DEVELOPMENT OF AN IOT BASED REAL-TIME TRAFFIC MONITORING SYSTEM FOR CITY GOVERNANCE

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ABSTRACT

The communication system installed in the ambulance and VIP vehicles can clutch the traffic at signals until it crosses the crowded area. The system is designed for junction/cross-roads, where often ambulance has to wait until the normal traffic is cleared. This is quite inconvenience for the patient who needs immediate treatment. There by this system is designed which can by-pass the existing signaling system temporarily. The demo module is constructed with four side signaling system for normal operation, means one junction is simulated for the demo purpose. Here in addition to the existing signal posts, separate signals must be installed to clear the way to the ambulance. Junctions are known as circles where flow of traffic is restricted from all four sides. We will use the LED displays for route diversion for the connecting junctions and roads for route clearance for all vehicles. For the governance of the city we will install ESP-32 camera which will work with IoT.

Keywords: Ambulance & VIP Vehicles, Route Diversion, Surveillance.

I.   INTRODUCTION

In our day-to-day life how, many times have we come across a situation wherein an emergency service say an Ambulance gets stuck in the traffic, the patient inside the ambulance may need immediate treatment, in this critical situation the only intention is to make some room for the Ambulance. But it might not be possible because of traffic signals; if the junction is too crowded then the ambulance may have to wait for another term. For these reasons, the vehicle may have to wait for few minutes, which could mean 'Life and Death' for the patient.

To solve this problem, here we present our practical solution.

In this project work, the goal is to see to it that the ambulance has its way cleared, till it reaches its destination, without any intermediate delays. This can be successfully achieved, if the ambulance interacts with the forthcoming traffic signal much before it arrives at that respective traffic junction. Digital communication can be used for this purpose. The Ambulance transmits a "Digital Code" to the Traffic signal. On receiving this code, the Controller at the traffic junction, which would be performing its usual operation will be held up for few seconds/minutes, and clears the way for ambulance. After the ambulance passes, the controller reloads the previously saved scenario. The above-presented idea can be implemented easily; for which the existing technology implemented at traffic junctions may have to be modified accordingly. The project work "RF network used to clear the way for ambulance" is aimed to clear the way for ambulance by holding the traffic at junctions where traffic signals are installed. By implementing this kind of system in each and all ambulance patients are transported to the hospitals in time during emergencies. The main concept involved in the system is to bypass the existing signaling system from the ambulance itself through a wireless control system, and energize red signals to the all sides approaching traffic except the way from where ambulance is approaching. As RF network is used to communicate with the junction signaling system from the ambulance, existing signals can be clutched little away from the junction, there by the time the ambulance reaches to the junction it can find a clear way for it.

In this project we are using Esp32 cam module. It is powers with USB of computer for the traffic surveillance.

II. METHODOLOGY

➢ This research work is carried out in five main phases according to design science research methodology. The five phases (i) research background study, (ii) objective definition, (iii) design and development of artifacts, (iv) demonstration to show how the artifacts resolve the problems, and (v) final evaluation.

➢ A research background study is conducted as part of an objective definition. It has been observed that wireless sensor networks are widely applied in traffic management projects and have a significant role in detecting and reducing traffic congestion

➢ The road space occupancy measure is a spatial measure calculated by considering the length of the vehicle, the safe distance between vehicles, and a buffer length. The safe distance between the two vehicles is 2 m.

➢ When a vehicle enters a road segment, the road occupancy measure is increased by the length of the vehicle and decreased when Based on the literature review, this research has decided to go ahead with magnetic sensors (or magnetic sensor-based PCB) for collecting traffic information as they show good accuracy in vehicle detection

III. MODELING AND ANALYSIS

➢ The review of sensors that are used for vehicle detection and classification. The sensors used in intelligent traffic monitoring systems can be on-road sensors or in-vehicle sensors. The on-road traffic sensors can be again classified into two types: intrusive and non-intrusive.

➢ Real-time traffic monitoring systems play a key role in the transition toward smart cities. A considerable amount of literature has been published on intelligent traffic management systems based on the IoT paradigm. Autonomous traffic sensing is at the heart of smart city infrastructures, wherein smart wireless sensors are used to measure traffic flow, predict congestion, and adaptively control traffic routes.

