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Computational Creativity: Generating new objects with a hierarchical Bayesian model

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Abstract: People can create impressive new objects: an architect designs new houses, a cook designs new recipes, and an entrepreneur designs new companies. On the other hand, computers are better known for consistency than creativity, and thus the computational basis of creativity remains mysterious. Recent work suggests that probabilistic generative models can capture how people generate simple types of new artificial objects [Jern & Kemp (2013). *Cognitive Psychology*]. We show how this idea can work for more complex, natural domains by learning a non-parametric Hierarchical Bayesian model that re-uses parts of related objects to design new ones. The model is an extension of recent computational work with handwritten characters [Lake, Salakhutdinov, & Tenenbaum (2013). NIPS], and we test it by providing a small set of characters from a shared alphabet and then generating a new character in that style. A comparison with people reveals the model can generate compelling new characters.