

Automating commercial video game development using computational intelligence

Abstract

Problem statement: The retail sales of computer and video games have grown enormously during the last few years, not just in United States (US), but also all over the world. This is the reason a lot of game developers and academic researchers have focused on game related technologies, such as graphics, audio, physics and Artificial Intelligence (AI) with the goal of creating newer and more fun games. In recent years, there has been an increasing interest in game AI for producing intelligent game objects and characters that can carry out their tasks autonomously. **Approach:** The aim of this study is an attempt to create an autonomous intelligent controller to play the game with no human intervention. Our approach is to use a simple but powerful evolutionary algorithm called Evolution Strategies (ES) to evolve the connection weights and biases of feed-forward Artificial Neural Networks (ANN) and to examine its learning ability through computational experiments in a non-deterministic and dynamic environment, which is the well-known arcade game, called Ms. Pac-man. The resulting algorithm is referred to as an Evolution Strategies Neural Network or ESNet. **Results:** The comparison of ESNet with two random systems, Random Direction (RandDir) and Random Neural Network (RandNet) yields promising results. The contribution of this work also focused on the comparison between the ESNet with different mutation probabilities. The results show that ESNet with a high probability with high mean scores recorded compared to the mean scores of RandDir, RandNet and ESNet with a low probability. **Conclusion:** Overall, the proposed algorithm has a very good performance with a high probability of automatically generating successful game AI controllers for the video game.