X Recognition and Motion-Tracking of 3D Objects

Background

Roof mounted conveyors are common in a wide range of industries. As shown in the illustration, trolleys carrying the produced goods are suspended from the conveyor. When the trolleys are swinging freely it is difficult to automatically load and unload goods using industrial robots Currently this task is performed with manual labour. The automation of this task using robots is an ongoing research activity at NTNU and SINTEF. We are planning to use a UR10 robotic manipulator in order to achieve the mechanical part. To enable the use of the robotic manipulator it is important to recognize and track the 3D objects that we need the arm to interact with. This is only one of many cases where a flexible solution to track different 3d objects are needed.

Assignment

The computer vision problem of recognition and tracking of 3D objects can be tackled in many ways. In literature various approaches exist, that have been presented with varying results. The main goals of the project are the following:

- Perform a litterature study on relevant existing techniques regarding the recognition and tracking of 3D objects with optical sensor data. Consider both arbitrary objects and objects where a model (e.g. CAD model) is available.
- Decide which method(s) are best suited for the targeted application, and discuss the advantages and disadvantages compared to other methods.

Experimental implementation of the chosen technique(s) in a SINTEF lab-setup to demonstrate the feasibility to track (and if time permits, interact with) objects in the application using real and live sensor data.It is beneficial if the candidate has some experience in in estimation techniques and computer vision.

The project duration is one year. During this time the student will have support from SINTEF researchers and in addition will have access to the Robotics Group's lab in SINTEF Mathematics and Cybernetics to implement and experimentally verify the results.

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