IDENTIFICATION OF LCD MONITORS

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Introduction

Two million LCD monitors and TVs are sold each year in Sweden. As a monitor contains both environmentally harmful substances and valuable materials, the interest in an automated recycling process is large. This project is a part of the research project HÅPLA, which investigates the possibility for such processes.

The objective of the project is to detect and locate LCD monitors in a pallet using data gathered from a Microsoft Kinect sensor, then use a Yaskawa SDA10industrial robot to pick upthe monitors and place them by the side of the pallet. The project shall investigate the degree to which the sensor can be used to detect LCD monitors as well as how much information that can be obtained about the monitors.

Figure 1. A possible setup of monitors in a pallet

Methods

- The monitors are modeled as planes in the point cloud image received from the Kinect. This is done by calculating point normals and grouping points with similar normals together.

Figure 2. Estimated monitors in a point cloud

- The mapping between robot and kinect coordinates is done by a calibration algorithm. This is essentially a rigid transformation between two coordinate systems.
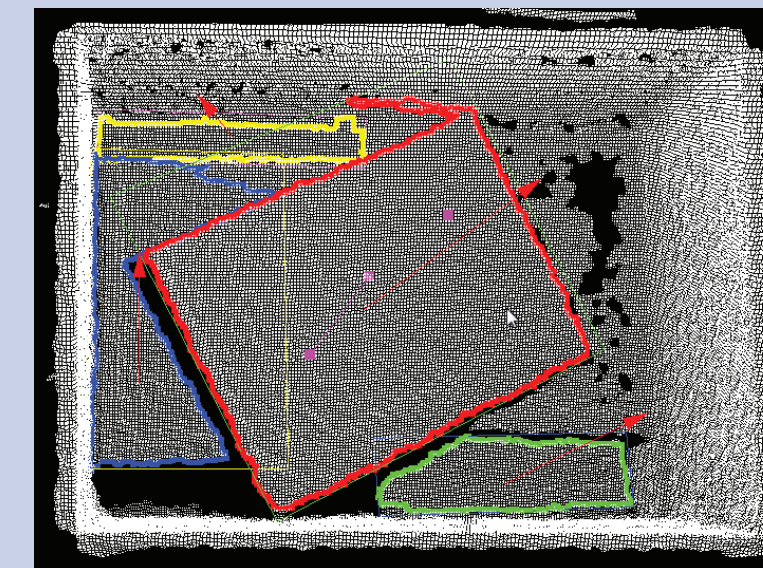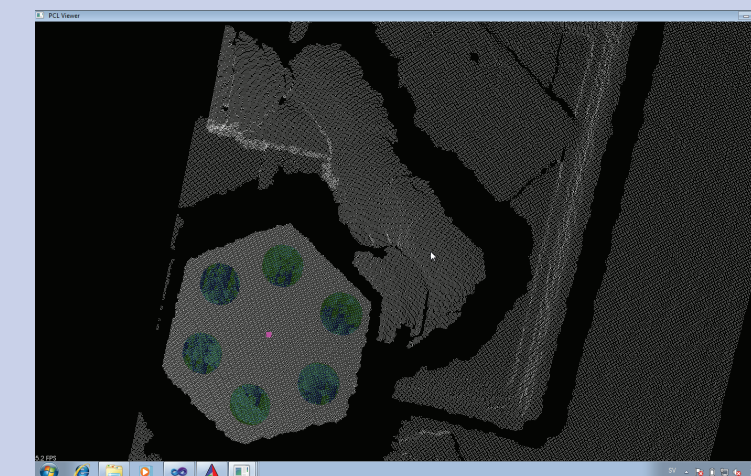

Figure 3. Tool Center Point located in a point cloud image

Result

Using external libraries such as openCV and PCL, it is possible to process the data gathered from the Kinect sensor to estimate and locate a monitor at an arbitrary position in the pallet and pick it up with the Yaskawa SDA10 robot.

Discussion

While being able to successfully pick up a monitor, the system does not yet work at a satisfactory fail rate.

