

THEME: Cybersecurity: Technology and Ethics

PROJECT: Robotics, Autonomous Learning and the Algorithm: Delineating Criminal Responsibility and Legal Liability in the New Machine Age

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Primary Location: CSIT

The domestic market for overt use of police Body-Worn Video (BWV) is potentially very large. Public Order deployments of police generally include both Forward Intelligence Teams and Evidence Gathering Teams, who are overtly collecting video footage of subjects using BWV (this is also known as second person video). One of the issues is how to exploit the data in order to provide enhanced situation awareness, both to officers on the ground and back at command and control centres.

The research question addressed by this work is: Can data analytics for BWV networks be used to recognise and track persons of interest during a public order incident? Specifically, given a third person video from a CCTV camera, the system will retrieve all second person video of those individuals in the third person video, acquired by police officers during the public order incident. Conversely, given a second person video containing an individual's signature, the system, will retrieve third person video containing that individual.

This will build on previous work that we have performed in this area for static mounted CCTV sensor networks. Specifically, we will address the novel challenges posed by BWV such as camera jitter, moving background and reduced resolution.

In this work, we will employ a 3-D multi-target tracking algorithm developed for tracking subjects in conventional CCTV systems where the camera angle is acute. We will develop a technique for matching a set of egocentric videos with an acute-view video. Following this, we will then associate each egocentric video with a viewer in the acute-view. In the second stage, we propose the use of bipartite graph matching between each egocentric video and each viewer in the acute-view. In the third and final stage, those viewers not associated with an egocentric video, will be associated by performing person re-identification between their signatures in the ego-centric video and the acute video.

The Security Innovation and Demonstration Centre (SIDC) recently hosted a workshop on Body-Worn Video and the Digital Criminal Justice System. Dr Chris Rampton who is Director SIDC, is a member of the CSIT advisory board and has expressed an interest in this work.

This project will partner another LINCS project supervised by Dr Graham Ellison, entitled "The Use and Potential of Body-Worn Cameras for Policing Purposes", which will focus on examining and evaluating practice to date in a range of

jurisdictions and making an assessment in particular of the technical as well as the human rights challenges which the use of such technology entails.

Primary Academic Discipline: Computer Science