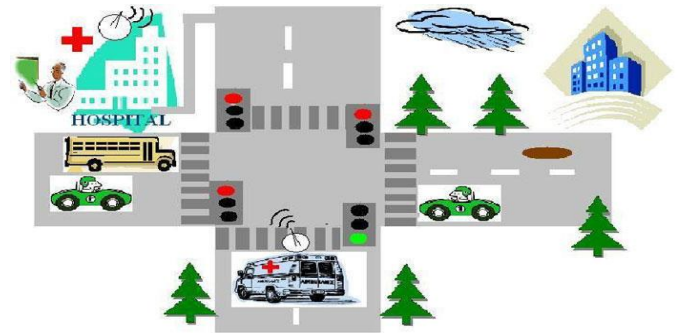

Figure 2: Represents a clear way for Ambulance ensuring all other routers are turned red.

In Figure 2: The picture depicts that signal is turned green for the lane in which ambulance is passing.

RESULT

In this paper, we aim to provide information that emergency vehicle is approaching towards Traffic Control System from certain kms which helps traffic system to clear path accordingly by switching that particular lane's traffic light to green ensuring all other routers are red. Here, we also aim to provide Buttons and an mobile application both of same usage. When Button1 is selected we can alert Hospital if the patient is alive or dead on the way to Hospital or to arrange pre-requirements..when button 2 is selected, it reports Police Station that this is an Accident case and when button 3 is choose it helps in selecting a group of blood which is immediately required and this message about blood group will be sent to Blood Bank.

CONCLUSION

The system presents a smooth traffic control considering automation with traffic free way for Ambulance by sending a unique id to traffic signal monitoring system to make a free way as the emergency vehicle approaches to the signal. The ambulance staff can directly inform Police about the case, if the patient is met with accident. whenever there is a need for the particular blood group, message will be sent to Blood Bank and the current status of the patient will be sent to Hospital aiming to reduce the time required to arrange the pre-requirements before patient reaches the Hospital so that the time will reduce and the hospitality is provided with-in small span of time.

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