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Guest Editorial

Special Section on Advances in Intelligent Visual Surveillance Systems

Visual surveillance refers to real-time observation of objects of interests in a video scene such as people or vehicles to find a description of their behaviors. Growing demands for high-level security and safety in commercial, law enforcement, and military applications has led to active research to build intelligent surveillance systems that perform with minimal manual reconfiguration. Such systems should be robust and adaptable enough to cope with variations in the environments such as illumination, scene geometry or scene activity. Visual surveillance technology has demonstrated effectiveness to measure traffic flow, detect accidents on highways, monitor pedestrian congestion in public spaces, compile consumer demographics in a shopping mall, log routine maintenance tasks in nuclear facilities, and count endangered species. Military applications include patrolling national borders, measuring the flow of refugees in troubled areas, monitoring peace treaties, and providing secure perimeters around military bases. Despite several excellent special issues focusing on visual surveillance that were published over the past decade, there has been a demand for an issue that covers practical aspects of real-world intelligent visual surveillance systems. This special section aims at putting together recent advances in computer vision, pattern analysis, and computational intelligence for real-world applications of intelligent visual surveillance. This special section presents six papers that cover a broad spectrum of intelligent visual surveillance techniques such as moving object detection, object tracking from stationary and moving camera platforms, recognition and classification of object classes, human motion analysis, distributed multi-sensor visual surveillance systems, and activity understanding.

The first paper "Intelligent Visual Surveillance – A Survey" by In Su Kim, Hong Seok Choi, Kwang Moo Yi, Jin Young Choi, and Seong G. Kong reviews recent advances and future trends in intelligent visual surveillance systems with a focus on moving object detection and tracking, scene interpretation, and wide area surveillance control.

In the paper "A Hierarchical Approach for Background Modeling and Moving Objects Detection," Jie Yang, Jinqiao Wang, and Hanqing Lu propose a hierarchical approach to background modeling and moving object detection in intelligent visual surveillance systems. This approach models the background with color information in pixel level and texture information in block level.

Jeong-Woo Woo, Wono Lee, and Minho Lee's paper "A Traffic Surveillance System using Dynamic Saliency Map and SVM boosting" proposes a traffic surveillance system that uses a dynamic saliency map and local/global feature analysis to detect and identify vehicles and pedestrians in real traffic situations.

The paper "Autonomous Feature Following for Visual Surveillance Using a Small Unmanned Aerial Vehicle with Gimbaled Camera" by Deok-Jin Lee, Isaac Kaminer, Vladimir Dobrokhov, and Kevin Jones presents feature following control and distributed navigation algorithms for visual surveillance using a small unmanned aerial vehicle equipped with a low-cost imaging sensor unit.

"Intelligent Unmanned Anti-theft System Using Network Camera" by Jong Sun Kim, Dong Hae Yeom, Young Hoon Joo, and Jin Bae Park presents the use of network cameras to build an intelligent visual anti-theft system. A pair of IP cameras detects and tracks intruders using background modeling and morphology and monitors the intruders to prevent the valuables from being stolen using the scale-invariant feature transform (SIFT) algorithm.

In "Vehicle License Plate Tilt Correction Based on the Straight Line Fitting Method and Minimizing Variance of Coordinates of Projection Points," Kaushik Deb, Andrey Vavilin, Jung-Won Kim, and Kang-Hyun Jo present a modified recursive labeling algorithm to determine the region of vehicle license plate in challenging conditions and uses least-square fitting with perpendicular offsets to correct tilt of the plate.

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