

Smart Wi-Fi Traffic Assister

¹A.T.Stephen Thangaraj, ²S.Thirumala Rao, ³Y.Anusha

¹Associate Professor, ^{2,3}Assistant Professor

Department of Computer Science and Engineering

Dhanalakshmi Srinivasan College of Engineering and Technology, Tamil Nadu, India

Abstract

Advancements of technology in mobile communications beside wide penetration in usage of smart phones and its applications additionally as increase in traffic densities at junctions in each major town ends up in the event of smart Wi-Fi Traffic Assister with signal preponderating victimization RFID technology. The most purpose of such system is to alleviate the tie up at the junctions by causation traffic density info from junction to Smartphone victimization Wi-Fi technology. The planned system placed at traffic junction uses four sets of red, yellow and inexperienced LEDs, four IR sensors, RFID reader, Wi-Fi module of these connected to associate degree ARM7 LPC2148 microcontroller. The IR device contains IR transmitter and IR receiver each is placed on either sides of road like this we tend to place all the IR sensors in a very four road junction. The on and off condition of this IR device offers the density info at a selected road. supported current traffic density at the four road junction, the microcontroller takes call and updates the light delays. The RFID technology is employed to override the light if there's any emergency vehicle like auto, fire truck or important person vehicle etc with associate degree RFID tag at any road in a very four road junction then the RFID reader reads the RFID tag and sends this signal to microcontroller then the inexperienced junction rectifier glows for that individual road. All the signals that cause amendment in traditional operation of traffic signalling are incessantly sent to users by Wi-Fi module and also the user can get the traffic updates whenever needed to his/her smart phone through a telnet application.

Keywords: Smart Phones, RFID, Wi-fi

Introduction

Mounting Smartphone access at the side of the migration of citizens from villages to cities for higher career opportunities results has been increased in population per annum in major cities. With the growing variety of vehicles, the traffic densities will increase day by day at each junction results in hold up and transportation delay on each major cities and concrete arterials ar increasing worldwide. The holdup deteriorates the standard of lifetime of voters and contributes considerably to environmental pollution [3]. The holdup may also be caused by giant Red lightweight delays, the delay of various lightweight is tough coded within the gift light signalling system and it's freelance on the present traffic conditions. So it's much necessary to develop, verify and validate straightforward nevertheless powerful models that facilitate in coming up with and up the security and potency of transportation. In this article the optimization of light controller in an exceedingly town victimization microcontroller is completed. The projected system i.e., "Smart Wi-Fi Traffic Assister" aims at determination this hold up downside and

conjointly tries to cut back potentialities of traffic jams, caused by traffic lights, to associate extent by grouping the traffic knowledge and causation the density info to Smartphone victimization Wi-Fi technology [4].

The microcontroller utilized in the system is ARM7 LPC2148. This method contains four sets of red, yellow and inexperienced LEDs placed at four road traffic junction, four IR sensors every with associate IR transmitter and IR receiver that ar mounted on the either sides of roads severally, RFID reader and Wi-Fi module. The IR system gets activated whenever any vehicle stays on road between IR transmitters and IR receiver which supplies the density info in an exceedingly specific road. In follow we tend to place variety of IR sensors mounted on a specific road at equal distances on the length of that road to some extent. Microcontroller controls the IR system once the IR detector sends its on and off signals to microcontroller then it sends the response by glowing inexperienced junction rectifier thereto specific road wherever the IR detector gets activated. Microcontroller conjointly sends these signals to Wi-Fi module[5].

The supported current traffic density at the four road junction, the microcontroller takes call and updates the light delays and sends this info to good phone through the utilization of Wi-Fi module as a result. The RFID reader is settled at a definite distance from the light controller at each road[1]. The RFID technology is employed to override the stoplight if there's any emergency vehicle like car, truck or influential person vehicle etc with associate RFID tag at any road in an exceedingly four road junction then the RFID reader reads the RFID tag and sends this signal to microcontroller then it responds by glowing the inexperienced junction rectifier for that individual road[2]. All the signals that cause modification in traditional operation of traffic signalling are ceaselessly sent to the user by Wi-Fi module and thereby the user can get the traffic updates whenever needed through his/her good phone with a telnet application. The typical smart wifi and block diagrams are represented in Fig.1 and Fig. 2 respectively for detailed understanding.

