

Artificial Intelligence in Video Games: Towards a Unified Framework

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The work presented in this dissertation revolves around the problem of designing artificial intelligence (AI) for video games. This problem becomes increasingly challenging as video games grow in complexity. With modern video games frequently featuring sophisticated and realistic environments, the need for smart and comprehensive agents that understand the various aspects of these environments is pressing. Although machine learning techniques are being successfully applied in a multitude of domains to solve AI problems, they are not yet ready to enable the creation of fully autonomous agent that can reliably learn to understand the environments found in complex video games. Since video game AI is often specifically designed for each game, video game AI tools currently focus on allowing video game developers to quickly and efficiently create specific AI. One issue with this approach is that it does not efficiently exploit the numerous similarities that exist between video games not only of the same genre, but of different genres too, resulting in a difficulty to handle the many aspects of a complex and realistic environment independently for each video game. These similarities, however, exist on a conceptual level. While video games do indeed share a variety of concepts, their interpretations vary from one game to another. Hence, these similarities can only be directly exploited at a conceptual level. Inspired by the human ability to detect analogies between games and apply similar behavior on a conceptual level, this thesis suggests an approach based on the use of a unified conceptual framework to enable the development of conceptual AI which relies on conceptual views and actions to define basic yet reasonable and robust behavior. Because conceptual AI is not tied to any game in particular, it benefits from a continuous development process as opposed to a development that is confined to the scope of a single game project.

The thesis manuscript can be downloaded from the following permalink: <http://hdl.handle.net/2268/181142>