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**Cross-domain Image Reconstruction**

**Nannan Wang**

**Xidian University, China**

**ABSTRACT.**

As an important task for “Safe City” construction, city-level video surveillance has evolved from the first generation of "visible" and the second generation of "readable" to the third stage of "intelligible". Due to the wide spatial distribution of city level cameras and large differences in their types and parameters, it is a major challenge to realize the "intelligible" city level video surveillance system. This lecture mainly introduces the recent progress on cross-domain image reconstruction and credible identity authentication technology, including (1) Behavior analysis (abnormal behavior detection, behavior location and recognition): complete semantic information extraction through multi-scale boundary sensitive network for temporal action localization; the differentiation of reconstruction quality of normal and abnormal data through the detection of temporal-spatial fusion features; (2) Cross-modality person re-identification: improving the feature modality invariance by measuring and constraining the modality differences between cross-modality person high-dimensional features; (3) Video object clarity (underlying vision): Improving the representation ability of inter-frame temporal dependence by joint priori information and motion invariance; (4) Cross-domain image synthesis (heterogeneous image generation and image stylization): Transforming the images from different modalities into unified modality to achieve information completion. (5) Cross-domain image recognition (heterogeneous face image recognition): Improving the interpretability and accuracy of cross-domain image synthesis and recognition through representation disentanglement learning. This research can provide a systematic solution for the intelligent analysis of network video streaming; (6) Credible identity authentication: here “credible” mainly refers to reliability and security. The algorithm is supposed to not only defend against external attacks (adversarial learning), but also protect private information.