IoT Based Real Time Traffic Analyzer

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ABSTRACT

In urban areas road side traffic plays a major problem for the people at emergency situation. Due to increase in population we cannot avoid road traffic all the time. But the vehicle at emergency situation such as ambulance, fire service can analyze the present traffic status of the root and they can choose alternate route to reach the destination at time. It based on camera which continuously records the video and the video is taken as image sequence. The image samples are processed, the vehicle crowd present in road is taken as positive values and non-vehicle areas are taken as negative value. Now this processed data is stored in cloud computing as public access. Camera consists of GPS module so just by typing the location one can get the traffic status of that area and can keep on monitoring the route. It will be very helpful for emergency situation. In this system we have an additional feature. This method utilizes several components from video processing and computer vision for motion detection, background subtraction, and vehicle detection.

KEY WORDS: Binary Image Subtraction, Dynamic Object detection, CCTV Camera.

1. INTRODUCTION

Traffic control and monitoring using video sensors has recently drawn increasing attention, due to the significant advances in the field of computer vision. Many commercial and reach systems use video processing, aiming to solve specific problems in road traffic monitoring.

Development of intelligent transportation systems (ITS) is an active area of research due to potential benefits to society that include reduced fuel consumption and emissions, improved safety, reduced cost of law enforcement, and reduced traffic congestion.

One of the most common uses of ITS has been in several applications within traffic law enforcement, such as vehicle speed detection and stop light enforcement. These applications have played an important role in decreasing the number of serious accidents.

For instance, in a study performed on rural roads in the Netherlands, speed limit enforcement with mobile radar was shown to result in 21 and 14% reductions in accidents involving severe collision and injuries, respectively.

Various research projects to detect and track vehicles from stationary cameras have been carried out in the past decade. In traffic surveillance system, the evaluation of traffic conditions can be represented by the following parameters: traffic flow rate, average traffic speed, the length of queue, the number of vehicles and traffic density. Most of the proposed methods used to extract traffic information based on vehicle detection and tracking techniques. In these systems, robust and reliable vehicle detection and tracking is a critical step.

Existing System: Traffic Surveillance by Counting and Classification of Vehicles. A novel algorithm for advance Traffic Surveillance by vehicle counting and classification, based on the image processing theory. Vehicle counting is done by Background subtraction and finding the centroid. Classification is done by thresholding method. A reference frame is initially used and considered as background information. While a new object enters into the frame, is detected by background subtraction. The foreground information and background information are identified using the reference frame as background model. Video sequences have been captured and tested with the proposed algorithm. Experimental results, which demonstrate the system's performance, are also shown.

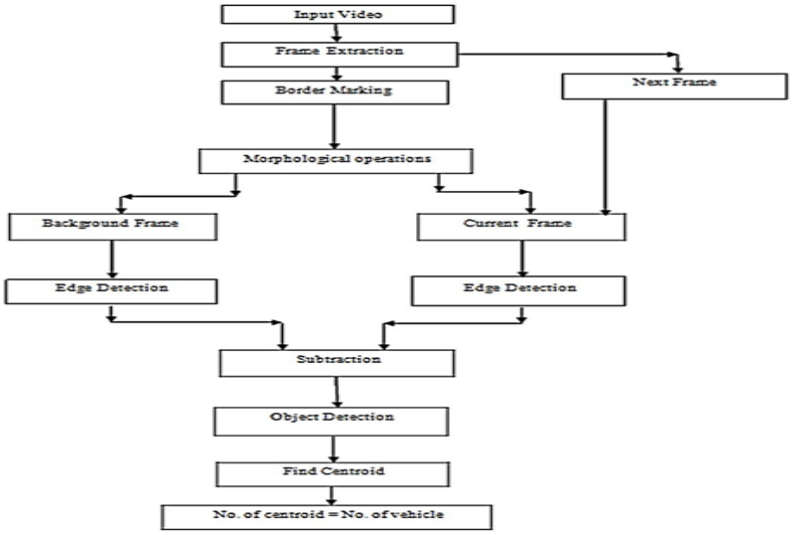

Figure.1. Flowchart of existing system

Problem Identification: The people at cities and emergency vehicles face many problems due to traffic. Because of that the people and emergency vehicle cannot reach the destination on time. It creates many problems. For instance, if any emergency vehicle delays to reach the destination the cause are severe the death may occur. To reduce these serious issues our proposed project helps the people and an emergency vehicle to reach the destination on time or before.

