REAL-TIME OBJECT DETECTION FOR MULTI-CAMERA SURVEILLANCE

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Abstract

Real-Time video surveillance presents issues related to illumination. For the task of object detection, we propose a method that makes use of an intensity-invariable but fragmented LBP foreground mask. A C4.5 Decision Tree is trained with the purpose of integrating foreground fragments as object components. The resulting classified segments are then integrated in a Dynamic Bayesian Network framework. Promising results are obtained using few examples for training the classifier, which can ease the set-up of the detector in real life multi-camera environments.

Scene Conditions

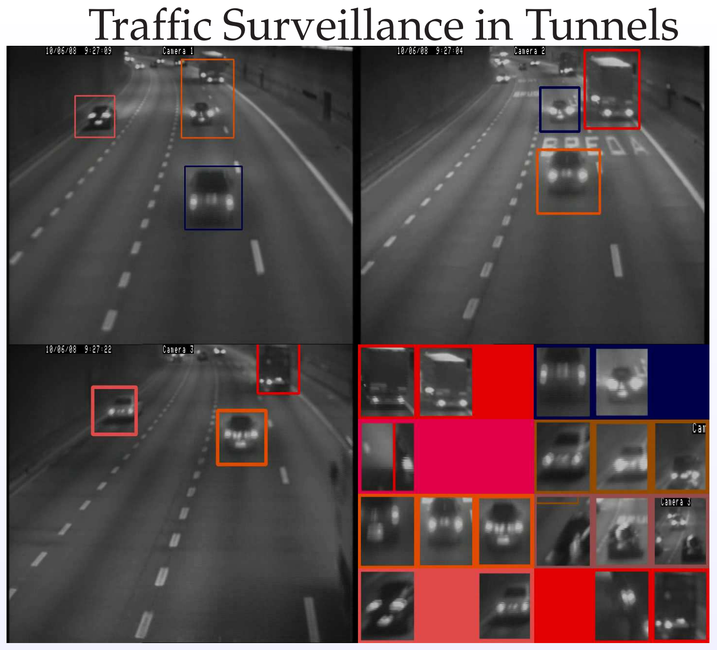
- Irregular Illumination, Light Reflection, Real-Time constrains.
- Ideal for Fast Texture Operators: Local Binary Patterns [1].
- LBP Pros: Robust Against illumination issues
- LBP Contras: Partial segmentation!

Conclusions

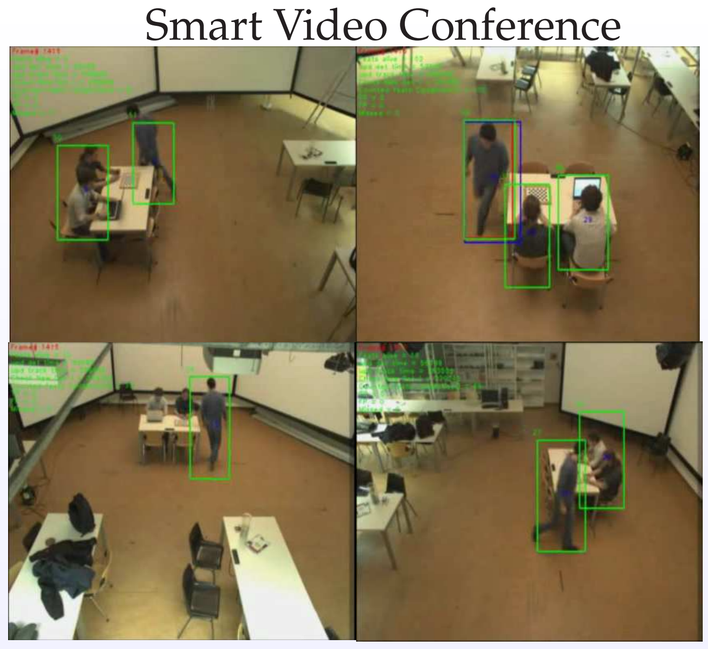
We have presented a method for real-time object detection which is robust to illumination issues. For the case of tunnel surveillance, we were able to achieve true positive performances around 95% and to distinguish between type of vehicles, with 91% of trucks and 94% of cars correctly tagged. When instances of detected vehicles are used in our Multi-Camera tracking method [2], matching performance reaches 86% in an arrangement of three non-overlapping view cameras. It is worth to notice that a small amount of examples have been used for training the detector, which make the method suitable for easy initial set-up.

