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Vehicular Movement Estimation At Intersection Using Opencv Software

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Abstract

In India, extreme traffic clog on urban streets because of fast urbanization and development of private vehicles. To oversee traffic blockage, propelled innovation applications, for example, intelligent transportation system (ITS) and traffic management focus (TMC) are utilizing now in a days. These strategies are ease powerful ways. For traffic clog management through ITS and TMC continuous estimation and expectation of traffic thickness is fundamental. It is for the most part anticipated from others different parameters that can be promptly measured utilizing accessible area based sensors. It is important to create precision. Traffic stream is profoundly stochastic in nature that requires the requirement for fusing the instability related with displaying. It is most appropriate for exact constant traffic state estimation. This technique needs just least information for translation. At the point when there is no accessibility of noteworthy information in such places like India this strategy is beneficial. The proposed plan is verified utilizing information measuring from a street extend in Ramavarappadu. System in this paper is planned and actualized with Visual C++ programming with Intel's OpenCv video stream preparing system to understand the ongoing programmed vehicle recognition and vehicle checking. Turnpikes, parkways and streets are getting packed because of increment in number of vehicles. Vehicle recognition, following, arrangement and numbering is critical for military, non-military personnel and government applications, for example, thruway checking, traffic arranging, toll accumulation and traffic stream. For the traffic management, vehicles location is the basic stride. PC Vision based methods are more reasonable on the grounds that these systems don't exasperate traffic while establishment and they are anything but difficult to adjust. In this paper we display reasonable, versatile and Computer Vision based system for moving vehicle discovery and checking. Picture from video grouping are taken to identify moving vehicles, with the goal that foundation is extricated from the pictures. The extricated foundation is utilized as a part of consequent examination to distinguish and order moving vehicles as light vehicles, substantial vehicles and cruiser. The system is executed utilizing OpenCv picture

improvement units and test results are exhibited from ongoing video taken from single camera. We tried this system on a tablet fueled by an Intel Core Duo (1.83 GHZ) CPU and 2GB RAM. This parkway traffic checking process has been created by foundation subtraction, picture separating, picture double and division techniques are utilized. This system is additionally equipped for numbering moving vehicles from pre-recorded video.

Key Words: OpenCV, Traffic Estimation, ITS, TMC.

.1. INTRODUCTION

1.1 INTRODUCTION

Vijayawada is one of the best metropolitan urban communities in the India. It is second biggest city in Andhra Pradesh after Vizag and it is situated on banks of more noteworthy waterway Krishna. Vijayawada has extensive verifiable significance and social legacy. It is considered as the rural and business capital of Andhra Pradesh. The Vijayawada urban has a populace of 1.01 million according to 2001 registration. Vijayawada Municipal Corporation is over exceptionally old and has been constitute as a district in 1888 with a territory of 30 sq.km. It was overhauled as a "Metropolitan Corporation" in the year 1981. Traffic counts, speed and vehicle classification are fundamental data for a variety of transportation projects ranging from transportation planning to modern intelligent transportation systems. Still “Traffic Monitoring” and “Information Systems” related to classification of vehicles relies on sensors for estimating traffic parameters. Currently, magnetic loop detectors are often used to count vehicles passing over them. Vision-based video monitoring systems offer a number of advantages over earlier methods. In addition to vehicle counts, a much larger set of traffic parameters such as vehicle classifications, lane changes, parking areas etc., can be measured in such type of systems. In large metropolitan areas, there is a need for data about vehicle classes that use a particular highway or a street. A classification and counting system like the one proposed here can provide important data for a particular decision making agency. Our system uses a single camera mounted on a pole or other tall structure, looking down on the traffic scene. It can be used for detecting and classifying vehicles in multiple lanes and for any direction of traffic flow.

