An Enhanced Surveillance System Integrating Pedestrian Attribute Recognition and Multi-Target Multi-Camera Tracking Technologies.

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ABSTRACT

Surveillance systems usually connect to multiple cameras for real-time video feeds. Traditionally, finding certain objects from these video feeds is a time-consuming and labor-intensive task. With the rapid development of AI-based computer vision, this research tries to enhance surveillance systems by integrating Pedestrian Attribute Recognition (PAR) and Multi-Target Multi-Camera Tracking (MTMCT) technologies. The PAR is to identify distinct appearance characteristics of a targeted person from images, enabling surveillance systems to identify and classify various attributes of pedestrians in a textual format, such as gender, age, hairstyle, types of clothing, accessories, etc. On the other hand, the MTMCT is for identifying and tracking moving objects across multiple cameras, which requires a series of AI-based processes, including object detection and tracking on images from individual cameras, re-identify objects when moving from one camera to another, etc. By integrating PAR and MTMCT technologies, a surveillance system can quickly locate target individuals from a large amount of image data based on space, time, and appearance information, which is extremely useful for various applications, including crime investigations, searching for missing persons, etc. In addition, as PAR models can extract local and global appearance features, these features can also help improve the re-identification accuracy in the MTMCT. As a result, we have constructed a surveillance system that provides an effective application for finding pedestrians with an improved MTMCT.

Keywords: Pedestrian Attribute Recognition, Multi-Target Multi-Camera Tracking, Surveillance, Person Retrieval, Re-identification.