IJRRECS/October 2013/Volume-1/Issue-6/1276-1282 ISSN 2321-5461

INTERNATIONAL JOURNAL OF REVIEWS ON RECENT ELECTRONICS AND COMPUTER SCIENCE

AERIAL SURVEILLANCE FOR VEHICLE DETECTION USING DYNAMIC NETWORKS

Chintha Srinivasareddy[1], Keshapaga Vinay Kumar[2]

[1]**M.tech Student, Dept of CSE, St.Peters Engineering College, Kompally, Hyderabad, A.P, India**
srinivasareddy.275@gmail.com

[2]**Associate Professor, Dept of CSE, St.Peters Engineering College, Kompally, Hyderabad, A.P, India**
vinaykumar1224@gmail.com

ABSTRACT:

We have presented an automatic vehicle detection system for aerial police investigation during this paper. In this system, we tend to shake the stereotype and existing frameworks of car detection in aerial police investigation, that are either region based mostly or window based. We tend to present a pixel wise classification technique for vehicle detection. The novelty lies within the indisputable fact that, in spite of activity pixel wise classification, relations among neighboring pixels during a region are preserved within the feature extraction method. We tend to contemplate options as well as vehicle colors and native options. For vehicle color extraction, we tend to utilize a color remodel to separate vehicle colors and non-vehicle effectively. For edge detection, we tend to apply moment conserving to regulate the thresholds of the canny edge detector mechanically, that will increase the ability and therefore the accuracy for detection in varied aerial pictures. Afterward, a dynamic theorem network (DBN) is built for the classification purpose. We tend to convert regional native options into quantitative observations that may be documented once applying pixel wise classification via DBN. Experiments were conducted on a good sort of aerial videos. The results demonstrate flexibility and sensible generalization talents of the projected technique on a difficult knowledge set with aerial police investigation pictures taken at totally different heights and beneath different camera angles.

Keywords: DBN, region based, window based, pixel wise classification, feature extraction.

1. INTRODUCTION:

Aerial investigation includes an extended history at intervals the military for observant enemy activities and at intervals the commercial world for observation resources like forests and crops. Similar imaging techniques unit utilized in aerial news gathering and search and rescue aerial investigation has been performed primarily exploitation film or electronic framing cameras. The target has been to gather high-resolution still photos of a region below investigation that will later be examined by human or machine analysts to derive knowledge of interest. Currently, there is growing interest in exploitation video cameras for these tasks. Video captures dynamic events that cannot be understood from aerial still photos. It permits feedback and triggering of actions supported dynamic events and provides crucial and timely intelligence and understanding that is not otherwise out there. Video observations are going to be accustomed notice and geo-locate moving objects in real time and to manage the camera, as an example, to follow detected vehicles or constantly monitor an internet site. However, video collectively brings new technical challenges.

Video cameras have lower resolution than framing cameras. therefore on induce the resolution required to identify objects on very cheap, it's generally necessary to use associate camera lens, with a slender field of scan. This winds up within the foremost serious defect of video in police work it provides exclusively a “soda straw” scan of the scene. The camera ought to then be scanned to cover extended regions of interest associate observer observing this video ought to pay constant attention, as objects of interest move an area in and out of the camera field of scan. The video collectively lacks a much bigger visual context the observer has issue perceiving the relative locations of objects seen at one purpose in time to things seen moments before. to boot, geology coordinates for objects of interest seen at intervals the video are not out there.

One of the most topics in aerial image analysis is scene registration and alignment. Another vital topic in intelligent aerial police work is vehicle detection and following. The challenges of car detection in aerial police work embody camera motions like panning, tilting, and rotation. additionally, mobile platforms at totally different completely different heights lead to different sizes of target objects.

In this paper, we've designed a brand new vehicle detection framework that preserves the benefits of the present works and avoids their drawbacks. The framework are often divided into the coaching section and also the detection section. within the coaching section, we have a tendency to extract multiple options as well as native edge and corner options, further as vehicle colours to coach a dynamic Bayesian network (DBN). within the detection section, we have a tendency to initial perform background color removal. Afterward, a similar feature extraction procedure is performed as within the coaching section. The extracted options function the proof to infer the unknown state of the trained DBN, that indicates whether or not a pixel belongs to a vehicle or not. during this paper, we have a tendency to don't perform region-based classification, which might extremely rely upon results of color segmentation algorithms like mean shift. there's no got to generate multi scale slippy windows either. The characteristic feature of the projected framework is that the detection task relies on pixel wise classification. However, the options square measure extracted during a neighborhood region of every pixel. Therefore, the extracted options comprise not solely pixel-level data however conjointly relationship among neighboring pixels during a region. Such style is simpler and economical than region-based or multi scale window detection ways.

