Simulated Landing of a Multirotor on a Boat at Sea: A Semantic Segmentation Approach

Abstract-This paper explains a semantic segmentation approach to the problem of autonomously landing a multirotor UAV on a ship at sea. A photo-realistic, 3D simulated world containing a boat on moving waves with a flying UAV was created for this project. The ship has a flat area that serves as a landing pad for the multirotor. The multirotor is equipped with a monocular camera, IMU, GPS, and a relatively powerful GPU. A pre-trained deep convolutional neural network was used to perform semantic segmentation on the camera's video feed in order to distinguish the boat from the ocean, and then later to distinguish the landing pad from the other parts of the boat. It was found that, although possible to accomplish, the dataset required to perform this task may be too difficult to come by for most applications.