Chapter 7
Intelligent Anomaly Detection Video Surveillance Systems for Smart Cities

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ABSTRACT

With the growing demands of safety for people and their properties, video surveillance has drawn much attention. These requirements have led to the positioning of cameras almost every corner. Smart video surveillance systems can interpret the situation and automatically recognize abnormal situations, which plays a vital role in intelligence monitoring systems. One vital aspect is to detect and alert generation of suspicious events then to notify operators or users automatically. A long time may pass before an event of interest to take place. In such situations, human attention may get diverted and an event of interest may get missed. In such case, video surveillance systems can effectively improve safety and security for the control and management of public areas or personal life. Independent surveillance systems to replace the traditional (human observer-oriented) systems also can relieve the workload of relative personnel.

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INTRODUCTION

Anomaly: something that deviates from normal, expected or standard pattern e.g. A camel between a flock. Detection of anomaly finds application everywhere, one of them application area is in video surveillance systems in smart cities and very active research area in computer vision, visual/video surveillance systems in dynamic scenes tries to find, recognize and track specific type objects/patterns from video data feed, and more generally to recognize and define object pattern/behavior. The motive is to develop intelligent video surveillance systems to substitute the traditional visual surveillance systems for smart cities that provide effectiveness and increase capability of operators, who monitor them, as the number of cameras exceeds. Briefly, the aim of video surveillance systems is not only to use cameras in the place of human eyes, but also to achieve the complete surveillance job as automatically as possible (Hu, Tan, Wang, & Maybank, 2004).

Video surveillance systems in real world has an extensive range of possible applications, such as traffic surveillance in cities, a security guard for community buildings, important buildings and expressways, detection of military interest targets, etc. Some of the video surveillance areas involving people or vehicles discussed below.

Access Control in Security Sensitive Areas

In some restricted or security wise sensitive areas such as defense laboratories, important private/governmental units and military bases, only persons with a specific identity are acceptable to enter at that areas. A biometric feature enabled database including legal visitors is built earlier using different biometric methods. When someone wants to get access to that area, the system could automatically acquire the person's features, such as facial appearance, height and walking gait from images taken from surveillance cameras in real time, and then decide whether the person can enter at that place.

Person-Specific Identification in Certain Scenario

Personal identification from distant view point by use of an intelligent surveillance system can provide assistance to the authorities, to catch accused/suspected persons. In such cases, authorities have to build a biometric feature-based database of suspects/accused, and put video surveillance at that locations where the probability of finding accused/suspects are high, e.g., bars, railway stations, casinos, bus stops, etc. The intelligent systems automatically identify and judge whether or not the people in