2 liturature review

System in this paper is designed and implemented with Visual C++ software with Intel's OpenCV video stream processing system to realize the real-time automatic vehicle detection

and vehicle counting. Expressways, highways and roads are getting overcrowded due to increase in number of vehicles. Vehicle detection, tracking, classification and counting is very important for military, civilian and government applications, such as highway monitoring, traffic planning, toll collection and traffic flow. For the traffic management, vehicles detection is the critical step. Computer Vision based techniques are more suitable because these systems do not disturb traffic while installation and they are easy to modify. In this paper we present inexpensive, portable and Computer Vision based system for moving vehicle detection and counting. Image from video sequence are taken to detect moving vehicles, so that background is extracted from the images. The extracted background is used in subsequent analysis to detect and classify moving vehicles as light vehicles, heavy vehicles and motorcycle. The system is implemented using OpenCV image development kits and experimental results are demonstrated from real-time video taken from single camera. We tested this system on a laptop powered by an Intel Core Duo (1.83 GHZ) CPU and 2GB RAM. This highway traffic counting process has been developed by background subtraction, image filtering, image binary and segmentation methods are used. This system is also capable of counting moving vehicles from pre-recorded videos.**Nilesh J. UkeRavindra C. Thool** ***December 2013***

In this paper we present vehicle density estimation, vehicle classification and stopped vehicle detection system for outdoor traffic surveillance is presented. It is important to know the road traffic density in predefined traffic videos especially in megacities for signal control and effective traffic management. In recent years, video monitoring and surveillance systems have been widely used in traffic surveillance system. Hence, traffic density estimation and vehicle classification can be achieved using video monitoring systems. In vehicle detection methods for several review of literature, only the detection of vehicles in frames of the given video. The stopped vehicle detection is based on the pixel history. This methodology has proved to be quite robust in terms of different weather conditions, lighting and image quality. Some experiments carried out on some highway scenarios demons t rate the robustness of the proposed solution.**P. Rajesh1, M. Kalaiselvi Geetha2 and R.Ramu3 2013**

3. STUDY AREA AND RAMAVARAPPADU

RAMAVARAPPADU is a sub-urban in Vijayawada, situated on national highway 5 in the outskirts of the city. In this ramavarapadu there exists a junction which is one of the busiest junctions in Vijayawada. In future ramavarapadu railway station can be used as a satellite station to reduce the pressure on Vijayawada main station.

Traffic at ramavarapadu ring: According to the traffic police 8am to 10:30 am and 6 pm to 8:30 pm. Is the peak time for vehicular movement Opening of a new road connecting gunadala road and national highway around babujagjeevanram statue will ease traffic snarls at the junction. A proposal has been sent to the National Highway Authority of India to Ramavarapadu Ring.

Figure 3.1 Ramavarappadu Ring road

Observations at Ramavarappadu Ring Road: It is thought to be a standout amongst the most vital focuses on NH5 to the extent Vijayawada city is considered, ramavarappadu ring has numerous deficiencies. The fundamental issue is that there are no signs to control traffic. Work force from the traffic division still screen physically. **No space for 'free left':** This separated, according to the first street arrange, a free left must be accommodated vehicles originating from eluru street or gunadala. However, lamentably, a noteworthy piece of the street has been involved by a private hotelier. The hotelier has practically possessed one aggregate path. This has not just discredited the motivation behind free left. In any case, additionally prompts blockage at the intersection, there were blemishes in the building of the streets that prompt National Highway. All approach streets to the National Highway were at a lower level at the meeting point. This requires vehicle drivers to increasing speed to arrange the slant. This ends up being perilous.**No street dividers:** Another vital viewpoint that experts have disregarded is nonattendance of dividers on the four –lane street from gunadala to National Highway. The nearness of dividers would have spared the lives, as the auto would have collide with the divider and come to end. The street extend from gunadala to National

Highway meeting point at ramavarappadu ring is a four path street and the stream of traffic on it is generally less contrasted with alternate streets. This makes dividers to venture on the gas. The nonappearance of speed-breakers on this extend enables the dividers to pick up speed.

