MURPHY: A Robot that Learns by Doing

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Abstract:

MURPHY consists of a camera looking at a robot arm, with a connectionist network architecture situated in between. By moving

its arm through a small, representative sample of the 1 billion possible joint configurations, MURPHY learns the relationships, backwards and

forwards, between the positions of its joints and the state of its visual field. MURPHY can use its internal model

in the forward direction to "envision" sequences of actions for planning purposes, such as in grabbing a visually presented object,

or in the reverse direction to "imitate", with its arm, autonomous activity in its visual field. Furthermore, by taking explicit

advantage of continuity in the mappings between visual space and joint space, MURPHY is able to learn non-linear mappings with

only a single layer of modifiable weights.