JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

A Survey paper on Unwarranted stoppage of automobiles

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***Abstract*—In the current scenario, rapid increase in the population and urban mobility in metropolitan cities like Bangalore, Mumbai, Chennai, Delhi congestion of vehicles often occur on the roads. The streets are becoming more populous making traffic congestion a serious issue to be solved. To tackle this issue of unwanted traffic congestion on roads, innovative and efficient thinking is required to develop a solution to this problem. Applications involving the use of the Internet of Things (IoT) have been growing around the world. Implementing these techniques will give us the full advantage of developing an efficient model to control this traffic congestion. Traffic can be controlled by either using traffic light or traffic police. The traditional traffic light methods are not an efficient way of controlling traffic anymore, a smart and automated traffic light system is required to overcome this problem. A smart traffic light system that will monitor the congestion level using sensors could be a possible solution to manage the traffic congestion. In the conventional method, each traffic signal has a fixed duration that cannot be varied based on the traffic density on each lane. This smart traffic light system can be replaced with the traditional system where the go time of each lane can be varied depending on the density of vehicles present in the respective lanes. In this type of control system, the traffic light scheduling and durations are dynamically controlled. This technology aims to smoothen the flow of vehicles, reduce the waiting time and queue length at a traffic signal.**

Keywords—Internet of Things (IoT), Traffic, Congestion, Traffic signal, Automobiles.

I. INTRODUCTION

Internet of Things (IoT) is a system of interrelated computing devices, machines or objects that have the ability to transfer data over a network without requiring any human interaction. IoT can also be described as object or a group of objects that are embedded with sensors, software and processing abilities that can connect with other devices over the internet to transfer data or communicate.

An IoT ecosystem consists of smart devices that are web enabled. These smart devices use embedded system such as processors and sensors, to collect, send and act according to the data collected. IoT devices share the collected sensor data by connecting to an IoT gateway or other edge devices where the data is either sent to the cloud to be analyzed2 or is analyzed locally.

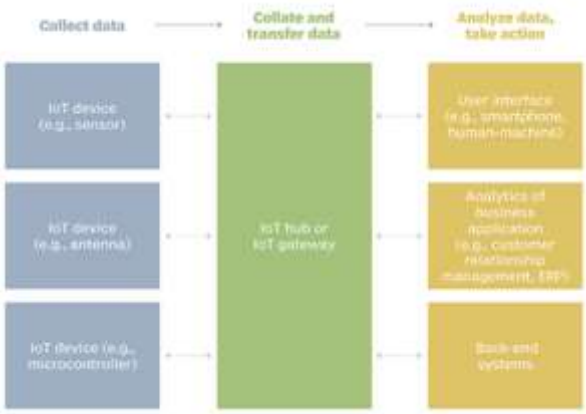

Fig. 1. IoT System

A. *Architecture*

IoT architecture consists of three tiers or layers: (a) Device or things (b) The edge gateway (c)The cloud

The things or device includes networked things like a sensor or an actuator that use protocols such as Bluetooth or any other proprietary protocols, to connect to an Edge Gateway. The edge gateway layer consists of sensor data aggregation system called Edge gateway functionality, such as pre-processing of the data, securing connectivity to cloud. Edge gateway can also give a common view of the device to the upper layer for easier management. The last layer i.e., the cloud layer includes cloud application built for IoT using microservices architecture, stored using backend data storage system. The cloud tier in most of the cloud-based systems features messaging and queuing systems that handles communication that emerge in all the tires.

Fig. 2. Architecture of IoT

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B. *Current Situation*

In the current method where the traffic signals are of static or fixed duration vehicles have to wait at the signal unnecessarily sometimes. Let us elaborate the situation, suppose there are two lanes one with high density of traffic and the other with less density of traffic. The wait time and go time of each lane is predefined for each lane. Now, the vehicles in the high-density lanes will have wait for every red signal on the traffic signal even when there are no vehicles in the less dense lanes, this not only creates unwanted traffic congestion but also creates chaos and people start breaking traffic laws.

