

Design and Implementation of Smart Traffic Controlling and Vehicle Tracking for Ambulances

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ABSTRACT

In this quick era, the human has no time for anything. He is totally occupied with his own work and completely committed himself to the purported PCs or portable PCs. A typical man more often than not inclines toward his own vehicle to go to office or work. On the streets, they once in a while conflict with the movement rules, bounce the activity signals and so on. He mostly does this sort of odd exercises to achieve the office on time. In this manner, it sets aside a decent measure of time for us to understand that we have to help other people principally the patients in the rescue vehicle. We simply fret over them and don't offer space to the ambulances with the goal that they achieve the clinics soon and will be spared out of peril. Along these lines, this project is intended to clear the activity and give a route to the emergency vehicle so that the patient can be set aside to the greatest degree. The project utilizes RF innovation to actualize this application.

Keywords: ARM7 processor, RF transceiver, GSM and GPS

I. INTRODUCTION

Lately, Taiwan has presented a various administration show that coordinates shrewd transportation frameworks with remote, calculation and sensor advancements to supervisory control and information procurement and oversees transportation issues [1]. This has provoked ascent of techniques for catching continuous movement circumstances, different activity location gadgets and comparing controls. With the support from clever specialists, it is conceivable to quick react to crises utilizing discovery gadgets to gather ongoing movement information for street convergence control and operations, in this way effectively decongesting activity in the most limited timeframe. This approach can enhance benefit levels by diminishing postponements from holding up at crossing points and normal driving time. Presently under the Government's restricted spending plan, not all street

intersections can be fitted with an astute detecting framework! Inquires about and grows practically ready to meet the genuine needs of the sensor framework, you can supplant the current costly detecting framework, understand the boulevards in each of the glimmering lights and absence of activity intersections introduced a smart detecting framework idea. This examination will test for Taiwan second-level street augmentation of movement volume is no settled cruised out activity and no clearly pointed far from pinnacle activity of intersection, to savvy sort sensor recognition expansion activity, then began, records control street trademark records transformation timing and time, decreased driving individuals by means of movement volume no clearly pointed far from pinnacle or expansion activity uncommon of intersection, because of intersection is settled Shi business, records by The creator might want to thank the Ministry of Science and Technology of the Republic of China, Taiwan, for fiscally supporting this exploration delivered of superfluous halted, time, then advancement course kept up more long of activity proceeded into length.

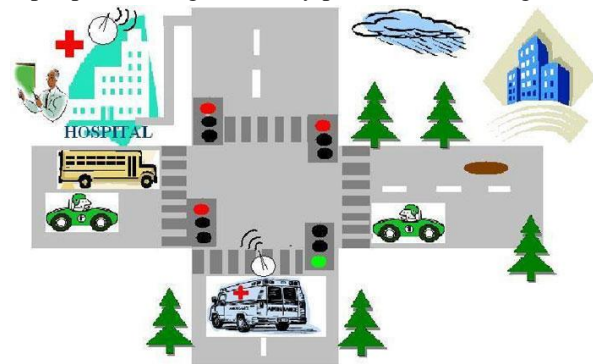


Fig. 1 Architecture of Smart traffic controlling

II. PROPOSED SYSTEM

The rescue vehicle will be settled with the RF transmitter and the RF collector will be settled at the movement signals. This transmitter transmits a remarkable code constantly into air. At the point when the emergency vehicle is close to the activity flags, the remarkable code, transmitted by the

transmitter from the rescue vehicle, will be gotten by the RF recipient at the movement signals. The controlling unit, in the wake of accepting the information from the RF recipient works the activity flags to permit the emergency vehicle to proceed onward without halting it i.e., the green flag will be given for quite a while so that the rescue vehicle can't be gotten in the movement. This green light will be given until the output of the RF beneficiary changes. The output changes when the RF collector does not get any contribution from the transmitter. After the rescue vehicle has passed away, the activity signs will be worked obviously.

