

DUAL-ARM CLOTH MANIPULATION PROTOCOL- SPREADING

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Purpose	Assess the ability of a dual arm robotic system to manipulate big pieces of clothes in dining room environment tasks.
Task Description	This task consists in taking a tablecloth and spreading it on a table, with different starting configurations.
Setup Description	<p><u>List of objects and their descriptions:</u> The following objects are used: Table: Any table with the following dimensions can be used:</p> <ul style="list-style-type: none"> • Width: [70, 80] cm; • Length: [120, 185] cm; • Height: [72, 75] cm. <p>Tablecloth: IKEA Fullkomlig 145 × 240 cm, available at the link: https://www.ikea.com/us/en/catalog/products/10343045/.</p>
	<p><u>Initial and target poses of the objects:</u> The following starting configurations must be considered for the objects. Tablecloth: Four possible starting configurations are defined:</p> <ul style="list-style-type: none"> • Two pre-grasped points ([pg2]). Cloth is pre-grasped at two corners (unfolded); • One pre-grasped point ([pg1]). Cloth is pre-grasped at one point; • Tablecloth folded on the table ([fd]). The cloth is not pre-grasped and is placed folded on the table; • Tablecloth random on the table ([cr]). Cloth is crumpled on the table. <p>Table: The table can be placed anywhere in the workspace of the robots.</p>

	To complete the task, the table must cover the table top.
	<u>Description of the manipulation environment:</u> The location of the tablecloth on the table for the folded and crumpled cases is not relevant for the task, as long as it is in reach of the robot. It can be placed at the optimal location of the arm workspace. However, the authors need to report in the benchmark results if their system needs the object to be in a particular location. There is no clutter in the environment.
	<u>Targeted robots/hardware/software:</u> Any dual-arm setup with grasping capabilities can be employed <u>Initial state of the robot/hardware/subject with respect to the setup:</u> Robot may be located anywhere with respect to the table. <u>Prior information provided to the robot:</u> All the objects and table dimensions are known by the robot.
Robot/Hardware/Software/Subject Description	
Procedure	<ol style="list-style-type: none"> 1. Setup the camera to record the manipulation and a timer. 2. Prepare setup and the manipulation environment: table, tablecloth and robot. Place the tablecloth in the chosen initial configuration. 3. Execute the manipulation recording the results and measuring time. 4. Take the measurements on the tablecloth to evaluate the quality function. 5. Write execution time and measurements in the table. Repeat steps 2-5 five times.
Execution Constraints	Any strategy adopted must be the same for the 5 executions.