Term Project: Learning to Play Tetris with Big Data!

Project report

Group10

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1. Introduction

The purpose of the project is to create a utility-based agent. Its goal is obtain a maximal amount of rows cleared without filling the board in the game of Tetris. The agent created uses a heuristic function that has been improved through the use of a genetic algorithm.

1. Strategy

For every moves (orientations and positions), the new block is evaluated using an utility function. The move with the highest effectiveness will be chosen. The utility function is a weighted sum of different features of the board after a move is played. In general, positive features can get the positive weights such as the number of rows cleared; otherwise, negative features can get the negative weights such as the number of column heights. The actual weight for each function is determined using a learning agents. The learning agent would generate a set of weight and an evaluator would test the performance of these weights.

* Features

|  |  |
| --- | --- |
| COL\_HEIGHT | The sum of height of all column |
| ABSOLUTE\_DIFF\_COL\_HEIGHTS | The sum of height difference between all pairs of adjacent columns. |
| MAXIMUM\_COL\_HEIGHT | The maximum column height of the state. |
| NUM\_HOLES | The number of holes, a hole is an empty block with a non-empty block above it. |
| ~~COMPLETE\_ROWS~~ | ~~Number of rows cleared.~~ |

* Genetic Algorithm
* Parallel processing

Since the genetic algorithm has a lot of data to process, we decided to use parallel processing to speed it up.

1. Result
2. Conclusion