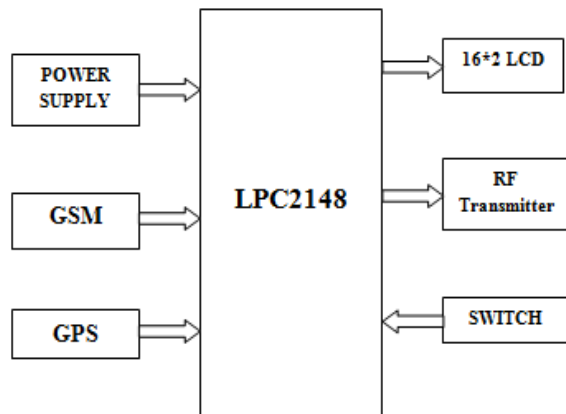


Fig.2 Block diagram of proposed system at vehicle side

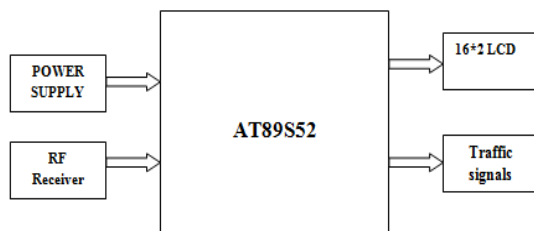


Fig.3 Block diagram of the proposed system at signal point

III. HARDWARE DESCRIPTION

A. ARM 7

The ARM7TDMI-S is a broadly useful 32-bit microchip, which offers superior and low power utilization. The ARM engineering depends on Reduced Instruction Set Computer (RISC) standards, and the direction set and related disentangle component are much more straightforward than those of small scale modified Complex Instruction Set Computers. This straightforwardness brings about a high guideline throughput and Impressive continuous interfere with reaction from a little and practical processor center. Pipeline strategies are utilized with

the goal that all parts of the preparing and memory frameworks can work consistently. Ordinarily, while one guideline is being executed, its successor is being decoded, and a third direction is being gotten from memory.

B. GPS

The Global Positioning System (GPS) is a satellite based route framework that sends and gets radio signs. A GPS collector gains these signs and furnishes the client with data. Utilizing GPS innovation, one can decide area, speed and time, 24 hours a day, in any climate conditions anyplace on the planet for nothing [1] and [2]. GPS was formally known as the NAVSTAR (Navigation Satellite Timing and Ranging). Worldwide Positioning System was initially produced for military. In light of its famous route capacities and on the grounds that GPS innovation can be gotten to utilizing little, economical gear, the administration made the framework accessible for non-military personnel utilize. The USA claims GPS innovation and the Department of Defense looks after it. The compositional parts of GPS are ordinarily alluded to as the control section (ground stations), the space portion (satellites) and the client fragment (beneficiaries).

C. GSM

A GSM modem is a remote modem that works with a GSM remote system. A remote modem acts like a dial-up modem. The fundamental distinction between them is that a dial-up modem sends and gets information through a settled phone line while a remote modem sends and gets information through radio waves [4], [5] and [6]. A GSM modem can be an outer gadget or a PC Card/PCMCIA Card.



Fig. 4 SIM900a GSM/GPRS Modem

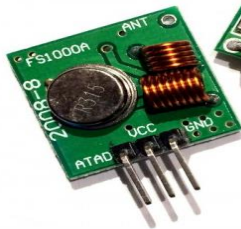
Regularly, an outer GSM modem is associated with a PC through a serial link or a USB link. A GSM modem as a PC Card/PCMCIA Card is intended for use with a tablet phone. It ought to be embedded into one of the PC Card/PCMCIA Card spaces of a

Portable PC. Like a GSM cell phone, a GSM modem requires a SIM card from a remote transporter keeping in mind the end goal to work.

D. RF Transmitter and Receiver

Radio recurrence (RF) is a recurrence or rate of wavering inside the scope of around 3 Hz to 300 GHz. This range compares to recurrence of exchanging current electrical signs used to deliver and distinguish radio waves. Since the greater part of this range is past the vibration rate that most mechanical frameworks can react to, RF normally alludes to motions in electrical circuits or electromagnetic radiation.

