

Vision-Based Collision Avoidance for Unmanned Aerial Vehicles by Recurrent Neural Networks

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Abstract : Due to the sensor technology, video surveillance has become the main way for security control in every big city in the world. Surveillance is usually used by governments for intelligence gathering, the prevention of crime, the protection of a process, person, group or object, or the investigation of crime. Many surveillance systems based on computer vision technology have been developed in recent years. Moving target tracking is the most common task for Unmanned Aerial Vehicle (UAV) to find and track objects of interest in mobile aerial surveillance for civilian applications. The paper is focused on vision-based collision avoidance for UAVs by recurrent neural networks. First, images from cameras on UAV were fused based on deep convolutional neural network. Then, a recurrent neural network was constructed to obtain high-level image features for object tracking and extracting low-level image features for noise reducing. The system distributed the calculation of the whole system to local and cloud platform to efficiently perform object detection, tracking and collision avoidance based on multiple UAVs. The experiments on several challenging datasets showed that the proposed algorithm outperforms the state-of-the-art methods.

Keywords : unmanned aerial vehicle, object tracking, deep learning, collision avoidance

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