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Interactive Learning SUSANNE STILL, University of Hawaii — We present an approach to behavioral learning that is based solely on simple information processing principles. Colloquially stated, we require that a learner's action policy should result in observations that enable the learner to construct a model with high predictive power at small cost. This requirement is formalized by an optimization problem, using information theoretic quantities. Our approach integrates model- and decision-making into one theoretical framework, including feedback from the learner. We derive and study classes of optimal models and policies. The models are distinguished in that they optimally trade bits for prediction accuracy by adjusting their fuzziness. We have shown elsewhere how these models are related to an established approach that was developed in the context of nonlinear dynamical systems, and we discuss here how our theory extends that approach. The optimal policies contain a natural balance between exploration and control. In contrast, in computer science the view is often that exploration is achieved by policy randomness. We have shown elsewhere that our theoretical approach can be used to remedy this misconception and to provide a unified view of curiosity-driven learning.

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