Transmitter



Receiver

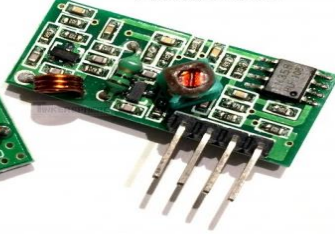


Fig. 5 RF Transmitter and Receiver

1) Properties of RF

Electrical streams that sway at RF have uncommon properties not shared by direct current signs. One such property is the straightforwardness with which it can ionize air to make a conductive way through air. This property is misused by 'high recurrence' units utilized as a part of electric curve welding. Another uncommon property is an electromagnetic compel that drives the RF current to the surface of conductors, known as the skin impact. Another property is the capacity to seem to course through ways that contain protecting material, similar to the dielectric cover of a capacitor. The level of impact of these properties relies on upon the recurrence of the signs.

IV. SOFTWARE REQUIREMENTS

Implementation of microcode deals in microcontroller programming, so that the IC's operations that have been utilized in this system can be controlled. For this framework, Orcad has been utilized for PCB based circuit design and the Keil $\mu\text{v}4$ software development tool has been used to write and compile the programming code, which has been written in the C language. Then after the Flash magic programmer is being utilized to compile this entire code into the microcontroller.

Tools Required

- Orcad
- Keil $\mu\text{v}4$
- Flash Magic

V. EXPERIMENTAL ANALYSIS

This section deals with the hardware setup and the executed results of proposed smart traffic controlling with vehicle tracking system. In this, we have to connect RF Tx to the vehicle side and RF Rx is connected to signal point. If the vehicle nearer to the signal the receiver will receive signal and then traffic signal will be a green sign in the way of ambulance or emergency vehicles. If ambulance receives any message from the hospital, then a switch will be pressed by the driver so that it should send message to the hospital with the web link through GSM. The complete hardware setup board i.e., transmitter and receiver sections have been shown in figure 6 and 7, which contains all the required hardware components fixed and inter connected each other on it. Figure 8 and 9 shows that the received message regarding the vehicle location founder and tracking of vehicle on Google map with latitude and longitude values.



Fig. 6 Proposed system transmitter setup



Fig. 7 Proposed system receiver setup

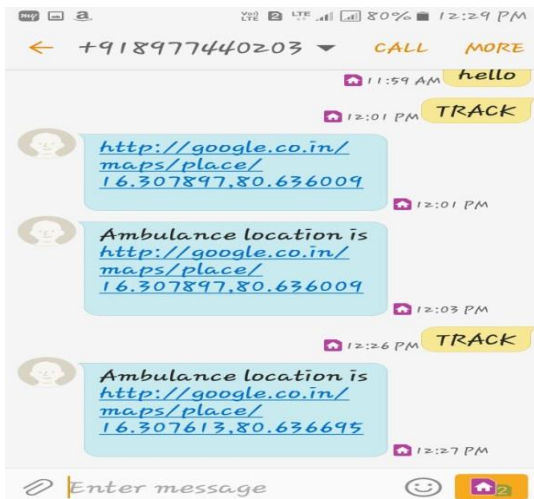


Fig. 8 Received messages at the hospital end

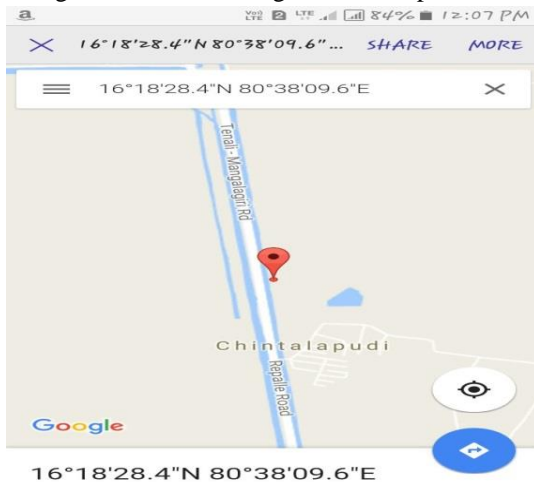


Fig. 9 Vehicle location tracking on Google maps

VI. CONCLUSION

Here, we have implemented a smart traffic controlling and vehicle tracking system for ambulances. We intended to clear the activity and give a route to the emergency vehicles such as ambulances, so that the patient can be saved to the maximum extent. We utilized RF transceiver for sending and receiving the control signals from the ambulances, we also implemented the tracking of the ambulance location by using GPS system. Further, this can be modified and will be enhanced by implementing Internet of Things (IOT) based controlling and monitoring of emergency vehicles using Raspberry Pi.

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