Detecting abandoned object in surveillance videos.

Project proposal

Rahul Sankhwar(11569)
Supervisor: Prof. A. Mukerjee

March 16, 2015

Aim:
Extending [1] (Anomaly Localization in Topic-based Analysis of Surveillance Videos), by considering abandoned objects as anomalous activity.

Motivation:
With increased terrorism, terrorists are targeting public places such as railway stations, airports, bus stations. The need for surveillance system is necessary. As stated in [2], I agree that effective and efficient detection of abandoned objects is very important to prevent attacks on landmarks, public transportation, and critical assets. It is very challenging problem to quickly detect anomalous objects/vehicles left behind.

Related work:
In [1], author had used topic based anomaly detection in surveillance videos, by using object-based models, for foreground modeling and low-level feature description. In [1], Pathak et al. used, foreground extraction method, ViBe proposed in [3].

In [2], Tian et al. developed a robust and efficient method to detect abandoned object and parked vehicle from surveillance videos.

Approach:
Foreground extraction mechanism in [3], Vibe, is based on motion cues and models abandoned objects/vehicles as foreground for few frames but then this information dies out. Therefore, in [1], problem with abandoned objects is that they loose the foreground characteristic after sometime. Thinking along this direction, in order to detect abandoned anomaly, grids over abandoned objects should also give some foreground info.
In order to do so, I wish to implement abandoned object detection method proposed in [2], in [1].

Data sets:
The following data sets are available to us:
http://www.cse.iitk.ac.in/users/vision/traffic-datasets/dataset3/dataset3.html
http://www.eecs.qmul.ac.uk/~andrea/avss2007_d.html
http://www.cvg.rdg.ac.uk/PETS2006/data.html
http://www.cvg.rdg.ac.uk/PETS2007/data.html

References:

1. D Pathak, A Sharang, A Mukerjee, "Anomaly Localization in Topic-based Analysis of Surveillance Videos" IEEE Winter Conference on Applications of Computer Vision (WACV 2015).
    http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7045912

2. Y.L. Tian, R.S. Feris, H. Liu, A. Hampapur and M.T. Sun, "Robust detection of abandoned and removed objects in complex surveillance videos," IEEE Transactions on Systems, Man and Cybernatics-PartC:Applications and Reviews, vol.41, no.5, pp. 565-576, 2011.
    http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=5571035&tag=1

3. O. Barnich and M. Van Droogenbroeck. "Vibe: A universal background subtraction algorithm for video sequences." Image Processing, IEEE Transactions on, 20(6):1709–1724, 2011.
    http://dl.acm.org/citation.cfm?id=2333806