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Letter to the Editor

Automated video surveillance and machine learning: Leveraging existing infrastructure for cardiac arrest detection and emergency response activation


To the editor,

Cameras are common in public spaces. Police operate 51,000 cameras in London, 43,000 in Beijing and 10,000 in Chicago [1]. The total number of surveillance cameras in these cities exceed 480,000, 420,000 and 17,000 respectively [2]. Technology for the automated detection of acts of violence and terrorism have been advancing over the past decade [3]. Unfortunately little or no attention is being paid to utilizing this infrastructure for the detection of medical emergencies such as cardiac arrest.

A cursory review of publically-available online cardiac arrest videos gives insight into the relatively predictable appearance of these events. In most public spaces the victim of out of hospital cardiac arrest suddenly goes from ambulating or standing to horizontal, on the ground, and not moving (outside of periarrest convulsions and/or agonal breathing). Refer to figure one for an example. The detection of this change in orientation, and subsequent lack-of-movement, is well suited to existing methods of analysis such as background subtraction, optical flow algorithms, motion detection, person tracking and behavior analysis.

Brief activation intervals, from dispatch of emergency medical services providers to arrival on scene, is associated with greater survival [4]. Time reductions from event recognition to emergency response may have a similar effect. If automated video surveillance is paired with basic life support crowdsourcing applications [5], additional reductions in time to first chest compression and defibrillation may be possible.

Collaboration between resuscitation and computer scientists represent an important cross-sectoral approach to out-of-hospital cardiac arrest. Given that much of the required infrastructure to implement automated video surveillance systems for cardiac arrest detection is already in place in many transit corridors and public spaces, this represents an important opportunity for resuscitation science.

Conflict of interest

None.

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