

ATM crime detection using image processing integrated video surveillance : a systematic review

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ABSTRACT

Integrating image processing in video surveillance systems is a challenging task that has been attempted for the past several decades. Despite being susceptible to crime, automated teller machine (ATM) surveillance system has not been fully integrated with image processing application for detecting criminal activity. On the other hand, the conventional state of the art image processing algorithms available for occluded and covered face detection, human abnormal behavior analysis and illegal object detection may not work for ATM having different environment (i.e. illumination and camera view), abnormal gestures, and crime devices. This article reviews the previous research works on all possible image processing applications that can be used in the ATM surveillance camera. The review embarks with the aim of (1) categorizing the studies, (2) analyzing their weaknesses and strengths, (3) highlighting significant research findings and (4) providing future research directions. To achieve these goals, this review summarizes the information based on abnormality detection, features, system framework and methodology, image acquisition, sample specification, performance analysis and project funding. Furthermore, the survey evaluates the studies from the point of view of their applicability, suitability, and usage in dynamic environment such as ATM. Viewing as a whole, despite having huge potential, a full-fledged video surveillance system integrated with image processing methods has not been found in the existing literature for ATM. The findings of this review may help the future researchers to develop dynamic and multipurpose algorithms for surveillance system that can detect and prevent ATM crime.

KEYWORDS

Automated teller machine; ATM crime; image processing methods; Video surveillance; Face occlusion detection; Abnormal activity detection; Illegal oblect detection

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