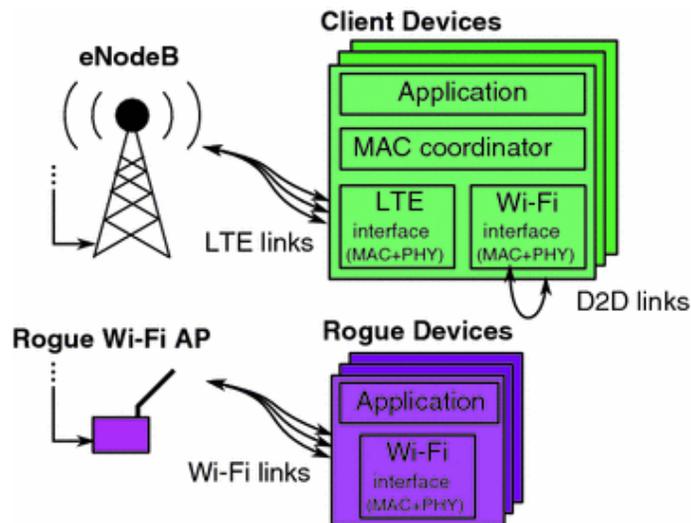


Fig 1: A typical Smart Wi-fi Assister. Source : Alexander Pyattaev(2016)

Thus supported vehicle density, small controller defines completely different ranges for light delays and updates those consequently. The system records vehicle density i.e., the IR detector ON and OFF condition in its memory and allocates predefined recording interval on real time basis. This recorded traffic density knowledge may also be went to analyze traffic condition at various traffic lights connected to the system. so administrator on a central station pc and good phone user will access traffic conditions on any approachable traffic lights and close roads i.e., with within the Wi-Fi signal vary to cut back hold up to associate extent. In future if we tend to implement this TIS in each traffic junctions altogether major cities it will be went to inform folks concerning the traffic condition at completely different places by victimization advanced networks for communication[6].

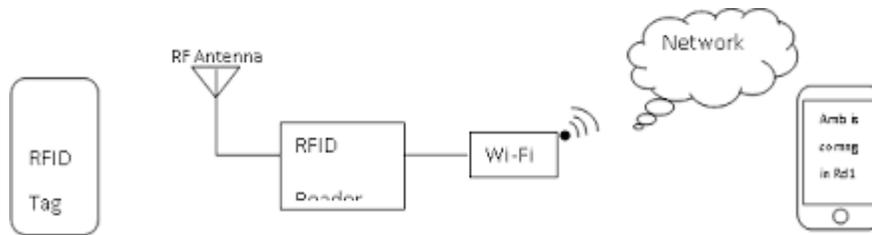


Fig.2 Block Diagram of a Smart Wi-fi Assister

II. Implementation of This Technique

In the style of this technique the microcontroller used is ARM7 LPC2148 in conjunction with this the system contains power provide, four sets of red, yellow and inexperienced LEDs placed at four road traffic junction, four IR sensors every with associate degree IR transmitter and IR receiver that area unit mounted on the either sides of roads severally, RFID reader, digital display and Wi-Fi module[7]. The IR system gets activated whenever any vehicle stays on road between IR transmitter and IR receiver which supplies the density data in a very specific road. The RFID technology is employed to override the traffic signalling and liquid crystal display is employed to display the traffic density data at each amendment in traditional operation of the traffic signalling. The Wi-Fi module ESP8266 is employed to send signals i.e., density data that is displayed on digital display from microcontroller to sensible phone users through the employment of Telnet application

III. Wi-Fi Technology

ESP8266 module is a powerful, low value and could be a self contained SOC with integrated TCP/IP protocol stack which will provide any microcontroller access to your Wi-Fi network i.e., this Wi-Fi module is appropriate for adding Wi-Fi practicality to AN existing microcontroller via a UART serial association. it's capable of either hosting AN application or offloading all Wi-Fi networking functions from another application processor. every ESP8266 module comes preprogrammed with AN AT command set code, meaning, you'll merely hook this up to your

Arduino device and obtain concerning the maximum amount Wi-Fi-ability as a Wi-Fi defend offers[8].

