ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 7, Issue 11, November 2018

Traffic Control System

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Abstract: In this paper, decentralized traffic light control using wireless sensor network. The system architecture is classified into three layers; the wireless sensor network, the localized traffic flow model policy, and the higher level coordination of the traffic lights agents. The wireless sensors are deployed on the lanes going in and out the intersection. These sensors detect vehicles' number, speed, etc. and send their data to the nearest Intersection Control Agent (ICA) which, determines the flow model of the intersection depending on sensors' data (e.g., number of vehicles approaching a specific intersection). Coping with dynamic changes in the traffic volume is one of the biggest challenges in intelligent transportation system (ITS). Our main contribution is the real-time adaptive control of the traffic lights. Our aim is to maximize the flow of vehicles and reduce the waiting time while maintaining fairness among the other traffic lights. Each traffic light controlled intersection has an intersection control agent that collects information from the sensor nodes. An intersection control agent manages its intersection by controlling its traffic lights.

Keywords: Automated traffic system, Arduino mega, Ultrasonic sensor, Buzzer, Light Emitting Diode (LED) ; Dual 7-Segment Display Internet of Things (IoT),Traffic congestion. Wi-Fi module ESP 8266

I. INTRODUCTION

In that Vehicular traffic is continuously increasing around the world, especially in large urban areas. The resulting congestion has become a major concern to transportation specialists and decision makers. We investigate the problem of adaptive control of traffic lights using real-time traffic information collected by a wireless sensor network (WSN). The wireless sensors are deployed on the lanes going in and out the intersection. Our aim is to maximize the flow of vehicles and reduce the waiting time while maintaining fairness among the other traffic lights. Each traffic light controlled intersection has an intersection control agent that collects information from the sensor nodes. we present an adaptive traffic control system based on a new traffic infrastructure using Wireless Sensor Network (WSN) and using new techniques for controlling the traffic flow sequences. These techniques are dynamically adaptive to traffic conditions on both single and multiple intersections. A WSN is used as a tool to instrument and control traffic signals roadways, while an intelligent traffic controller is developed to control the operation of the traffic infrastructure supported by the WSN.

II. LITERATURE SURVEY

Title: Traffic Avoidance in VANET using Ant Colony Optimization K.Sivakumar1* and C. Chandrasekar2
Author:-1Research Scholar, 2Professor, Department of Computer Science, Periyar University, India
Description:- Nowadays traffic avoidance is most complicated problem in this urban area. This paper proposes how to avoid or quickly cross the traffic in large area based on Ant Colony Optimization (ACO) in VANET. It is proposed for identifying the best path to a destination in the simulation area. It has a traffic factor such as vehicle speed, number of vehicles percent in specific path, road capacity, and alternate path to the destination. The simulation results are analysis using SUMO, MOVE, NS2 tools.

Title: Web Service Based Automation System For Duration Scheduling and Remote Control Of Traffic Signal Light.
Author: Emre Dandil,Sabri Gultekin
Description: Thus During Sudden moments of intervention, a great convenience and speed will be ensured for updating the duration of lights. In the study , a prototype is designed on the breadboard and the results are observed on this prototype. Furthermore, Users can be able to control the traffic signals through the internet by the designed interface applications. Therefore significant gains are predicted for the traffic signalization systems in terms of time and financial costs.

Title: Device to Device Interaction Analysis in IoT based Smart Traffic Management
Author: Shubham N. Mahalank, Keertikumar B. Malagund, R. M. Banakar

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

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Vol. 7, Issue 11, November 2018

Description: In an experiment of Smart Traffic Management System the method to determine Traffic Density on a particular lane is discussed. Ultrasonic Sensors are employed as the data acquisition unit to collect the information regarding Traffic Density and Raspberry Pi is used as Control Unit for processing the data. The information regarding traffic density sensed is processed and transmitted to the users provided with Android Application, where the user get a notification about the traffic density in that particular lane and hence assist to take an alternate path.

Title :- An Easy to Deploy Street Light Control System Based on Wireless Communication and LED Technology.
Author :-Pilar Elejoste 1, Ignacio Angulo 1, Asier Perallos 1,*, Aitor Chertudi 1, Ignacio Julio García Zuazola 1, Asier Moreno 1, Leire Azpilicueta 2, José Javier Astrain 3, Francisco Falcone 2 and Jesús Villadangos 3
Description:-This paper presents an intelligent streetlight management system based on LED lamps, designed to facilitate its deployment in existing facilities. The proposed approach, which is based on wireless communication technologies, will minimize the cost of investment of traditional wired systems, which always need civil engineering for burying of cable underground and consequently are more expensive than if the connection of the different nodes is made over the air. The deployed solution will be aware of their surrounding's environmental conditions, a fact that will be approached for the system intelligence in order to learn, and later, apply dynamic rules. The knowledge of real time illumination needs, in terms of instant use of the street in which it is installed, will also feed our system, with the objective of providing tangible solutions to reduce energy consumption according to the contextual needs, an exact calculation of energy consumption and reliable mechanisms for preventive maintenance of facilities.