Existing System:

Hinz and Baumgartner used a graded model that describes totally different levels of details of car options. there's no specific vehicle models assumed, creating the tactic versatile. However, their system would miss vehicles once the distinction is weak or once the influences of neighboring objects square measure gift.

Cheng and pantryman thought of multiple clues and used a combination of specialists to merge the clues for vehicle detection in aerial pictures. They performed color segmentation via mean-shift algorithmic program and motion analysis via amendment detection. additionally, they given a trainable successive most a posterior technique for multi scale analysis and social control of discourse info. However, the motion analysis algorithmic program applied in their system cannot traumatize aforesaid camera motions and sophisticated background changes. Moreover, within the info fusion step, their algorithmic program extremely depends on the colour segmentation results.Lin et al. projected a way by subtracting background colours of every frame then refined vehicle candidate regions by implementing size constraints of vehicles. However, they assumed too several parameters like the most important and smallest sizes of vehicles, and therefore the height and therefore the focus of the mobile camera. forward these parameters as glorious priors won't be realistic in real applications.

The authors projected a moving-vehicle detection technique supported cascade classifiers. an outsized range of positive and negative coaching samples ought to be collected for the coaching purpose. Moreover, multi scale slippy windows square measure generated at the detection stage. the most disadvantage of this technique is that there square measure plenty of miss detections on revolved vehicles. Such results don't seem to be shocking from the experiences of face detection mistreatment cascade classifiers. If solely frontal faces square measure trained, then faces with poses square measure simply lost. However, if faces with poses square measure side as positive samples, the amount of false alarms would surge.

Disadvantage

- Hierarchical model system would miss vehicles when the contrast is weak or when the influences of neighboring objects are present.
- Existing method result highly depends on the color segmentation
- a lot of miss detections on rotated vehicles
- a vehicle tends to be separated as many regions since car roofs and windshields usually have different colors
- high computational complexity

Proposed System:

During this paper, we've got designed a brand new vehicle detection framework that preserves the benefits of the prevailing works and avoids their drawbacks. The framework will be divided into the coaching section and therefore the detection section. within the coaching section, we have a tendency to extract multiple options together with native edge and corner options, yet as vehicle colours to coach a dynamic theorem network (DBN). within the detection section, we have a tendency to 1st perform background color removal. Afterward, identical feature extraction procedure is performed as within the coaching section.

The extracted options function the proof to infer the unknown state of the trained DBN, that indicates whether or not a element belongs to a vehicle or not. In this paper, we have a tendency to don't perform region-based classification, which might extremely depend upon results of color segmentation algorithms like mean shift. there's no ought to generate multi-scale slippery windows either. The characteristic feature of the planned framework is that the detection task relies on element wise classification. However, the options ar extracted in a very neighborhood region of every element. Therefore, the extracted options comprise not solely pixel-level data however conjointly relationship among neighboring pixels in a very region. Such style is more practical and economical than region-based or multi scale window detection strategies.

Advantage

- More Effective and efficient.
- It does not require a large amount of training samples
- It increases the adaptability and the accuracy for detection in various aerial images

System Architecture:

