



## “Machine Pose Estimation from Camera Video Stream”

Company	Project Level	NDA?
MacGregor	Master	“Yes”

### Short Introduction

Explore the capabilities of visual feature extraction from live stream for the estimation of machine pose under motion compensation control relative to a fixed structure using a single high definition camera.

This project is relevant for a student of machine learning, computer science or general AI interest. The tasks are only programming related.

### Project Description

A machine in an off-shore environment installed on an Service Operation Vessel (SOV) approaching a service platform compensates its motion based on proprioception and the vessel's own pose estimation. As the machine approaches a target platform fixed to the seabed, a camera fixed to the machine provides a video feed that in theory can provide the remaining relative orientation between machine and landing platform.

### Objective

The objective is to use the first seconds of the video to recognize sufficient features to track in real-time the main object in the scene and provide the information to the control system to further close the loop of the motion compensation.

In an initial phase we would like to hold the position of the machine close to the platform for evaluation of stability. A second phase will see the machine reducing the gap to the platform until contact is made.

### Expectations

Depending on the progress and challenges some of these expectations can initially be relaxed or postponed and fit into the academic timeframe.

The algorithm should be able to work for unknown platform shapes, colours or initial orientation. No modification to the existing installation is expected. Background objects or light conditions are not under control. Meaning the algorithm should be robust to all these variations.

The frequency of updated pose should be no more than 50 ms delay. Initial pre-processing should be no more than 5 seconds.

Resolution is expected at 5 mm, pending camera resolution

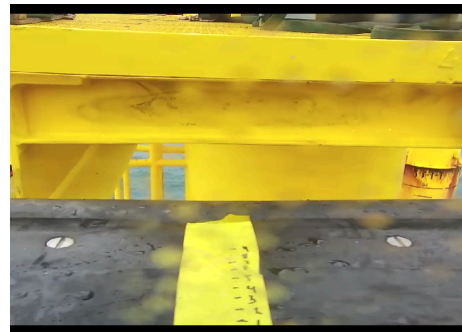
Context is Industrial setup. No natural features in video other than the sea of clouds.

### Keywords

- Automation
- Machine Learning
- Computer Vision
- Artificial Intelligence

### Additional Information

The image provided shows the lower part of this image shows a fixed structure on the machines. Which is therefore static. The yellow structure in front is the target to track. Note that the camera has water splashes.



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