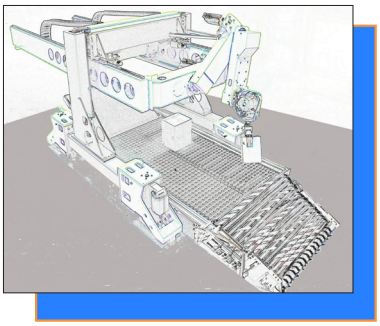
The RobLog Project Passes Milestone 4!

The middle of September marked the true check-off date for passing Milestone 4 in the EU Project „RobLog“, the building of an autonomous cognitive robot for unloading of containers (www.roblog.eu). This is a definite turning point in the project, as it was consented that at this timeframe, the „system will be able to perform under constraints of a real world setting, including the challenges of a real world unloading scenarios.‘‘ For the RobLog Project, this means simulating scenes for the removal of goods that could be found in real shipping containers, both heterogeneously and homogenously packed.

The Testing for Milestone 4: Two actual and specific scenarios were created for the demonstrators to be tested against their original benchmarks, the actual results of both tests were recorded and fared very well. The requirements were to test the cycle time for each demonstrator, specifically measuring robustness and damage of goods. The cycle time is defined as the time that is required to unload a single object from the container, including the steps: object recognition and localization, object grasping and unloading, and the required movements of the robot.

Milestone 4 Video & Test Results:

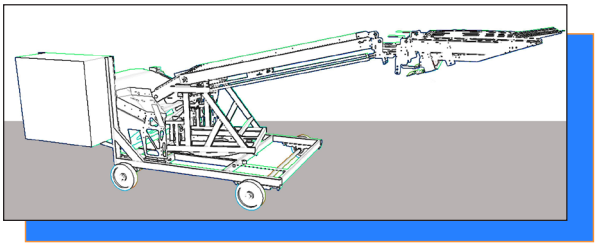


RobLog Advanced Demonstrator

The testing scenario included 13 small objects (parcels, sacks, barrels, plush toys) set inside a container as an example to demonstrate the removal of heterogeneous goods. In total, 13 cycles were performed with an average cycle time of 3.75 minutes, well under the originally planned 7 minutes.

Each cycle time includes an average of 0.4 minutes user interaction time, i.e. the time used by the user to confirm the system-proposed object to be uploaded, or the time that additionally elapsed if the user selected another object different than the system proposed. Moreover, an average of 0.64 minutes (included in the average cycle time) is dedicated to the object recognition which is triggered in a cycle. In the evaluated scene, 12 of the 13 attempted cycles were successfully conducted which led to a robustness of 92.3%. It is worthy to note, that a small parcel placed on the right was not present in the object-database. Hence, it was an "unknown" object, which although a goal for MS5, was already achieved.

Milestone 4 Video & Test Results:



RobLog Industrial Demonstrator

For the industrial scenario, the scene was set to simulate the unloading of heavy sack-shaped goods from shipping containers, such as coffee sacks. The scene contained 21 sacks weighing between 15 - 25 kg in the front of the container tightly piled into 4 stacks. Each stack contained 5 sacks, except for the second from the left (which consists of six sacks).

In total there were 21 unloading cycles performed until the container was cleared. The robot was running in a fully autonomous mode without user intervention, except for one cycle, when the user assistance was requestedastwosackswheresimultaneously grasped by the gripper. In the evaluated scene, 20 of the 21 attempted cycles were successfully conducted with an average cycle time of 2 minutes, in line with the originally proposed cycle time of 2 minutes. This led to a robustness of 95.2%. In the overall unloading process, only one sack was slightly damaged as evident by a small tear in the sack.

Background information on the project: Two physical demonstrators, fully autonomous and cognitive, will result at the end of the project in January of 2015. Though running the same software, the demonstrators differentiate in their applications: an Advanced machine for unloading of heterogeneous goods, and an Industrial machine for unloading of homogenous sack-shaped goods. Both demonstrators are synced with a GUI displaying the current overall environment of which the demonstrator is working in; object recognition and the perceived environment along with a schematic showing the consequential actions for the removal of targeted items. This additional technology allows for an operator to observe from a safe distance the scenarios at all times, and when essential make inputs.

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