METHEDOLOGY

Traffic volume is the number of vehicles crossing a section of road per unit time at any selected period. Traffic volume is used as a quantity measure of flow; the commonly used units are vehicles per day and per hour. A complete traffic volume study may includes the classified volume study by recording the volume of various types and classes of traffic, the distribution by direction and turning movements and the distribution on different lanes per unit time. The objects and uses of traffic volume studies are given below:

- Traffic volume is generally accepted as a true measure of the relative importance of roads and in deciding the priority for improvement and expansion.
- Traffic volume study is used in planning, traffic operation and control of existing facilities and also for planning and designing the new facilities.
- This study is used in the analysis of traffic patterns and trends.
- Classified volume study is useful in structural design of pavements, in geometric design and in computing roadway capacity.
- Volume distribution study is used in planning one-way streets and other regulatory measures.
- Turning distribution study is used in the design of intersection, in planning signal timings, channelization and control devices.
- Pedestrian traffic volume study is used for planning sidewalks, cross walks subways and pedestrian signals.

Traffic counts are generally of two types, permanent or secondary where permanent means that traffic is monitored for 24 hours per day and 365 days per year, permanent traffic counts provide data for a number of applications including:

1) On line traffic management and surveillance (queue and shock wave detection, incidents, LOS, delays etc.)
2) Traffic demand and network planning (V/C ratios, bottlenecks etc.). Pavement management and maintenance.
3) Traffic forecasting.
4) Travel demand management.

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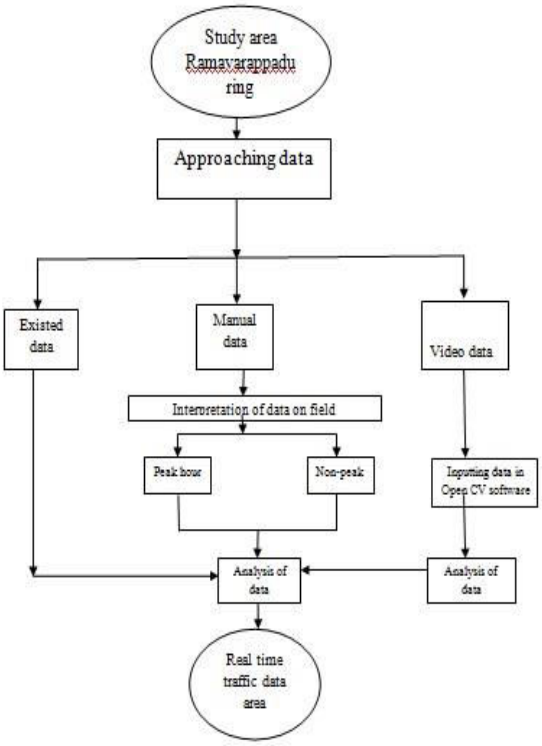

Fig 3.2 Methodology

Types of traffic data collection: It is essential to know the magnitude of traffic data required or to be collected, which will then determine its quality and type of vehicle classification to be adopted. Traffic counting falls in two main categories, namely;

1) Manual counts.
2) Automatic counts.

Manual count: The most common method of collecting traffic flow data is the manual method, which consists of assigning a person to record traffic as it passes. This method of data collection can be expensive in terms of manpower, but it is nonetheless necessary in most cases where vehicles are to be classified with a number of movements recorded separately, such as at intersections. At intersection sites, the traffic on each arm should be counted and recorded separately for each movement. It is of paramount importance that traffic on roads with more than one lane are counted and classified by direction of traffic flow.Permanent traffic-counting teams are normally set up to carry out the counting at the various throughout the road network at set interval. The duration of the count is determined prior to commencement of traffic counting and it is dictated by the end use of data. The teams are managed and supervised by the technical staff to ensure efficient &proper collection of data.

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Automatic counts: The direction of vehicular presence and road occupancies has historically been performed primarily on or near the surface of the road. The exploitation of new electromagnetic spectra and wireless communication media in recent year, has allowed traffic detection to occur in a non-intrusive fashion, at locations above or to the side of the roadway. Pavement-based traffic detection currently relatively inexpensive will be met with fierce competition in the coming years from detectors that are liberated from the road surface.

