
DLR Institute: Remote Sensing Technology Institute (IMF) at DLR Oberpfaffenhofen

Position: Master Thesis / Internship

Job Specification: Developing computer vision algorithms based on deep learning approaches (e.g., Convolutional Neural Networks - CNNs) to detect and track people and vehicles in RGB aerial image sequences. Reviewing the existing methods and benchmark them on the DLR's own person and vehicle detection and tracking datasets. Since most of the existing methods have been developed for the Computer Vision scenarios (oblique view), they may face many new challenges when they are applied to aerial images; such as different viewing angle (view from above), very small object sizes, the large number of target objects (could be a few thousands of people in an aerial image), and the low frequency of the sequences (about 2 Hz). Thus, adapting the existing methods to this domain requires considering all these aspects and challenges. The results of people and vehicle detection and tracking allow us to better analyze traffic and crowd behaviors especially in the crowded scenarios (concert, public festivals and events) or in the case of disasters (e.g., flood, earthquake) for security and safety purposes to help Early Response teams and decision makers.

Keywords: Person tracking, Vehicle tracking, Detection, Convolutional Neural Networks, Deep Learning, Machine Learning, Aerial image sequences, Remote sensing.

Required Qualification: The candidate should have a background in Computer Science, Computer Vision, Signal Processing, Remote Sensing or a related discipline. Programming skills are required.

Advantageous Skills: Experience with Machine Learning and Deep Learning frameworks, such as Pytorch or Tensorflow; programming experience in Python.

English competence: Very good