Project Proposal

**Project Idea:** Evolutional machine learning with neural nets

**How it would work:** An environment can be created in which neural net creatures can be placed. ‘Food Pellets’ appear randomly around the area. Each ‘creature’ is an instance of a class which contains values for weights in the neural net. Each creature takes relative positions of food pellets as inputs, which are then multiplied by the weights to give movement as output. The first ‘generation’ of creatures has randomly generated weights, and compete against each other to collect food pellets. After they have all competed, the top half who collected the most food pellets (or possibly ‘survived’ longest, where a creature needs food pellets to survive) are used to generate a new set of creatures, making random slight changes to the weights. The next generation consists of the top half of the previous generation and the generated ‘offspring’. This is repeated until eventually the creatures learn to move towards food pellets.

I may also make it so creatures gain size when eating food pellets, and can eat other creatures which are smaller than them.

**Development language:** Java

**Satisfies Criteria:** - Each creature is an instance of a class, and they are all stored in an array (Array of records)

- Creatures must be sorted in order to choose which ones to reproduce (sort algorithm, which may use recursion)

**End-user-group:** ~15+ years, computing students interested in machine learning and neural nets.