Applications

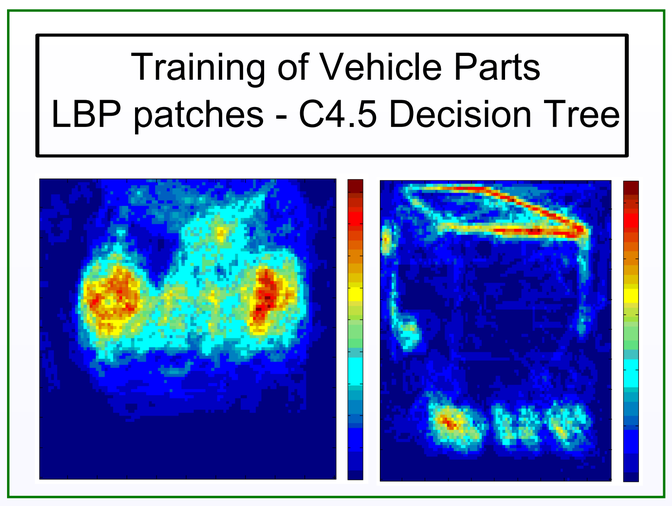
Traffic Surveillance in Tunnels

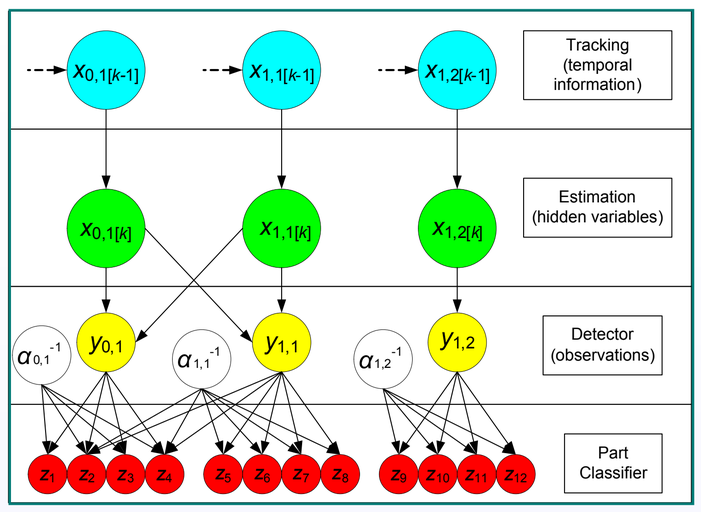


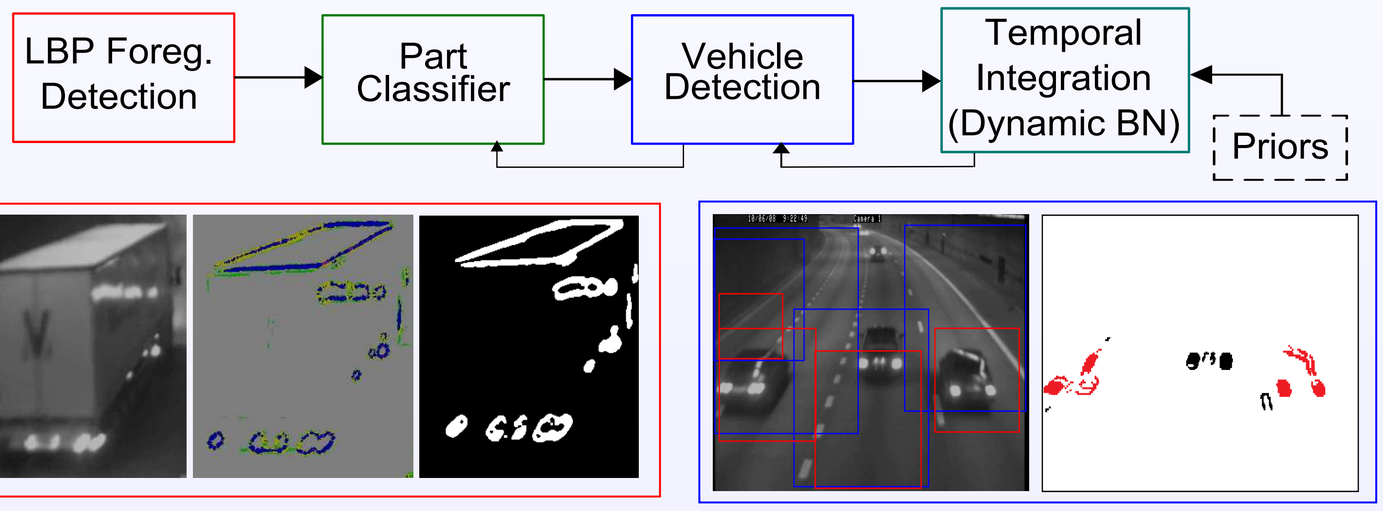
Smart Video Conference



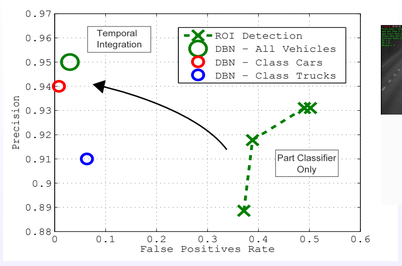
Proposed Method for Detection

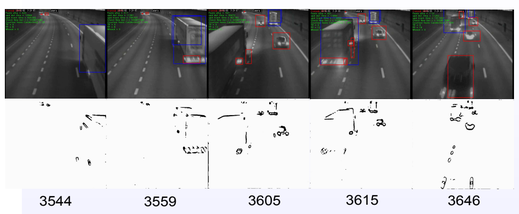






Results





Multi-Camera Performance (Vehicle Matching) [2]

	Detection Camera 1		Detection Camera 2		Detection Camera 3		Multi-Cam Matching	
Method	TR	FP	TR	FP	TR	FP	MR	FP
Proposed	95 %	4.4%	94.5%	4.1%	94 %	4.6%	86%	8%
SinglePart	94.9%	10.3%	93.3%	9.1%	92.9%	8.2%	80%	12%
TrackByDet	92.9%	12.1%	91.1%	10.0%	91.7%	9.5%	77%	14%

References