
Abstract

Commercial computer games have significantly evolved in the recent decade. Current games feature vast and highly detailed virtual environments with realistic physics, complex and highly dynamic gameplay as well as complex multi-player game modes. Therefore, the creation of sophisticated and intelligent game agents that inhabit the game worlds and oppose or collaborate with the player has become a considerable challenge in terms of competitive performance and fast adaptation, but also concerning the believability and human-likeness of the shown behaviour.

This thesis gives a general introduction into the field of artificial intelligence in computer games and proposes several approaches to create intelligent game characters for a three-dimensional, action-oriented computer game. The focus of these approaches is to create competitive and quickly adapting game agents that show sophisticated, human-like behaviours. To achieve this, the proposed methods are based on the imitation of other players and the usage of a population of several agents that collaborate to accelerate the learning process. The foundation of the presented work lies in the utilisation of powerful adaptation and learning techniques like evolutionary algorithms, reinforcement learning and cultural learning.