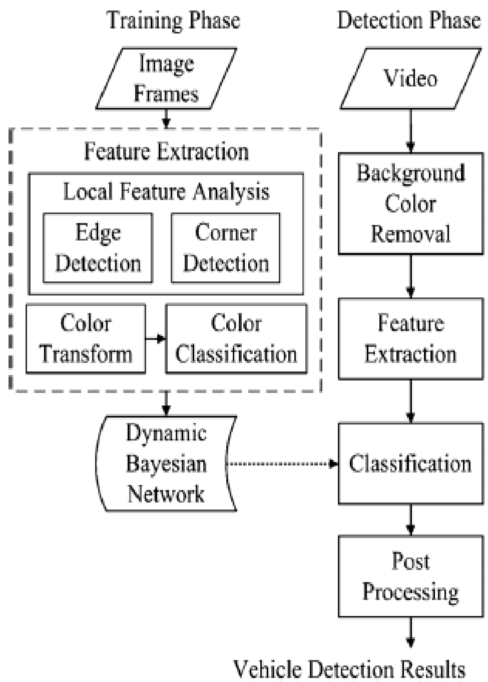
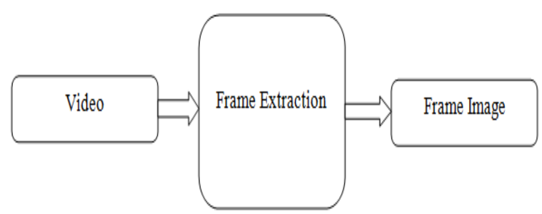


Fig: 1Architecture

Proposed Work:

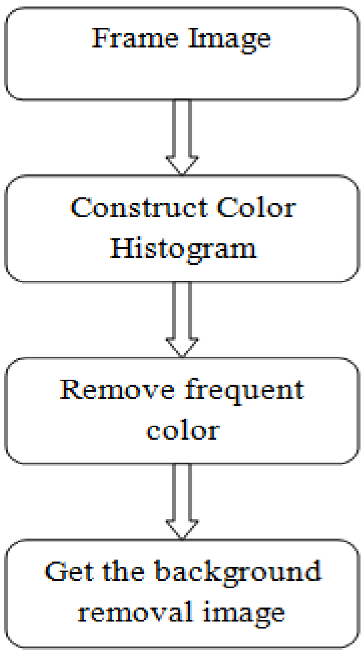
Frame Extraction:

In this module we read the input video and extract the number of frames from that video input video.



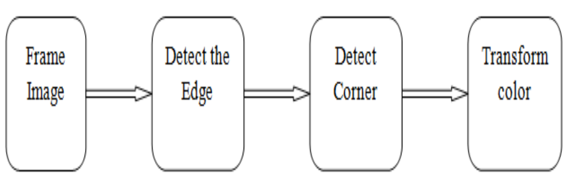
Background color removal

In this module we have a tendency to construct the colour bar chart of every frame and take away the colours that seem most often within the scene. These removed pixels don't got to be thought-about in sequent detection processes. acting background color removal cannot solely scale back false alarms however conjointly speed up the detection method.



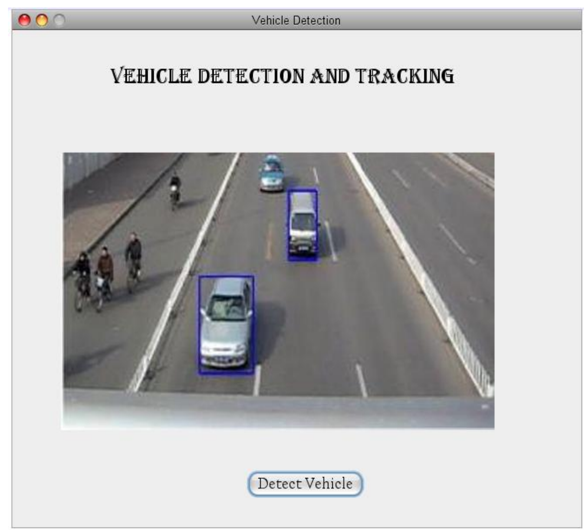
Feature Extraction

In this module we have a tendency to extract the feature from the image frame. during this module we have a tendency to do the subsequent Edge Detection, Corner Detection, color Transformation and color classification.



Classification

In this module we tend to perform constituent wise classification for vehicle detection exploitation DBNs. (Dynamic theorem Network). within the coaching stage, we tend to get the chance tables of the DBN model via expectation-maximization formula by providing the ground-truth labeling of every constituent and its corresponding determined options from many coaching videos. within the detection section, the theorem rule is employed to get the likelihood that a constituent belongs to a vehicle.



