

Action Recognition in multi-camera video surveillance



Motivation



Automating the process of recognizing dangerous human actions is crucial to save time, effort and keep the situation under control. In this work, I aim to develop a system using deep learning that classifies abnormal and safe actions to be used in real time security systems.

METHODOLOGY



Dataset labels are at the video level during training. Normal and anomalous videos are treated as bags and short segments of each video as instances in a bag. For each segment the 3D convolution features are extracted. During testing, video segments are fed into the deep network which assigns anomaly score for them. Using both positive and negative bags, the anomaly detection model is trained using a deep MIL ranking loss which encourages high scores for anomalous video segments compared to normal segments.

Problem Statement

the system's input consists of videos of the scene taken by a multi-camera network which helps in reducing the ambiguity that results from some camera view-points. The System's output is the classification of a video being dangerous or safe.

RESULTS/FINDINGS



The dataset were divided into training and testing sets. Both training and testing sets contain all 13 anomalies at various temporal locations in the videos. This approach achieved an AUC of 75.41

Method	AUC
Binary classifier	50.0
Hasan <i>et al.</i> [18]	50.6
Lu <i>et al.</i> [28]	65.51
Proposed w/o constraints	74.44
Proposed w constraints	75.41

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DataSet

UCF crime anomaly detection dataset consists of 1900 long and untrimmed real-world surveillance videos, it is grouped as follows 950 unedited real-world surveillance videos with clear anomalies and 950 normal videos, with 13 realistic anomalies such as fighting, road accident, burglary, robbery, etc. as well as normal activities. This is a challenging dataset having changes in camera viewpoints, illumination and background noise. Some anomaly frames:



Flow Diagram