C. *Oppurtinity*

Implementing a smart or intelligent traffic light where the wait time and the go time of a traffic signal depends on the density of the vehicles on each lane. With the help of appropriate sensor and optimised processing techniques we can make an IoT system where the traffic signals change the duration of the red and green signal with respect to the density of vehicular traffic on the respective lanes.

II. RELATED WORKS

The author Dr.Vikram Bali , Ms. Sonali Mathur et.al. [1] Developed system works in the method to find the proper work of Infrared , display viewing, radar modulation of the congestion management. These all help in working on the congestion large productive manner. The system proposed made use of new thinking like the new method that make difference as compared to the available solutions. It comprises of RFI-D tag,tag tool scanner along with ArdUNO also joining all this for proper function of the model. The tag will take the input and save data after getting data from the tag and notify it to mainserver which make use cloud technology. The method make prominent all automobiles will reach the final location without having trouble in congestion problem. Finally ,this make ensure outcome ensure the valuable time and making of working on a good efficient city.

A certain author Hua Wei et.al explained that at wherever four road section, there will be two variety in way of of path: enter path and exit path. An enter path is way where automobiles will make a way to the cross-section road. An exit path works in making a way for exit of automobiles out of the criss-cross section. Figure 3 shows a junction which has four entering path and exit path [2]. The southern entry path is shown in this figure as the path or in northern path where automobiles going towards the southern way is observed. The end outcome of congestion management looks to ease efficient along with proper running automobiles in junction.

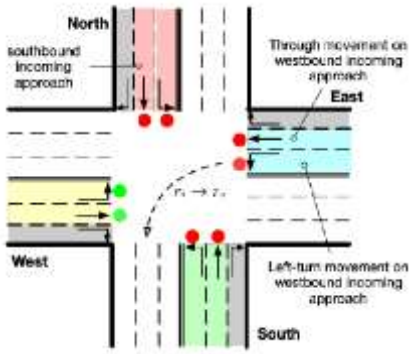

Fig. 3. A junction with quadraple entry and exit path

Sabeen Javaid er.al proposed efficient congestion controlling system to work on automobiles at road criss-cross, by getting information through sensors, and RFI-Ds which located and added adjacent on pathways [3]. It will process detected information at the first level and store in available storage server and finds number of automobiles so as make managing congestion according to number of the automobiles. It will also help the people to have knowledge on the number of vehicle in the so as to ensure particular road through analysis. Normal methods did not work in controlling current congestion properly. Looking at all these methods for congestion management systems, a proper method was proposed in ensuring the proper movement of vehicles without waiting in the singals.

A specific author Anam Firdous, Indu, Vandana Niranjan designed to work on the congestion signals based on the number of vehicles in that particular [4]. The Arduino Uno take input data from the IR dectectors. Arduino will find the population of vehicles based on the information received from the detectors, according to the automobiles waiting in the lane to ensure it will control the way in which congestion signals recession of display lights are used for showing in the display. Every amber pole has three ,top is green then comes orange and then red one. The infra detectors detect automobiles according the sense one of the way reflected through the detectors and actuators. These detectors opposite to the way and towards road to ensure congestion managing properly and effectively.

S.Sundara Mahalingam, S.Arockiaraj gave explanation that Precedence of congestion display wants making to be be managed according to count of automobiles staying as to equal way. The proposed system and method develop a density based amber light system for the automobiles. The caution light changes on its own way on identifying the number of vehicles. This method is demonstrated which uses IR sensors along with Arduino. Detectors are IR which help calculate the population in specified lane. Infrared detectors will not work in some of the regular light and has some limitations. so amber light does not works in proper way [5]. In coming days, it may be replaced with good detectors for the detection. IR detectors may be used every each lane in

well-known manner to detect traffic density accurately. these sensors always manage the congestion on that particular lane. these sensors are connected to the Arduino for the analysis of the congestion of automobiles. Based on these sensors, controller detects the congestion and manage the congestion system accordingly. The managing of traffic light depends on number of automobiles available in the lane.

