ISSN 2395-1621

IOT Based Auto Vehicle Traffic Routing Navigation System

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ABSTRACT

A world with growing individual traffic requires sufficient solutions for traffic monitoring and Navigation. The actual ground based approaches for traffic data collection may be barely sufficient for everyday life, but they will fail in case of disasters and mass events. Here, we presented a new Image Processing based Automatic Routing Navigation System. In this method road image captured using the high resolution camera and transmitted to PC for processing. Traffic density is calculated from these images for each road and according to the traffic density signals sent on Internet for other locations and Traffic Signals. This Traffic density will be shown to nearby signal on dashboard. Because of this alternate solutions can be obtained.

Keywords: Traffic monitoring and Navigation, Automatic Routing Navigation System, Traffic density.

ARTICLE INFO

Article History

Received: 20th April 2017

Received in revised form :

20th April 2017

Accepted: 23rd April 2017

Published online :

23rd April 2017

I. INTRODUCTION

Traffic congestion is one of the major problems of urban life. This problem is increasing day by day because of the increasing number of vehicles with limited infrastructural development. Under this circumstance, the conventional traffic light systems which are timer based are not able to control traffic congestion. If a lane has more traffic congestion than the others, the existing system fails to control traffic. Traffic density is a fundamental macroscopic characteristic of traffic flow, and is used in assessing traffic performance from the point of view of users and system operators. It is also employed as the primary control variable in freeway control and surveillance systems. A common feature across road networks in many urban regions in the developing world is the presence of critical congestion areas; we refer to a critical congestion area as one where a network of roads converge and a large amount of traffic needs to traverse the common congestion area. Traffic data may come from different sensors such as loop detectors, pneumatic sensors, or cameras. In particular, in the area of urban traffic monitoring, real-time data are integrated with short- and long-term knowledge of the traffic status, to dynamically update traffic information. To ensure a reliable transportation system it is important to have an intelligent traffic control System. The very first step to do that is to acquire traffic data. Traffic data may come from different sensors. Some examples are use of induction loop, infra-red light sensor, optical flow etc. However in recent day's image processing techniques has been very important and promising topic to deal with traffic related problems because of its ease of maintenance and being more intelligent system. Different techniques have been proposed to acquire traffic information. Most of the work detects edge of the vehicles and counts the number of traffic on the road. However the disadvantage of the method is that counting the number of vehicles may give faulty results when space between the vehicles on the road is very small (i.e. two cars very close to each other may be counted as one vehicle).. To analyze and regulate the traffic based on operations management, it is necessary to determine the volume and density of the incoming traffic. Once we are able to detect and separate out traffic into packets based on density, we can ensure that at any given point of time there is maximum density of vehicles passing through the intersection thereby having high throughput and less waiting time for all the vehicles. Also by using the IOT concept we can share this information. We can implement a screen on each traffic signal so we can get the traffic density of the upcoming signals, by which we can change the path/road according the

traffic. This may help in reducing the traffic congestion on large amount.

II. PROPOSED WORK

A. Block Diagram

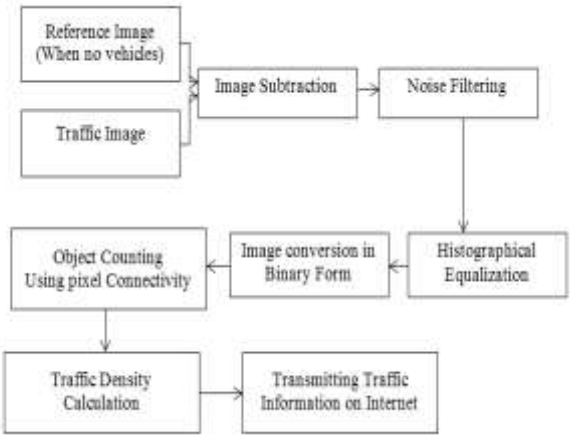


Fig 1-Block Diagram

B. Block Diagram Description

The picture of a road can be represented as digital data i.e. binary data but it needs to be processed before using so as to extract relevant information from it. This is to be done because when the image is captured from natural environment, the image is raw and unformatted. Therefore operations like image enhancement, edge enhancement, brightening etc. are used. In the framework the image is captured through the camera, then it is subtracted and noise is filtered from the image. The image contrast is adjusted by using the Histographical Equalization. In order to get the appropriate traffic density the image coversion is done into binary form, and then the traffic density calculation is done by ratio of no of objects detected to the background in the image, which is then transmitted by using Internet.

C. Hardware Description

1) Camera

Camera is use for catching street chart .camera catch picture is indicating change in thickness of street.

Picture is catch by high determination web camera.

Fig 2 : Camera INTEX IT-306 WC

Features

1. Frame rate: up to 30fps
2. 30 mega pixels (3264*2448) interpolated
3. USB 1.1 interface.
4. Night Vision.

2) Raspbery Pi

Fig 3 : Raspberry Pi Model

The Raspberry Pi is a series of credit card-sized single-board computers. It promotes Python and Scratch as the main programming language, with support for many other languages. The raspberry pi board comprises a program memory (RAM), processor and graphics chip, CPU, GPU, Ethernet port, GPIO pins, Xbee socket, UART, power source connector. It also requires mass storage, for that we use an SD flash memory card. So that raspberry pi board will boot from this SD card similarly as a PC boots up into windows from its hard disk. Optional hardware specifications include USB mouse, powered USB hub, case, internet connection, the Model A or B: USB WiFi adaptor is used and internet connection to Model B is LAN cable.

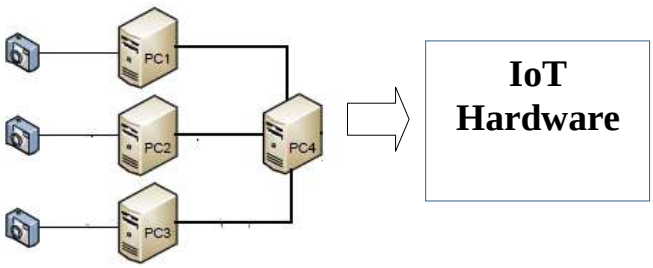
Features & Details:

1. 512 MB SDRAM memory
2. MMC, SD, SDIO Card slot on board storage
3. Linux Operating system
4. Dual Core Video Core IV Multimedia coprocessor
5. 3.5 MM Jack, HDMI Audio Out

D. Software Description

1.Matlab
2.Eclipse
3.Java

III. IOT CONCEPT



IoT is Things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental, and user contexts.
IoT is simply the network of interconnected things/devices which are embedded with sensors, software, network connectivity and necessary electronics that enables them to collect and exchange data making them responsive.

APPLICATIONS

1. Navigation Systems: This provides us proper information about the roads and helps us to reach us our destination quickly.

2. Traffic signal breaking detection system: It includes the detection of vehicle or object breaking the traffic rules or traffic signal.

3. Smart Cities: It is most efficient for the smart cities due to the increase in the traffic density.

IV. DISCUSSION

In this venture we have built up a traffic Navigation and Routing system which gives the information of traffic density to the server using IOT. Advanced feature in this system is that, every signal is going to have a screen or LCD which will display the traffic density in the upcoming signals, by which we can switch our route according to the traffic further by using our intelligence.

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