Capturing videos:

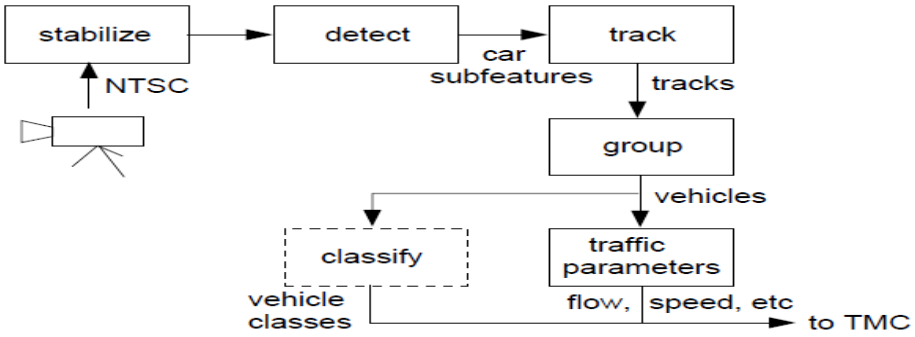

Fig 3.3 Video image processing system

Video image processing system utilizes machine vision technology to detect vehicles and captured details about individual vehicles when necessary. A video processing system usually monitors multiple lanes simultaneously, and therefore it requires high level of computing power.

Fig 3.4 video picture of traffic data at Ramavarappadu

OpenCv

OpenCV [OpenCV] is an open source (see http://opensource.org) PC vision Library accessible from http://SourceForge.net/ventures/opencvlibrary. The library is composed in C and C++ and keeps running under Linux, Windows and Mac OS X. There is dynamic advancement on interfaces for Python, Ruby, Matlab, and different dialects. OpenCV was intended for computational productivity and with a solid concentrate on Realtime applications. OpenCV is composed in improved C and can exploit multicore processors. In the event that you covet promote programmed enhancement on Intel designs [Intel], you can purchase Intel's Integrated Performance Primitives (IPP) libraries [IPP], which comprise of low-level streamlined schedules in various algorithmic zones. OpenCV naturally utilizes the suitable IPP library at runtime if that library is introduced. One of OpenCV's objectives is to give an easy to-utilize PC vision framework that people groups construct genuinely modern vision applications rapidly. The OpenCV library contains more than 500 capacities that traverse numerous zones in vision, including plant item investigation, therapeutic imaging, security, UI, camera adjustment, stereo vision, and apply autonomy.

4. RESULT:

In this chapter the results and observations of the tests conducted are presented, analyzed and discussed. The system is able to track and classify most vehicles successfully. Figures show some results of our system

Figure 4.1 recording video.

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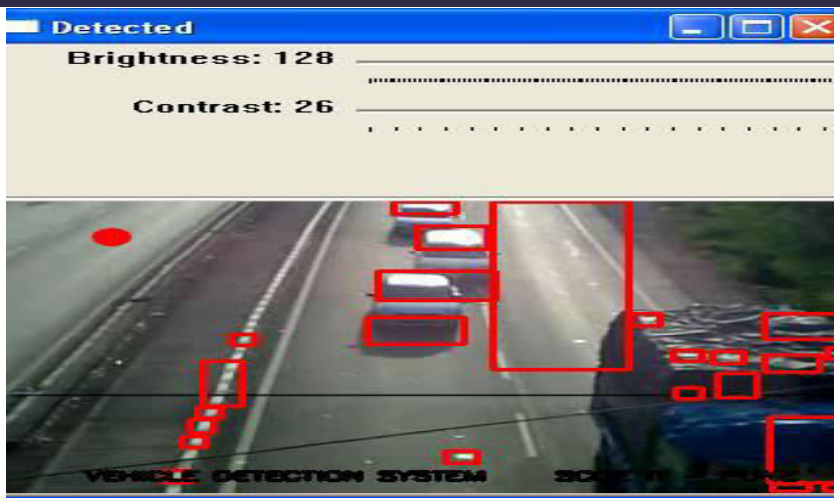

Figure 4.2 Detecting vehicles by pre-recorded video.

