From Chess and Atari to StarCraft and Beyond: How Game AI is Driving the World of AI

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The predominant paradigms/algorithm types

- Reinforcement Learning

- Deep Learning

- Deep Reinforcement Learning

- Monte Carlo Tree Search

The predominant game genres

- Real-time strategy games

- Multiplayer online battle arena games
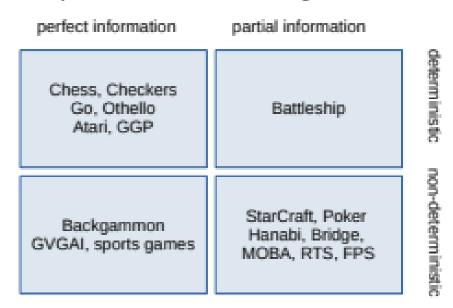
- First person shooter games

Fig. 1 Available information and determinism as separating properties for different games treated in Game AI.
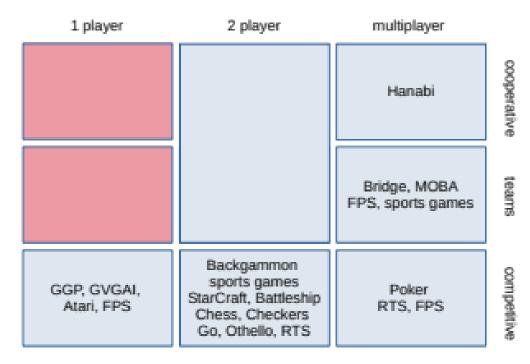

Fig. 2 Player numbers and style from cooperative to competitive for different games or groups of games treated in Game AI. Note that for several games, multiple variants are possible, but we use only the most predominant ones.

Learning to play from states and actions

1. AlphaGo

o   a world-class professional human-level Go AI using the combination of MCTS with DL

o   With human experience

o   Self-play

2. AlphaGo Zero

o   Removed all human data from AlphaGo

3. AlphaZero

o   Can learn to play Go, Chess and Shogi

Procedural content generation

- An algorithmic creation of game content such as levels, textures, quests, characters, or even the rules of the game itself

- Replayability

  e.g. Minecraft, No Man's Sky

Other use cases for current AI methods

Game analytics

o Collect data about players and update the game

Player modelling

o model the experience or behavior of the player

o allow the game to be adapted to the individual player

The future of Game AI

- More natural language processing

- the progress in player modeling and game analysis

- Procedural content generation