SUPPLEMENTARY INFORMATION

Hierarchical generative modelling for autonomous robots

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	Lower joint position $[rad]$	Upper joint position $[rad]$	Joint velocity $[rad/s]$	Joint torque $[Nm]$
Shoulder roll	-1.3	1.5	5.9	190
Shoulder pitch	-2.9	2.0	5.9	190
Shoulder yaw	-3.1	2.2	11.6	65
Elbow pitch	-2.2	0.1	11.5	65
Torso roll	-0.2	0.3	9.0	150
Torso pitch	-0.1	0.7	9.0	150
Torso yaw	-1.3	1.2	5.9	190
Hip Roll	-0.6	0.5	7.0	350
Hip pitch	-2.4	1.6	6.1	350
Hip yaw	-0.4	1.1	5.9	190
Knee pitch	-0.1	2.1	6.1	350
Ankle Pitch	-0.9	0.7	11	205
Ankle Roll	-0.4	0.4	11	205

Table S1: Mechanical specifications of Valkyrie.

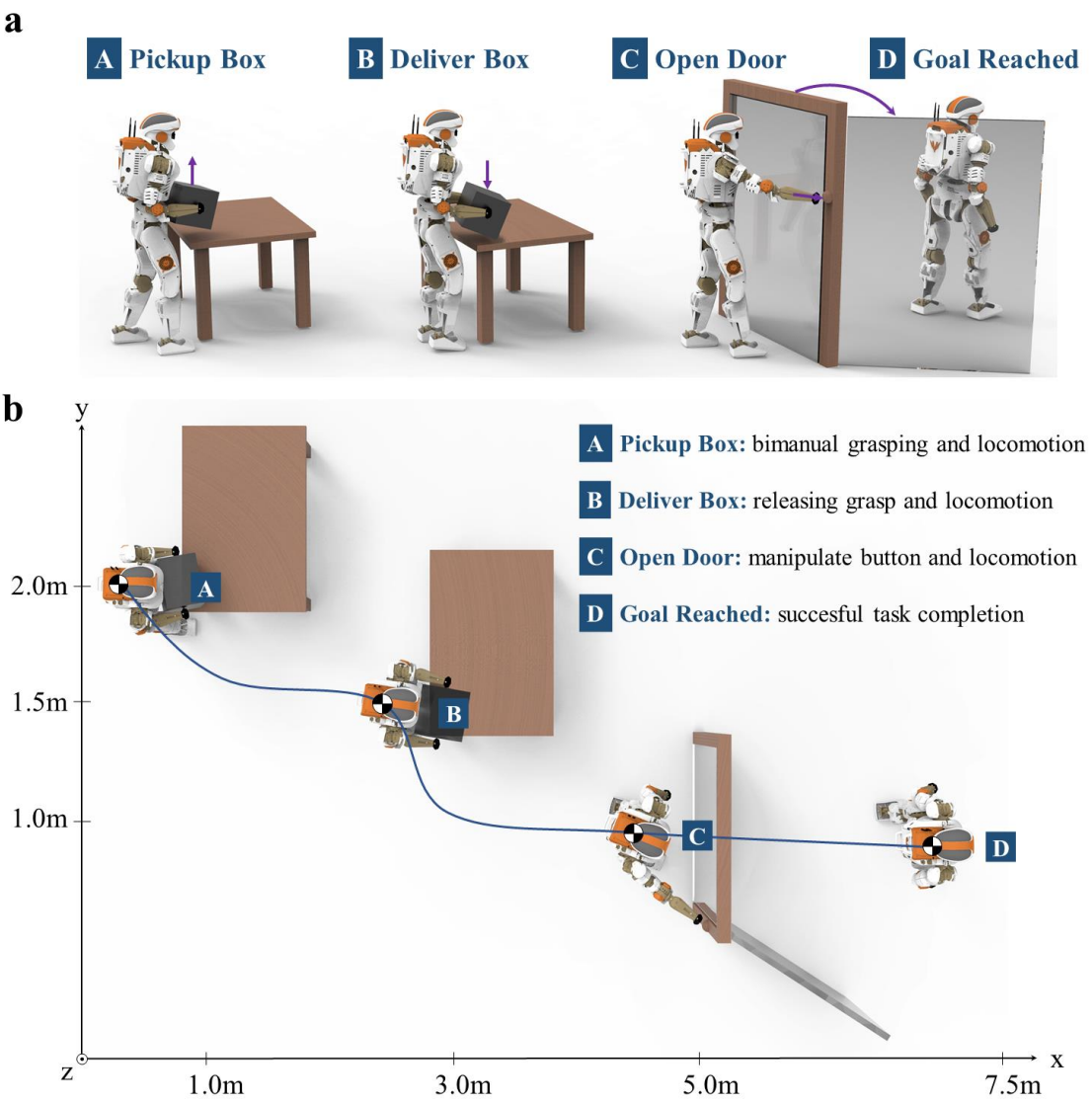

Figure S1: Visual presentation of the robot task: pick up a box, deliver it to the second table, approach the door, press the button to open the door, and enter the destination once the door opens fully. (a) shows the side view of the task; (b) shows the top-down view with x-y coordinates in Cartesian space.

	w_1	w_2	w_3	w_4	w_5	w_6
Value	1	0.1	1	2	2	5

Table S2: Weights for high-level reward

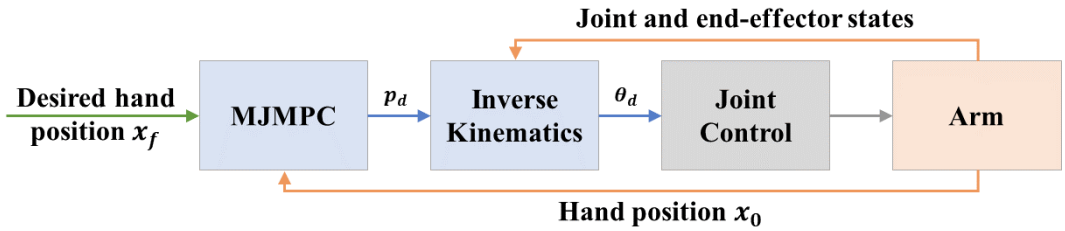

Figure S2: Control diagram of the manipulation policy. The Minimum Jerk Model-Predictive Control scheme provides a Cartesian space trajectory which is transformed into the joint space by Inverse Kinematics.

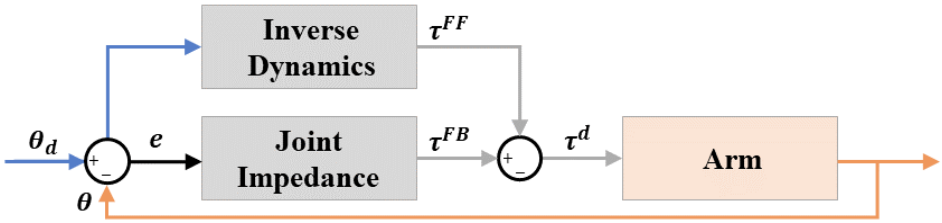

Figure S3: Dual-loop control structure for low-level joint control: Inverse Dynamics (feedforward) loop and Joint Impedance Control (feedback).