PROPOSE SYSTEM
In the proposed embedded system Project on Intelligent traffic control system, the traffic signal lights are controlled by single board computers with the reference of vehicle density on the road. If the vehicle density is high then the interval of green signal will be faster than the default time interval. The four side single board computers will check the density and that information will send to the server that controls the traffic signals. So four side single board computers will be connected in a wireless network. The wireless network obtained with ZigBee wireless protocol with this technique the passengers can save time at the traffic signals.

III. SYSTEM ARCHITECTURE

Following diagram is our system's architecture diagram:

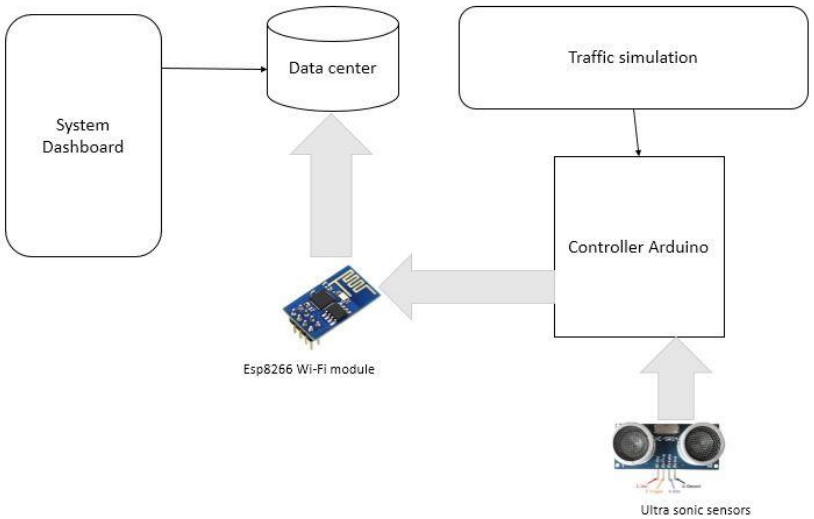

Figure 1: system architecture

In system architecture the user can register the application and registration is successful then login the application. Using Ultrasonic sensor can sense the data. This data can be save in Arduino and this information is send to the application using Wi-Fi. The Wi-Fi module is ESP8266 can be used and send data to user.

IV. METHODOLOGIES

In Normally the traffic signals will ON and OFF in an equal interval of time. But when the vehicle density increases on the road the interval of green signal and red will change. On the road there will be fixed with ultrasonic transceiver module and it will be placed some distance apart from the traffic junction. So whenever the vehicle density increases,

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ISSN (Print) 2319-5940

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some vehicles may stopped on the ultrasonic transceivers fixed on the road. The ultrasonic will detect the vehicle and check for certain time interval, if the vehicle is still on the same place after a certain time then the system will take it as vehicle density. According to the time interval of reflection of ultrasonic, the system will calculate the percentage of vehicle density and that information will be sending to the server over radio communication. The server will collect all information from all the side single board computers and calculate which side road should show green signal and how much time green signal should be there.

CONCLUSION

We design of an intelligent traffic control system, utilizing and efficiently managing WSNs, is presented. An adaptive traffic signal time manipulation algorithm based on a new traffic infrastructure using WSNs is proposed on a single and multiple road intersection point. A new technique for changing the traffic phase's succession, during the traffic control, is another contribution of this paper. The proposed system with its embedded algorithms is proved to play a major role in alleviating the congestion problem when compared to inefficient classical traffic control systems. Furthermore, our traffic control system can be easily installed and attached to the existing traffic road infrastructure at a low cost and within a reasonable time. The system is self-configuring and operates in real-time to detect traffic states and exchange information with other nodes via a wireless communication with self-recovery function. In addition, no traffic disruption will be necessary when a new traffic sensor is to be installed. In the future work of this study, we plan to simulate the human driving behaviors and package the entire system using FPGA technology. In addition, different types of intersections and different types of crossing directions in the system will be considered.

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