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Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Abstract:

This report contains the video material showing two contributions towards Demo 1.

Keyword list:

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This deliverable contains two video files related to Demo 1.

1. File GraspingAndAccumulation.divx

We show the development of a grasping strategy for unknown objects and its implementation. We also present a method to extract an object representation from images of a moving object and known proprioceptive information. Both parts are described in more detail in Deliverable D4.1.1. The combination of the two methods which leads to a system which can autonomously explore its environment is described in Deliverable D8.1.1.

The video is showing successful and unsuccessful grasps of unknown objects. Furthermore it shows how physical control over an object — in conjunction with the known proprioceptive information — can be used to extract an object model.

A Stäubli RX-60 robot with an external stereo camera system was used for this experiments.

2. File DetectScan.mpg

These two videos illustrate our implementation of the following explorative behaviours, which include both sensing and motor control:

- Optimal placing of the object in space so that it is positioned at the image center and at the appropriate distance from the camera so that it appears in the image at the optimal size for observation. In other words, the object is placed so that it covers a significant portion of the image but is not too close to the boundaries. This was implemented via feedback control exploiting the redundancies of the arm.
- Discerning the object from the background. We applied a Bayesian approach for this purpose. The proposed methodology uses a background model, knowledge about the robot motion and knowledge about the robot hand appearance to extract object images. No prior knowledge about the object is assumed. The approach works because the robot has control over the object.
- Observation over the continous area of the view sphere so that data about the object can be collected from all relevant viewpoints. This was again implemented using feedback control, exploiting the redundancies of the arm and ensuring that its manipulability is optimal during motion.

We have implemented the system on the robotic arm available at JSI and implementation on the Karlsruhe humanoid ARMAR is currently under development.