Results:

Fig 2: Vehicle Detection page

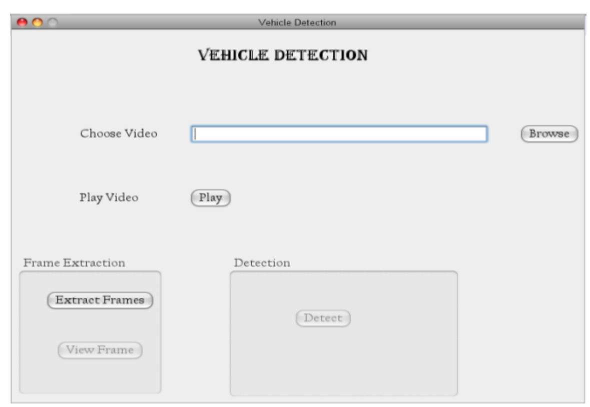


Fig 3:Input page

In this we can give the video as input.

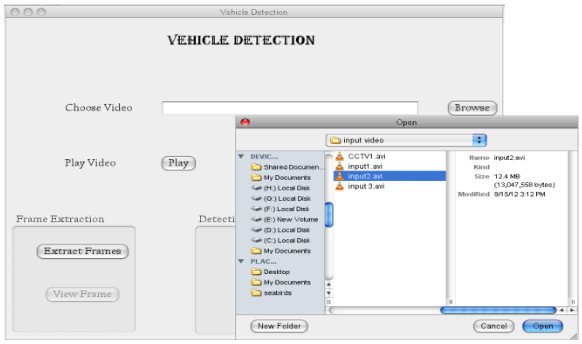


Fig 4: Selection page

In this we can select the video file to give as input.

Fig 5: Video Page

In this we can play the input video which we have given.

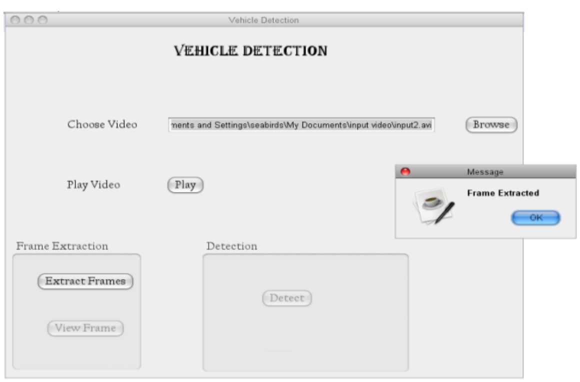


Fig 6: Frame Extraction

In this we are performing the frame extraction from a particular video.

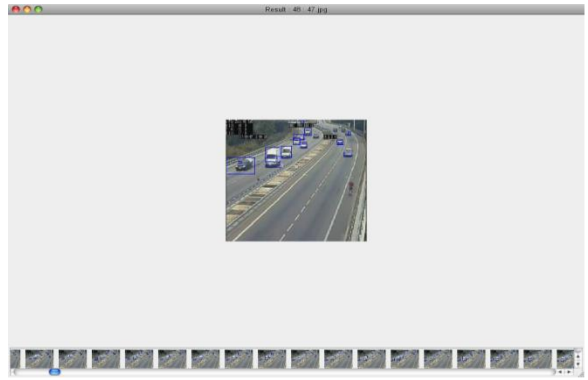


Fig 7: Vehicle detection

Conclusion:

In this paper, we've got projected associate degree automatic vehicle detection system for aerial police work that doesn't assume any previous info of camera heights, vehicle sizes, and side ratios. During this system, we've performed region-based classification, which might extremely depend upon procedure intensive color segmentation algorithms like mean shift. We have generated a pixel wise classification methodology for the vehicle detection by using DBNs. In spite of performing arts pixel wise classification, relations among neighboring pixels in a very region square measure preserved within the feature extraction method. Therefore, the extracted options comprise not solely pixel-level info however additionally region-level info. Since the colors of the vehicles wouldn't dramatically amendment attributable to the influence of the camera angles and heights, we have a tendency to use solely a little range of positive and negative samples to coach the SVM for vehicle color classification. Moreover, the amount of frames needed to coach the DBN is extremely tiny. Overall, the whole framework doesn't need an outsized quantity of coaching samples. We've got additionally applied moment protective to boost the cagy edge detector, that will increase the ability and therefore the accuracy for detection in varied aerial pictures. The experimental results demonstrate flexibility and sensible generalization skills of the projected methodology on a difficult knowledge set with aerial police work pictures taken at totally different heights and beneath different camera angles. For future work, performing arts vehicle following on the detected vehicles will more stabilize the detection results. Automatic vehicle detection and following might function the inspiration for event analysis in intelligent aerial police work systems.

