



Expertise

Master Thesis B.Eng. Jan Kupecek

Master thesis deals with a robot system, which is able to pick different work pieces out of a box. For this task part recognition with camera system is necessary – also called bin picking.

Work was done at Fibro Läßle Technology (FLT) GmbH in Haßmersheim.

After introduction of bin picking task different 2,5d- and 3d-camera technologies are compared with respect to resolution, field of view and speed.

In the next chapter overview of most important manufacturers of 3d-camera-systems in the machine vision market is given.

After a consultation about possible borrowing of a 3d camera system FLT decided to use Ensenso N20 3d camera system and MVTec Halcon vision library.

Hard- and Software was developed for Ensenso camera connection to PC and for connection with the Kuka robot.

2d shape-based Halcon matching techniques were implemented to recognize work pieces. With this task Halcon could robustly recognize X,Y position and Z rotation, however the distance in Z which was achieved just from 2D image was not accurate enough. Recognition was made more robust by using depth information in addition.

Results are summarized in conclusion.

During this work hard- and software was developed to enable the construction of a robot which is able to pick different work pieces out of a box. Robot is working. Test video of working robot is watchable.

The presented master thesis fits formal requirements with only little concerns.

Final mark was:

mark: 1.0 (very good)

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