

Test Plan

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Status

Reviewed		
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Images and Graphics, TSBB11

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Document History

Version	Date	Performed changes	Performed by	Reviewed
0.1		First draft	EG, PB, SA, JF, AdL, VE	

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System Overview

The system shall detect and locate LCD monitors in a pallet. An industrial robot will be used to pick up the monitors, one by one, and place them by the side of the pallet.

Components

The components included in the system is the Yaskawa SDA10 industrial robot, the Yaskawa NX100 control system, a Microsoft Kinect sensor and an image processing unit to compute suitable grasping points and angles for the robot to pick up monitors. Also included is a technical documentation and an user manual.

Boundaries

The program will be used in a Microsoft Windows environment and the control system (Yaskawa NX100) used by the available Yaskawa robot.

Definitions

Successful pickup

Grasping and lifting the monitor without dropping it.

Monitor goal position

A specified, pre-programmed position and orientation.

Test Specifications

The following tables sets out the tests that should be made to verify that the system fulfills the Requirement Specification. Each test has its own row in the table. The first column holds the identification number of the requirement that is tested. The second column is a brief description of how the test was performed and the third by whom. The fourth column states if the requirement was fulfilled or not.

Table 1. Test specifications

Testnr	Test description	Performed by	Evaluation
1	Make sure that a Yaskawa SDA10 robot with a Yaskawa NX100 Controller is used.	AdL, VE, SA	OK
2	Make sure that a Microsoft Kinect sensor is used.	AdL, VE, SA	OK
3	Make sure that the system is used in a Windows environment.	AdL, VE, SA	OK
4	Run the image processing part of the system using many different Kinect snapshots. Verify that the segmentation works and planar regions are found.	VE, SA	OK
5	Run the image processing unit on different snapshots and make sure that a) b) an appropriate monitor is found and that the normal is placed in the middle of the screen. c) the ratio between the bounding box area and the convex hull area matches the visibility of the monitor.	VE, SA	OK
6	Run the image processing unit on different snapshots and make sure that the chosen grasping point is in the center of the monitor screen.	VE, SA	OK
9	Start the pick up program and make sure that the screens are picked up.	VE, SA	OK
11	Start the pick up program and make sure that the monitors are properly placed in the monitor goal position.	VE, SA	OK
12	Start the calibration program. After the program has finished make sure that the Kinect coordinates multiplied with the transformation matrix match the robot coordinates. Make sure that the error is sufficiently small.	VE, SA	OK
13	Try to place the Kinect sensor on different heights above the middle of the pallet. Evaluate the segmentation result and the robots movement freedom.	SA	OK

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14	Make sure that the estimated grasping point is in the center of the monitor screen.	VE, SA	OK
16	Start the user interface and make sure that all features, Requirement 17-19, works.	VE, SA	OK
17	Start the calibration cycle using the user interface.	VE, SA	OK
18	Start the grasping cycle using the user interface.	VE, SA	OK
19	Make sure that the user is notified if the system fails.	VE,SA	OK
24	Make sure the system stops if no monitor can be found.	VE,SA	OK

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