Proposed System: First, The raw images is taken and converted to complete black image. That black image is stored in database for comparison. Then the continuous video of road side traffic is recorded by using the camera.

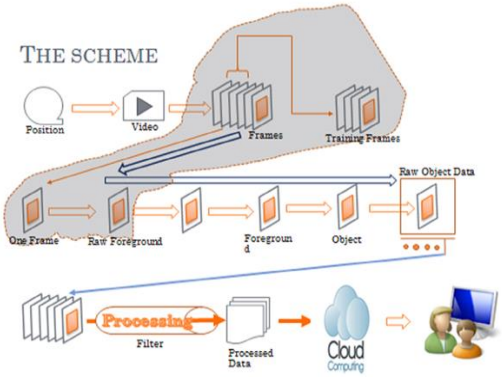

Figure.2. Block Diagram of Text Reading

If the video recording camera is used, then the continuous video is converted into continuous image frames. Each and every image frames are separated and processed.

These images are converted binary images and separated as foreground object and background object. This can be done by two method: a. Binary image subtraction method and b. Dynamic object detection method.

Binary Image Subtraction: It subtracts the converted binary image with already stored raw background image and gives the traffic area value.

Dynamic Object detection method: In this method object which ever moving can be calculated and gives the traffic value; while analyzing both cases the, Binary image subtraction is more efficient than dynamic object detection method. Because in case of object detection method at the time of traffic static vehicle cannot be detected this is a drawback of that method.

Figure.3. Trained background

The fig.3, given above is an example to take background image and process it to binary image. The picture given below illustrates how the image frames are taken for processing.

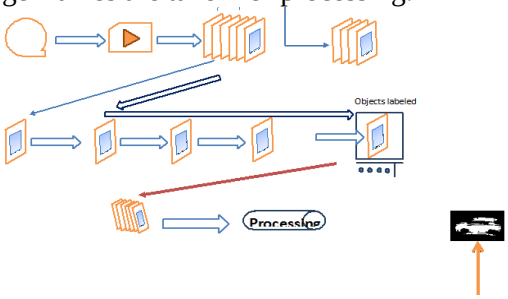

Figure.4. Image frames

In our proposed project the output is given to the end user through cloud i.e. by accessing the G-mail account. In that account the real time data of the corresponding location is updated continuously. The future work is to make the project reliable for user.

CCTV Camera: Surveillance cameras are video cameras used for the purpose of observing an area. They are often connected to a recording device or IP network, and may be watched by a security guard or law enforcement officer. Cameras and recording equipment used to be relatively expensive and required human personnel to monitor camera footage, but analysis of footage has been made easier by automated software that organizes digital video footage into a searchable database, and by video analysis software (such as VIRAT and Human ID).

Figure.5. Positioning of camera

Cloud Computing: Cloud computing, or in simpler shorthand just "the cloud", also focuses on maximizing the effectiveness of the shared resources. Cloud resources are usually not only shared by multiple users but are also dynamically reallocated per demand. This can work for allocating resources to users.

The term "moving to cloud" also refers to an organization moving away from a traditional CAPEX model (buy the dedicated hardware and depreciate it over a period of time) to the OPEX model (use a shared cloud infrastructure and pay as one uses it).

The amount of footage is also drastically reduced by motion sensors which only record when motion is detected. With cheaper production techniques, surveillance cameras are simple and inexpensive enough to be used in home security systems, and for everyday surveillance.

Proponents claim that cloud computing allows companies to avoid upfront infrastructure costs, and focus on projects that differentiate their businesses instead of on infrastructure.

2. CONCLUSION AND FUTURE WORK

In this paper, a method for estimating the traffic using Image Processing is presented. This is done by using the camera images captured from the highway and videos taken are converted to the image sequences. Each image is processed separately and the number of cars has been counted. If the number of cars exceeds a specific threshold, warning of heavy traffic will be shown automatically.

The advantages of this new method include such benefits as:

- Non-use of sensors
- Low cost and easy setup and good accuracy and speed.

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