

Research results on the robot TALOS*

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Fig. 1. The TALOS-001 (a.k.a. Pyrene) robot performing manipulation with a wooden box

1 Demonstration Data

- Demonstration title: Research at LAAS on the TALOS robot
- Website of the group: <https://www.laas.fr/public/en/gepetto>
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1.1 Description of the robot

LAAS Gepetto proposes to demonstrate his latest results on the TALOS robot. It is in itself a research result as it was specified by the Gepetto group and build by PAL-Robotics. This robot is 1.75 *m* and weights 95 *kg*. It was presented at the Int. Conference on Humanoid Robotics in 2017 [1]. The walking pattern generator provided by PAL-Robotics can make the robot walk using a joystick up to 10 *cm/s*. The robot has torque sensors which make it possible to run a whole body controller using current control.

2 Demonstration proposal

2.1 Motion planning and task based controllers

We propose to demonstrate the research we have been developping in this robot which is motion planning for manipulation using task based controllers. This work is based on [2] presented at the Int. Symposium on System Integration. It demonstrates the capabilities of our motion planner to find a sequence of manipulation tasks and create a sequence of hierarchical task based controllers see Fig.1. In [2] we published the result depicted in the following youtube video https://www.youtube.com/watch?v=_a-LVFeSR2M. We are currently expanding this result with vision feedback to realize visual servoing.

2.2 Differential Dynamic Programming

We demonstrate the robot capabilities to lift large weights in [3]. Using a differential dynamic programming approach and after identifying the actuator model we were able to control one joint of the robot in a receding horizon. In current control mode the elbow joint was able to lift up to 34 *kg*, the robot mechanics was protected by the mathematical formulation of the system and the sensor feedback. The result is depicted in the following youtube video <https://youtu.be/g8-LZHWIaXk>.

2.3 PAL-Robotics demonstrations

The robot is also coming with demonstrations provided by the company building the robot. This is namely their on-line pattern generator and their torque based controller. The latest working on TALOS-001 is available here: <https://www.youtube.com/watch?v=akK1E0nzIbM>

3 Needed space

In order to realize the demonstration a $4 \times 4m^2$ space is needed for: the robot, a table for 3 computers (the table is to be provided), a lifter, the table on which manipulation will occur (brought by the team). We needs plugs for the robot charger and the 3 computers.

References

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