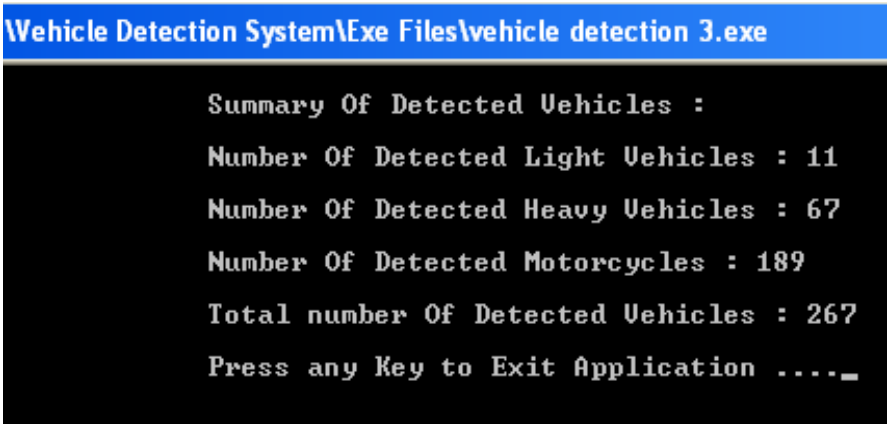

Figure 4.3 Classification of detected vehicles.

Figure 4.4 Log Repositories.

The following are the total no of vehicles counting by using opencv software through videos

Table no 4.1 Total no of vehicle counted in one day

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5. CONCLUSION

Due to increase in expressway, highways and traffic congestion, there is a huge amount of

S No	Session	Time	Duration	Speed	Type Of Vehicles			Lane	Total		
					CARS	BUSES	LORRY	TRUCKS			
									1	2	
1	MORNING	9 : 00 - 9 : 30 AM	30	46	291	65	48	33	254	160	415
		9 : 30 - 10 : 00 AM	30	42	274	47	26	14	190	148	339
		10 : 00 - 10 : 30 AM	30	43	289	54	35	26	221	160	382
		10 : 30 - 11 : 00 AM	30	40	250	73	19	9	194	134	329
		11 : 00 - 11 : 30 AM	30	45	261	49	20	24	190	151	342
		11 : 30 -12 : 00 PM	30	36	249	31	33	34	162	172	344
2	AFTERNOON	01 : 00 - 01 :30 PM	30	41	125	30	32	25	109	90	109
		01 : 30 - 02 : 00 PM	30	47	138	34	18	12	105	74	189
		02 : 00 -02 : 30 PM	30	51	117	27	24	21	153	113	276
		02 : 30 - 03 : 00 PM	30	49	102	23	16	18	93	52	155
		03 : 00 - 03 : 30 PM	30	47	135	24	19	14	75	94	179
		03 : 30 - 04 : 00 PM	30	41	166	26	33	18	105	120	235
3	EVENING	04 : 00 - 04 : 30 PM	30	40	273	56	38	23	164	203	377
		04 : 30 - 05 : 00 PM	30	43	294	64	46	37	225	193	428
		05 : 00 - 05 : 30 PM	30	44	205	49	32	18	191	170	371
		05 : 30 - 06 : 00 PM	30	49	258	61	63	31	210	190	410
		06 : 00 - 06 : 30 PM	30	46	272	53	58	32	206	186	302
		06 : 30 - 07 : 00 PM	30	43	259	54	43	23	188	168	336

potential applications of vehicle detection and tracking one expressway and highways. In this paper we have demonstrated vision based system for effective detection and counting of vehicles running on roads. The main aim of our system is to detect the moments of vehicles by analyzing camera pictures with the help of computer vision. Vehicle counting process accepts the video from single camera & detects the moving vehicles and counts them. Vehicle detection and counting system on highway is developed using OpenCV image development kits.

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