Traffic Alert System Through SMS Using Image Processing

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I. INTRODUCTION

With the increasing buying power of common man today the number of vehicles on the road is creating heavy traffic that is difficult to control and maintain safety .Millions of Accidents occur worldwide each year, and the death toll from this accident in the millions. According to the Traffic Report by the WHO, road traffic accidents kill more than 1.2 million people each year, and about 50 million people are injured or disabled. Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new commitment to prevention.Road traffic congestion poses a challenge for all large and growing urban areas. Traffic congestion is a condition on road networks that is characterized by slower speeds, longer trip times, and increased vehicular queuing. Today, the number of vehicles is increasing exponentially. However, road infrastructure cannot be increased in the same ratio. This leads to increasing traffic congestion. Traditional system is effective but is limited by the time human can work. Human intervention is there to take clever, critical decision and handle emergencies. Traffic policemen decide time for traffic signal control depending on the density at particular lanes. Existing automatic system uses preset signal timings to control traffic at intersection. Time to be Preset time is again decided by the traffic officer depending upon his/her survey about traffic condition for a particular intersection. Most of the time, these methods are ineffective, because of sudden fluctuation in flow of traffic apart from peak hours. The cyclic signaling method with existing preset timing in automated system will be inappropriate in situation of waiting, even if few or no vehicles available on the other road. Fixed timing will not be inappropriate in case large number of vehicles waiting to cross the junction. Inconvenience will be caused by unnecessary waiting; people will lose time, miss opportunities and get frustrated. Traffic congestion problems create a deep impact on companies" production and transportation of goods. Need is for automatic adjustment of the signal timing with changing traffic conditions, in similar fashion as to what the officer does in traditional system. System must be capable to handle emergencies. Researchers all over the world are engaged in exploring different technologies to detect traffic.

There aremany techniques, which can be used for adaptive traffic controlmanagement system.One of them is video based image processing system. The ability to see and recognize things has limited functions for human eyes. As a result the sometimes the image itself is needed to be enhanced to make it clearer and take it to the level of human eye. In order to do this the field of image processing has been introduced to the modern world.

II. PROBLEM DEFINITION

Increased traffic congestion and associated pollution are forcing everyone in transportation to think about rapid changes in traffic processes and procedures to keep our mobility safe, comfortable, and economical.

Though, there has been lot of work done in the area of Traffic Control system. But there were always certain limitations with the existing system. The problems identified with the previous work done are:
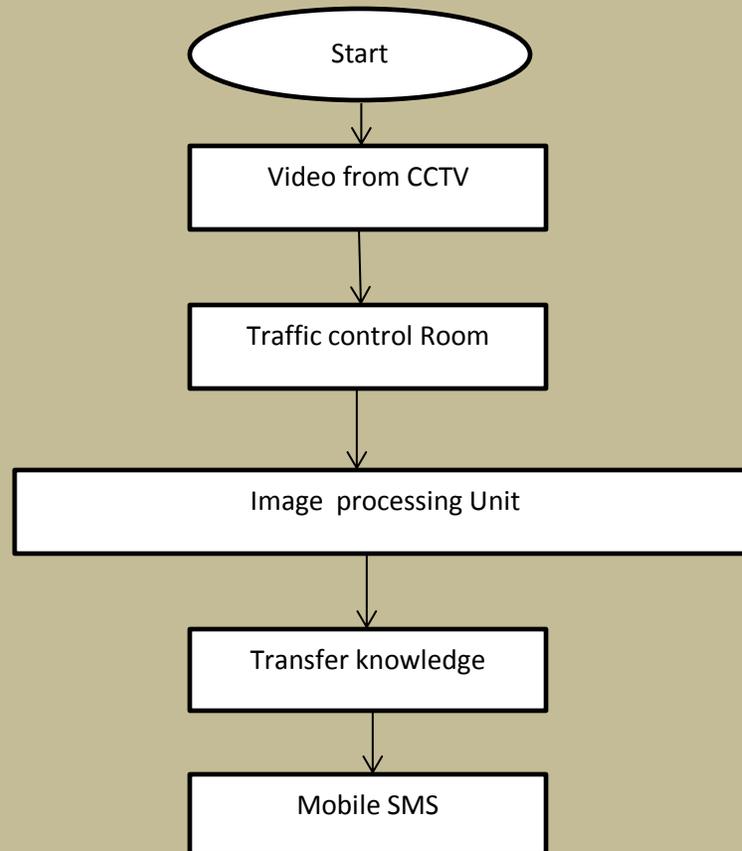
1. Controlling the traffic from a central location by phasing traffic light from all around the city and then sending them to master controller through some communication media. The process sometimes results in delays and in turn congestion problems.

2. Using GPS has a limitation in terms service reception while driving inside a modern city which a lot of long buildings. Lack of high performance computing platform.
3. Systems were not scalable as they were designed in a centralistic way.

III. PROPOSED SYSTEM

Our scheme basically consists of three parts: a) detection of congestion at any road leading to a junction and send the sequence of images to traffic control room b) Apply different image processing technique on received images to effective management to control that congestion ensuring smooth traffic flow c) Send the information to the people through the SMS. At present traffic lights are passively controlled. At the time of setting up the traffic lights at a particular junction, the concerned officials study the traffic flow pattern through that junction at different times of the day on different days of the week. From this observed flow pattern, the corresponding timers of traffic lights are programmed to operate for a predefine time-duration.

The system operation is shown as a flowchart in Figure 1. For better coverage of receiving traffic information three sources are used video cameras,control room, mobile device detectors. For avoidance of traditional traffic control system limitation the communication network will exist so that it will be accountable to a series of on-demand service, except that result of the calculations will be send to both, the vehicle and control centers.

