



SCHOOL OF COMPUTER AND
COMMUNICATION SCIENCES

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Computer Vision Laboratory

Unseen Spacecraft Pose Estimation

Baseline solution by implementing a machine learning
framework with target models included

Bachelor's Thesis in Computer Science

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Summary

This project falls within an Unseen 6 Degrees of Freedom (DoF) competition, organized in collaboration with the European Space Agency (ESA) Advanced Concept Team. Essentially, we are dealing with space objects that are unfamiliar to us, and our objective is to accurately predict their 6D poses. The action of the Computer Vision Laboratory (CVLab) team is twofold: firstly, we are tasked with creating a challenging dataset featuring multi-object, unseen, and occluded spacecraft scenarios. This involves ensuring a high degree of rendering realism. Secondly, we are focused on developing a baseline solution, which entails implementing a pose estimation model and conducting thorough training and testing on our dataset. My role this semester was primarily concentrated on the latter aspect, specifically on a track that incorporated target models.

Foremost, we started with a literature search by reading recent papers about generalizable 6DoF object pose estimation. Out of candidate models, our interest fell on Generalizable Model-Free 6-DoF Object Pose Estimation from RGB Images, shortly denoted by Gen6D [1].

Abbreviations

ESA European Space Agency

DoF Degrees of Freedom

CVLab Computer Vision Laboratory