End-to-end CNN-based model for action decision-making in Robotic cloth manipulation tasks

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Abstract

At the Perception and Manipulation Laboratory, in the context of both BURG and CLOTHILDE European projects, we investigate how robots can learn, execute and understand the manipulation of garments for complex tasks such as laundry handling, bed-making, or folding and unfolding kitchen rags, among others. For such purposes, we have developed different intelligent grippers that are capable of mimicking the required human prehensile actions. Moreover, we are also developing techniques for robot transfer learning by means of kinesthetic teaching and visual human demonstration.

Under these conditions, the student will dedicate the time investigating about action decision-making algorithms based on the interpretation of force and close range visual information. Her/His research will focus on: creating a benchmark dataset based on force and visual data, and developing end-to-end CNN-based vision models for direct robot action control in manipulation of garments tasks, such as the ones listed above. The project will have a duration of 9 months that will give the student the opportunity to learn the latest Deep Learning techniques and to evaluate the solution in realistic scenarios. The student will be encouraged to collaborate with international partners and a to produce a scientific publication.

Keywords— Deep learning, Action decision-making, Robotic cloth manipulation