2021-09-21

Labelling of 3D-scan data using open-source library

The last 10 years industrial robotics has all been about collaborative robots. The next 10 years will all be about machine learning. Machine learning is the final solution to make robots work next to the human and will be as versatile as a human being on the workshop floor and all throughout the society. There are two very important areas to be solved using machine learning algorithms. 1) to use sensors to map the surrounding environment and to label the components next to the robot. 2) how to act from this interpretation, or rather how to take the correct decision given a goal value. Furthermore, the later topic will be how to automate the automation; hence how to eliminate the manual work of programming.

This master thesis project will investigate the new emerging 3D opensource solutions on the market to interpret 3D. One example could be the Open3D (http://www.open3d.org/), which seems to be a rather competent system to label 3D scan data as input to a machine learning framework. I don't want to restrict you on how to go about this.

The use-case of this thesis work will be the following: to create an automatic programming concept for welding pipes. The concept is based on using laser scanning from Hexagon. The robot scans the bead a nominal weld trajectory. A nominal weld trajectory will be calculated based on this scan input. The system will iteratively generate and execute weld trajectories in a mix with scanning. Ones the goal value is met the iteration stops and the weld cycle is complete.
In this project you will work with Prodtex, Hexagon and the end-user. Your responsibility will be the labelling of scan data using an open-source 3D framework.
Two students are strongly recommended for the project. An EU-project on this topic is submitted for approval recently. The thesis project will be managed by Prodtex AB.

Dr. Henrik Kihlman
DEPARTMENT OF INDUSTRIAL
AND MATERIAL SCIENCE
Division of Production
henrik.kihlman@chalmers.se
Chalmers University of Technology
SE- 412 96 Gothenburg, Sweden
Chalmers University of Technology
Corporate Identity No: 556479-5598