Video Analytics
For Multi-Camera Collaborative Sensing

Motivation
Focus on fundamental single camera based video analytics to provide high level overview of events via multiple visual sensors. The intuitive spatial-temporal representation provides easier navigation across sensors and enables correlation with social-media data.

Applications
• Infrastructure planning
• Retail analytics
• Events management during emergency
• Event analytics with social media data

Background Subtraction
Background subtraction is an essential preprocessing step for video analytics application, such as anomaly detection, object detection and video summarization. We proposed a hybrid foreground extractions algorithm for robust and efficient modelling on challenging visual data.
• Per-pixel GMM modelling on gradient image to detect moving contours
• Dual threshold per-pixel GMM modelling on color channel
• Generate a “strict foreground mask” and a “strict background mask” to compensate idle foreground subjects
• Perform constrained graph-cut based optimization for background modelling and foreground extraction

People Counting
Building on object detection and object tracking algorithms, we can quantify the person flow on a virtual location. People counting has various applications in security (e.g., counting number of people in a building during an emergency) and retail (e.g., capturing human traffic flow in a shopping mall).

Video Summary
From a hours long video footage, we can produce a short summary video that summarizes the activities of the longer video. It contains an index of the interesting objects that appeared in CCTV footage, which can reduce the amount of manual effort required in video forensics in response to crimes and other events. Additionally, the indexed objects can be used to support more advanced queries, e.g., when a person wearing a red shirt appeared in the video footage.

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