References:

[1] R. Kumar, H. Sawhney, S. Samarasekera, S. Hsu, T. Hai, G. Yanlin, K. Hanna, A. Pope, R. Wildes, D. Hirvonen,M. Hansen, and P. Burt, "Aerial video surveillance and exploitation," *Proc. IEEE*, vol. 89, no. 10, pp. 1518–1539, 2001.

[2] I. Emst, S. Sujew, K. U. Thiessenhusen,M. Hetscher, S. Rabmann, and M. Ruhe, "LUMOS—Airbome traffic monitoring system," in *Proc. IEEE Intell. Transp. Syst.*, Oct. 2003, vol. 1, pp. 753–759.

[3] L. D. Chou, J. Y. Yang, Y. C. Hsieh, D. C. Chang, and C. F. Tung, "Intersection- based routing protocol for VANETs,"*Wirel. Pers. Commun.*, vol. 60, no. 1, pp. 105–124, Sep. 2011.

[4] S. Srinivasan, H. Latchman, J. Shea, T. Wong, and J. McNair, "Airborne traffic surveillance systems: Video surveillance of highway traffic," in *Proc. ACM 2nd Int. Workshop Video Surveillance Sens. Netw.*, 2004, pp. 131–135.

[5] A. C. Shastry and R. A. Schowengerdt, "Airborne video registration and traffic-flow parameter estimation," *IEEE Trans. Intell. Transp. Syst.*, vol. 6, no. 4, pp. 391–405, Dec. 2005.

[6] H. Cheng and J.Wus, "Adaptive region of interest estimation for aerial surveillance video," in *Proc. IEEE Int. Conf. Image Process.*, 2005, vol. 3, pp. 860–863

[7] S. Hinz and A. Baumgartner, "Vehicle detection in aerial images using generic features, grouping, and context," in *Proc. DAGM-Symp.*, Sep. 2001, vol. 2191, Lecture Notes in Computer Science, pp. 45–52.

[8] H. Cheng and D. Butler, "Segmentation of aerial surveillance video using a mixture of experts," in *Proc. IEEE Digit. Imaging Comput. —Tech. Appl.*, 2005, p. 66.

[9] R. Lin, X. Cao, Y. Xu, C.Wu, and H. Qiao, "Airborne moving vehicle detection for urban traffic surveillance," in *Proc. 11th Int. IEEE Conf. Intell. Transp. Syst.*, Oct. 2008, pp. 163–167.

[10] L. Hong, Y. Ruan, W. Li, D. Wicker, and J. Layne, "Energy-based video tracking using joint target density processing with an application to unmanned aerial vehicle surveillance," *IET Comput. Vis.*, vol. 2, no. 1, pp. 1–12, 2008

[11] R. Lin, X. Cao, Y. Xu, C.Wu, and H. Qiao, "Airborne moving vehicle detection for video surveillance of urban traffic," in *Proc. IEEE Intell. Veh. Symp.*, 2009, pp. 203–208.

[12] J. Y. Choi and Y. K. Yang, "Vehicle detection from aerial images using local shape information," *Adv. Image Video Technol.*, vol. 5414, Lecture Notes in Computer Science, pp. 227–236, Jan. 2009.

[13] C. G. Harris and M. J. Stephens, "A combined corner and edge detector," in *Proc. 4th Alvey Vis. Conf.*, 1988, pp. 147–151.

[14] J. F. Canny, "A computational approach to edge detection," *IEEE Trans Pattern Anal Mach. Intell.*, vol. PAMI-8, no. 6, pp. 679–698, Nov. 1986

CHINTHA SRINIVASAREDDY
M.tech(CSE)(pursuing)
srinivasareddy.275@gmail.com
ST.Peters Engineering College kompally, Hyderabad.

KESHAPAGA VINAY KUMAR
ASSOC .PROF (DEPT OF CSE)
vinaykumar1224@gmail.com
ST.Peters Engineering College kompally, Hyderabad.