Ph.D. in Information Technology
Thesis Defenses

September 11th, 2023
at 11:30
Room "Aula Seminari Nicola Schiavoni"

Elhanash Hassan Mahmoud Shehawy– XXXIV Cycle
ROBOTIC HANDLING OF LAUNDRY
Supervisor: Prof. **Paolo Rocco**

Abstract:

The perception and autonomous manipulation of clothes by robots is an ongoing research topic that is attracting a lot of contributions. Automating the handling of laundry using a single-arm robot is considered in this thesis, which involves three main tasks. Two of them are the loading and unloading a washing machine while the third one is using reinforcement learning to flatten and fold a piece of cloth. Customized approaches for finding a grasping point for the robot are presented which utilized computer vision. Color-based segmentation using active contours was used to extract grasping points and pre-defined weights determined the optimum one for the loading process. Surface analysis was used with point cloud to identify wrinkles present in the clothes for picking a grasping point for the unloading process. Machine learning was used to detect any items left inside the drum to verify completion of the unloading process. A modular framework is created to account for the sub-problems associated with the full process. Pre-set poses and path segments were used to create a motion plan for the robot in Cartesian space. ROS, depth and 2D cameras and Doosan robot were used for experiments.

PhD Committee
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