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December 6, 2015

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Solving Tetris: A Heuristic-Based Reinforcement Learning Approach

Purpose, Goals, and Scope

Computer science and artificial intelligence algorithms such as classical search, Markov decision processes, constraint satisfaction problems, and reinforcement learning have been used to attempt to play and solve popular games for decades (Grob et al. 2008). Classic video games like Tetris, Pong, Breakout, and Minesweeper are particularly interesting problems because of the randomness incorporated and the already-present computer involvement. Additionally, expansions of these games that were released after the originals are even harder for both humans and computers to solve.

Our main goal was to build an agent to autonomously play the classic video game, Tetris by modeling it as a Markov decision process. We needed to define a state and action space for the model and develop a heuristic for finding the optimal resting position and rotation for whichever random piece is currently falling based on the reward for attaining certain arrangements of pieces on the board. Additionally, we needed to programmatically place the piece in We implemented a Q-learning algorithm

Works Cited

Groß, Alexander, Jan Friedland, and Friedhelm Schwenker. "Learning to Play Tetris

Applying Reinforcement Learning Methods." European Symposium on Artificial Neural Networks. Bruges. 23 Apr. 2008. Lecture.