Figure 4. Yaskawa SDA10 robot

Restrictions lie in the robustness of the plane segmentation and the path planning of the SDA10 robot. Improving these would further diminish the fail rate of the system.
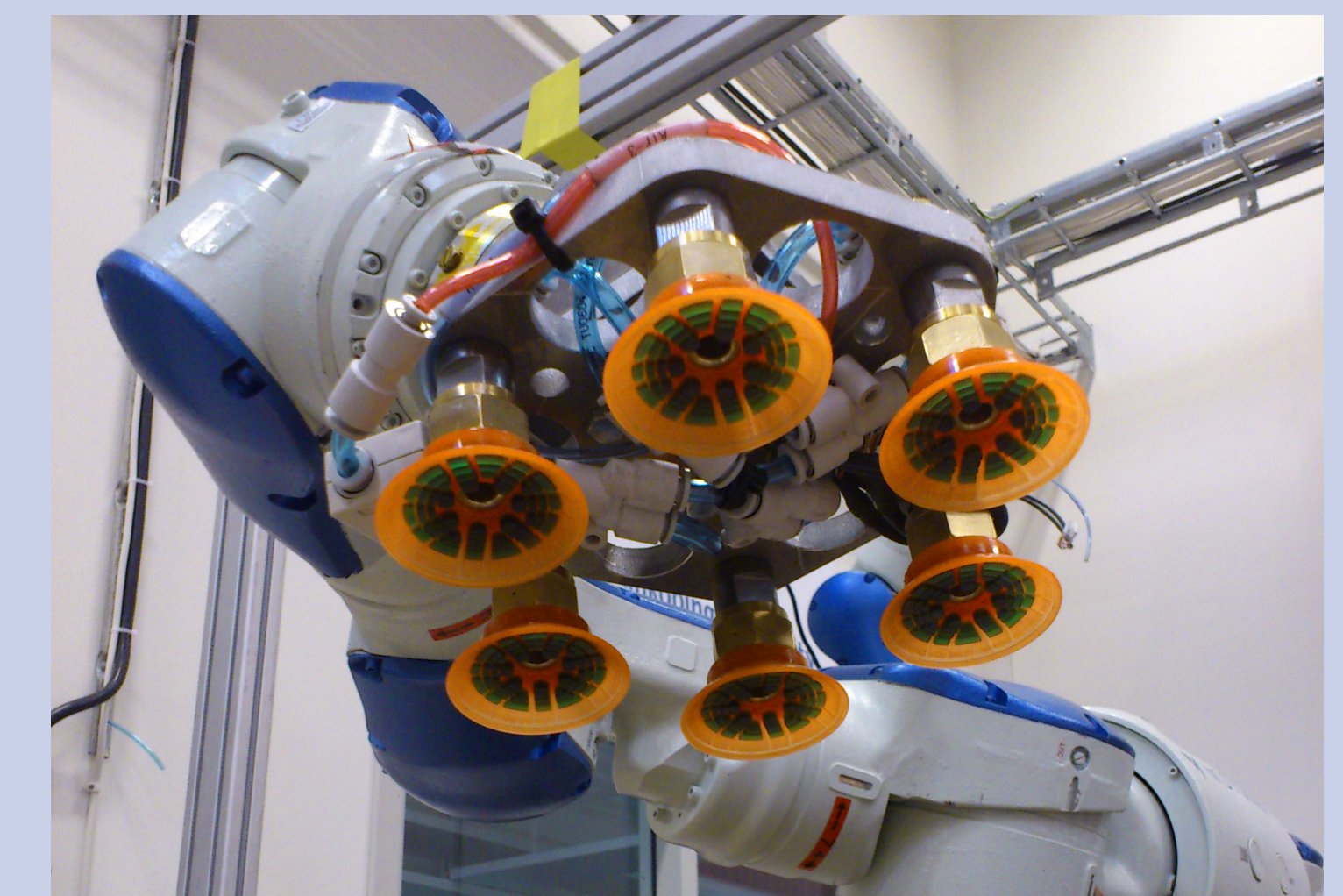

Figure 5. Grasping tool