Constraints on Adaptive Networks for Modeling Human Generalization

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Abstract: The potential of adaptive networks to learn categorization rules and to model human performance is studied by comparing how natural and artificial systems respond to new inputs, i.e., how they generalize. Like humans, networks can learn a detenninistic categorization task by a variety of alternative individual solutions. An analysis of the con(cid:173) straints imposed by using networks with the minimal number of hidden units shows that this "minimal configuration" constraint is not sufficient to explain and predict human performance; only a few solu(cid:173) tions were found to be shared by both humans and minimal adaptive networks. A further analysis of human and network generalizations indicates that initial conditions may provide important constraints on generalization. A new technique, which we call "reversed learning", is described for finding appropriate initial conditions.