Abstract

Since centuries board games have been very prominent facet of human life. It has played very imperative and pivotal role as research area in the field of Artificial Intelligence since many decades. Machine learning based systems have shown the penchant of constantly evolving and improving and always preserves its truthfulness as a learning system. The notion of constructing computer programs modelled on move making is motivational drive for systems which reveal acumen, wisdom aptitude and self-adaptation.

The game playing programs tries to imitate human game playing approach in its own limited operative possibilities. Such competences can be well explored in an important domains like board games of two-player, zero-sum, deterministic, perfect information and alternate move. The thesis takes Game of Checkers and Game of Reversi as its test bed games of research to address computer program based learning by addressing search complexity and decision complexity of them.

Research uses min-max search with alpha-beta pruning to address the issue of search complexity. It takes novel approach in forming genetic string that is based on study of important board game features. These genetic strings act as evaluation functions which are evolved using various genetic parameters for a specified size of population for iterative generations in a given set of number of games to find near optimal solution. These evolved weights are used to make move making decision that addresses decision complexity. The collected set of fitness weight values for different disc positions and generations imply the evolutionary learning of board game computer programs.