BLOCK DIAGRAMS
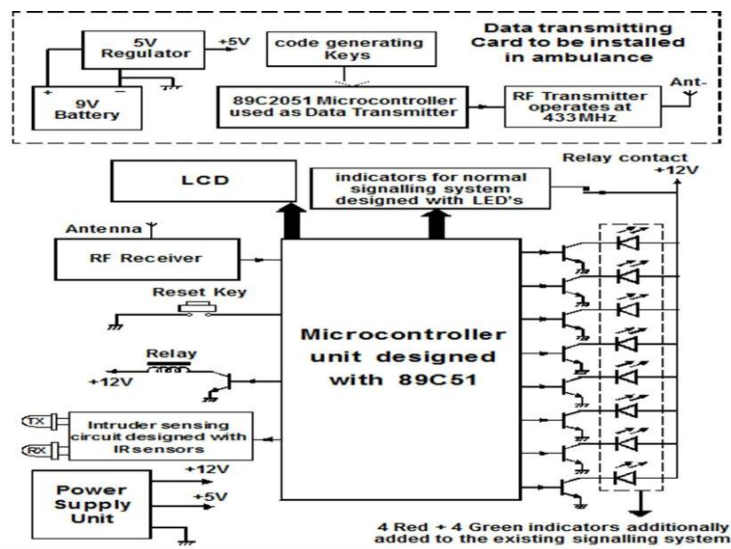
Block diagram for traffic monitoring
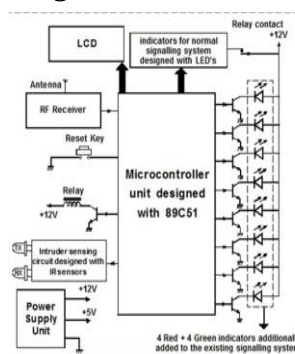
Block diagram for route diversion

IV.   RESULTS AND DISCUSSION

➢ The project work is aimed to clear the way for ambulance at junctions.

➢ The main advantage of using this technology is to carry the patient to the hospital in less time.

➢ The system is designed and developed successfully, for the demonstration purpose prototype module is constructed & results are found to be satisfactorily.

➢ The signal post is constructed with 16 indicators, out of 8 indicators are used for normal signaling system.

➢ They contains 4 red indicators and four green indicators.

➢ With the help of these 8 indicators normal function of traffic signaling system will be performed based on the timings data programmed through controller.

➢ In addition 8 more signals are provided for the ambulance, these signals clutches the traffic in emergencies.

➢ Depending up on the data transmitted from the ambulance, all three sides' traffic will be held up except the way from where the ambulance is approaching.
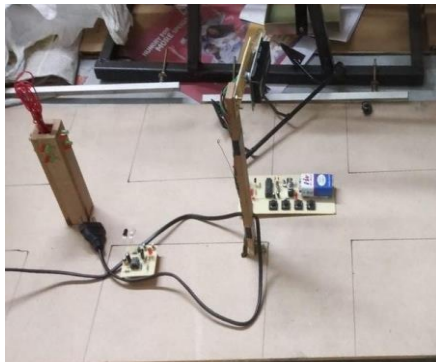
Traffic controlling equipment

Live streaming

V.   CONCLUSION

The project work "RF network used to clear the way for ambulance" is aimed to clear the way for ambulance at junctions. The position of the ambulance from which way it is approaching to the junction, this is the information that is supposed to be transmitted from the ambulance to the remote end embedded system from where the traffic lights are controlled. Based on this information, the corresponding signal lights will be controlled automatically. The wireless communication network designed with RF modules is aimed to communicate with the control circuit. The main advantage of using this technology is to carry the patient to the hospital in less time. Since it is a prototype module, low power transmitter is used there by the range is restricted to less then 60foot. But for real applications little high power transmitter can be used such that approaching ambulance information can be transmitted at least one kilometer away from the junction, by which the way will be cleared for the ambulance by the time it reaches to the junction.

The system is designed and developed successfully, for the demonstration purpose prototype module is constructed & results are found to be satisfactorily. The RF modules used in the project work are purchased from the market, they are working well. During the trail run we have tested the range & we found that the transmitter is able control the signals from a distance of 60feet in open air. The demo module constructed with small signal post is aimed to control the four side's traffic, for this purpose cross roads are simulated over wooden plank. Pee signal post is constructed with 16 indicators, out of 8 indicators are used for normal signaling system, they contains 4 red indicators and four green indicators. With the help of these 8 indicators

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ACKNOWLEDGEMENTS

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