Fig.3 Pin Diagram of ESP8266. This ESP8266 module is a very value effective board with an enormous, and ever growing, community. The module will even be reprogrammed to act as a standalone LAN connected device—just add power. This module encompasses a powerful enough on-board process and storage capability that enables it to be integrated with the sensors and different application specific devices through its GPIOs with least development up-front and least loading throughout runtime. Its high degree of on-chip integration permits for least external electronic equipment, together with the front-end module, is meant to occupy least PCB space. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existence interfaces, it contains a self-calibrated RF permitting it to figure below all operative conditions, and needs no external RF components. The ESP8266 Module isn't capable of 5V thus 5-3.3V logic shifting and can need AN external Logic Level device.

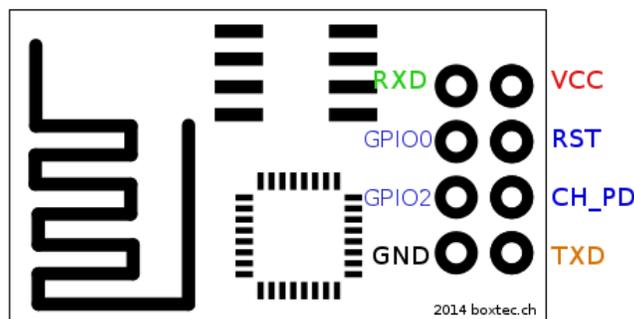


Fig.3 Pin Diagram of ESP8266

IV. Software Tools

The package employed in the event of this method is Telnet application and Keil compiler.

A. Telnet Application

- Telnet is associate degree application layer protocol used on the web or native space network to produce a biface interactive text destined communication facility employing a virtual terminal association Telnet even predates internetworking and also the fashionable information science packet and transmission control protocol transport layers.
- The TELNET protocol provides a uniform interface, through that a program on one host (the TELNET client) could access the resources of another host. (the TELNET server) like the shopper were an area terminal connected to the server.
- For example, a user on a digital computer on a LAN could connect with a bunch hooked up to the LAN like the digital computer were a terminal hooked up on to the host. Of course, TELNET could also be used across WANs likewise as LANs.

V. Conclusion and Future Scope

This paper is employed for improvement of traffic signal controller by victimization IR Sensors for current traffic density data that is displayed within the LCD and conjointly sent to users sensible phone through Wi-Fi technology. this method is employed to cut back traffic jams caused by traffic lights delay ANd conjointly by the response of current traffic updates data to the sensible phone users to an extent and can get winning results if enforced.

In future AN economical application is meant for obtaining this current traffic density data beside GPRS route map with color cryptography betting on level of density for higher image to user.

References

- [1] J. Guo, J. Xia, and B. Smith, "Kalman filter approach to speed estimation using single loop detector measurements under congested ," J. Transp. Eng., vol. 135, no. 12, pp. 927–934, Dec. 2009
- [2] M. A. Ferman, D. E. Blumenfeld, and X. Dai, "An analytical evaluation of a real-time traffic information system using probe vehicles," J. Intell. Transp. Syst., vol. 9, no. 1, pp. 23–34, 2005.
- [3] Pyattaev A. et al. (2014) Network-Assisted D2D Over WiFi Direct. In: Mumtaz S., Rodriguez J. (eds) Smart Device to Smart Device Communication. Springer, Cham
- [4] Stylianos Gisdakis, Vasileios Manolopoulos, Sha Tao, Ana Rusu, and Panagiotis Papadimitratos "Secure and Privacy-Preserving Smartphone based TIS" IEEE Transactions on intelligent transportation systems, VOL. 16, NO. 3, JUNE 2015
- [5] S. Tao, V. Manolopoulos, S. Rodriguez, and A. Rusu, "Real-time urban traffic state estimation with AGPS mobile phones as probes," J. Transp.Technol., vol. 2 no. 1, pp. 22–31, Jan. 2011
- [6] V. Manolopoulos, S. Tao, A. Rusu, and P. Papadimitratos, "Smartphonebased traffic information system for sustainable cities," ACM SIGMOBILE Mobile Comput. Commun. Rev., vol. 16, no. 4, pp. 30– 31, Feb 2013
- [7] Y. Chen, L. Gao, Z. Li, and Y. Liu, "A new method for urban traffic state estimation based on vehicle tracking algorithm," in Proc. ITSC, 2007pp. 1097–1101.
- [8] Y. Wang, M. Papageorgiou, and A. Messmer, "Real-time freeway traffic state estimation based on extended Kalman filter: A case study," Transp.Sci., vol. 41, no.2 , p. 167, May 2007