**Autonomous landing scene recognition based on transfer learning for drones**

**Abstract:**

In this paper, we study autonomous landing scene recognition with knowledge transfer for drones. Considering the difficulties in aerial remote sensing, especially that some scenes are extremely similar, or the same scene has different representations in different altitudes, we employ a deep convolutional neural network (CNN) based on knowledge transfer and fine-tuning to solve the problem. Then, LandingScenes-7 dataset is established and divided into seven classes. Moreover, there is still a novelty detection problem in the classifier, and we address this by excluding other landing scenes using the approach of thresholding in the prediction stage. We employ the transfer learning method based on ResNeXt-50 backbone with the adaptive momentum (ADAM) optimization algorithm. We also compare ResNet-50 backbone and the momentum stochastic gradient descent (SGD) optimizer. Experiment results show that ResNeXt-50 based on the ADAM optimization algorithm has better performance. With a pre-trained model and fine-tuning, it can achieve 97.8450% top-1 accuracy on the LandingScenes-7 dataset, paving the way for drones to autonomously learn landing scenes.

**With regards and Gratitude**

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