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         ┌─────────────┐
         │    Start    │
         └─────────────┘
                │
                ▼
      ┌────────────────────┐
      │   Video from CCTV   │
      └────────────────────┘
                │
                ▼
      ┌────────────────────┐
      │ Traffic control Room│
      └────────────────────┘
                │
                ▼
   ┌──────────────────────────┐
   │   Image  processing Unit  │
   └──────────────────────────┘
                │
                ▼
      ┌────────────────────┐
      │ Transfer knowledge  │
      └────────────────────┘
                │
                ▼
      ┌────────────────────┐
      │    Mobile SMS       │
      └────────────────────┘
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3.1 Image Processing Techniques for Traffic Analysis

FIG.2 shows the overview of the operation of a video-based traffic monitoring system. A camera mounted on a structure, such as the streetlight pole, looking over the traffic scene serves as the sensor device for the capturing of traffic images. The captured analogue video images are then

transmitted to a processor which converts the analogue video into digital form. The digitized images will then be processed and analyzed for the extraction of traffic information using image processing techniques. The extracted information can then be transmitted to an external user, such as a traffic control center, for traffic monitoring/control .The source video camera is capturing the videos from roads send the images to Traffic Control Room the by using image processing techniques the system is counting the number of vehicles and sending the data to city traffic center. The system also proposes to use mobile device detectors to approximate the number of vehicles in a particular region.

3.2 Procedure for Image Processing We have used image processing along with object detection to detect traffic jam. It involves several steps of image processing to make decision about traffic jam. Key points of these steps are,

• Image Analysis
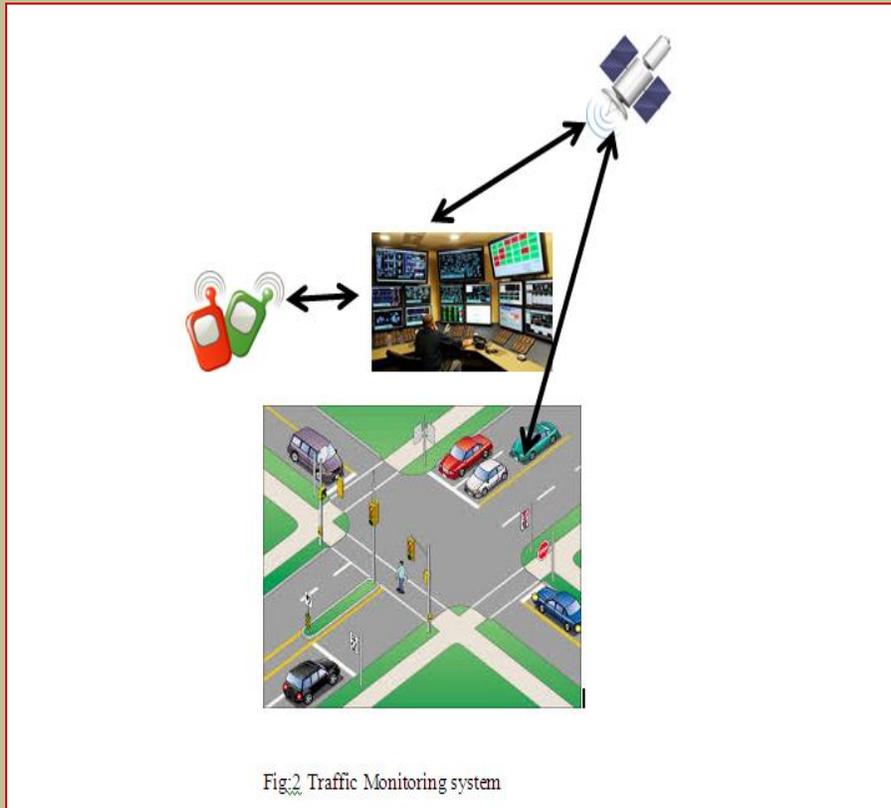• Object detection
• Typed object count

Fig:2 Traffic Monitoring system

4. Conclusion

The study showed that image processing is a better technique to control traffic jam. It is also more consistent in detecting vehicle presence because it uses actual traffic frames. It visualizes the reality so it functions much better than those systems that rely on the detection of vehicles metal content. The analysis can thus be improved with multiple sequential cameras along a highway which in addition to localized congestion control, analyzes the congestion build up from the starting point to the end point. With the aggregate image data, the congestion control strategy can make global decisions and affect congestion control on a reasonably sized scale. Overall, the

system is good but it still needs improvement to achieve a hundred percent accuracy.systems that rely on the detection of vehicles metal content. The analysis can thus be improved with
multiple sequential cameras along a highway which in addition to localized congestion control, analyzes the congestion build up from the starting point to the end point. With the aggregate image data, the congestion control strategy can make global decisions and affect congestion control on a reasonably sized scale. Overall, the system is good but it still needs improvement to achieve a hundred percent accuracy.

5. Future Enhancement
The idea of traffic jam detection can be extended further. Depending upon the location of the camera at the road level the filmed scenes can be used for number plate recognition. Processing problem is related to symbol extraction from number plate image and further symbol recognition. This will help in the progress of automatic number plate registration and recognition. Also the same concept can be used for Traffic Light Control wherein the timer of the signal for its corresponding road is automatically increased or decreased depending upon the traffic density on the particular road facing the camera. Speed of vehicles can be detected and eventually it can help the traffic management system and the police to get better control over the traffic flow of the particular location. Traffic Monitoring at night will become simpler as compared to the traditional patrol team scanning the roads.

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