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Game Theory: simulation versus theory.

Game theory has a beautiful mathematical form, rich in theorems, which often falls apart when build simulations of human behaviour based on it. This presentation examines assorted points of divergence between theory and practice when game playing agents are trained via evolutionary computation. This training technique violates the defining hypothesis of a Nash equilibrium, often fails to find Nash equilibria, and yet it can be similar to the way humans learn social interaction. Evolving agents have invented nepotism, searched for stability over quality of outcome, and generally not behaved like the idealized optimizers of standard game theory. Factors affecting these deviations from theory include kin selection, drift, and finite population effects, all of which violate the hypotheses of many forms of game theoretic analysis.

The clean simplicity of mathematical game theory can also be modified by constraints arising from a situation that change its character substantially. In the latter part of the talk we will examine a mechanic that translates a mathematical game into a card game and demonstrate at least one card game that is useful in instruction at the K-12 level.