T.E Some fun et.al proposed the normal caution light which has pre-defined method and function in making a way to make the display"go time"for vehicles at junction by not considering the density of automobiles. This gave us a idea gave a solution display in the amber signal. This system uses IR sensors to count and to calculate the congestion density in each lane.Detectors are connected to display with a connection with MC. The micro-controller (MC) used is the ArdMega along for 2560 chip for some of analysis of congestion. The system was developed to control unwarranted traffic. Outcome obtained that congestion control with infrared Detectors along with a ArdMega 2560 produced a good output and the duration took to manage unwanted stopping at a criss-cross was lessen notably by sixty percent time.[6]

The 68% population of the world would live in the city or metropolitan areas by 2050. Inorder to rectify the problems in conventional traffic we use this method.[7] it was developed Megalingam et al.

The information is feed to wireless network (WSN) nodes. They have implemented a technology to exchange information between WNS nodes and central monitoring systems (CMS). They track the vehicles at higher speeds and they reduce vehicle waiting time.

An adaptive neuro-fuzzy interface system (ANFIS) is utilizes to control the traffic signals. Rules are automatically generated by ANFIS according to the given input output dataset. The smart cities are planned by implementing this method

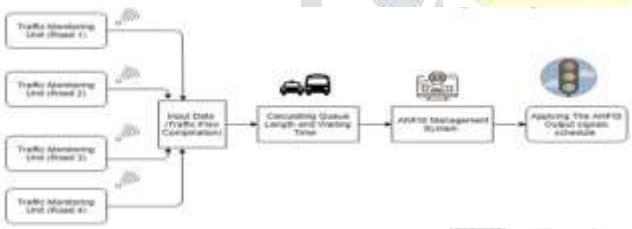

Fig. 4. Flow diagram of Adaptive Neuro-fuzzy Inference system [9].

To save our lives in emergency times ambulance plays an important role due to heavy traffic in all the places. There are chances of losing these lives. So, this method is implemented in which the signals are sent to the microcontrollers, these signals are sent to the microcontroller by the sensors. [10] This microcontroller can therefore be used for controlling the speed on the vehicles. In the proposed system they have used IR sensors to measure the traffic density. [10] According to logic 0 and 1, microcontroller changes the glow time of the green LED.

The information is exchanged Between the devices for controlling instruction to each other through the Internet and other communication Medium. The following equation is used to calculate the overall IoT information [11].

$$IoT = Real - time\ physical\ information + appliances + networking\ media \quad (1)$$

With the increased population the number of vehicles has also Increased, so there is a need of smart traffic management system.

There are four video cameras at each traffic junction in all four sides they all have red lights facing the road. In this use MATLAB library for image and video processing and C++ compilers are used for algorithmic results. [12] Consider there are four sides namely S1, S2, S3 and S4 and respective cameras installed namely C1, C2, C3, C4 receives the live information from the cameras and does similar processing for each information.

There is a circuit which has a current grant and then convert the input AC voltage (227/220 V) to DC voltage (5V). [8] Two control DC Lance at 12 Volt this is grant voltage input terminal is to be inserted to contribute energy for the lamp. For Microcontroller electronic circuit, we use STMicroelectronics STM32F103C8T6 microcontroller with Cortex-M3 32-bit ARM core [8].

CONCLUSION

The study concludes that the current method of managing traffic at the any junction or a signal is of fixed duration where the wait time and go time of the signal are fixed irrespective of the traffic density. We can implement a smart or intelligent traffic signal where the wait time and go time of the signal depends on the density of traffic on respective lanes. We can use appropriate sensors to read the density of the vehicles and process these data to make the traffic signal dynamic.

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