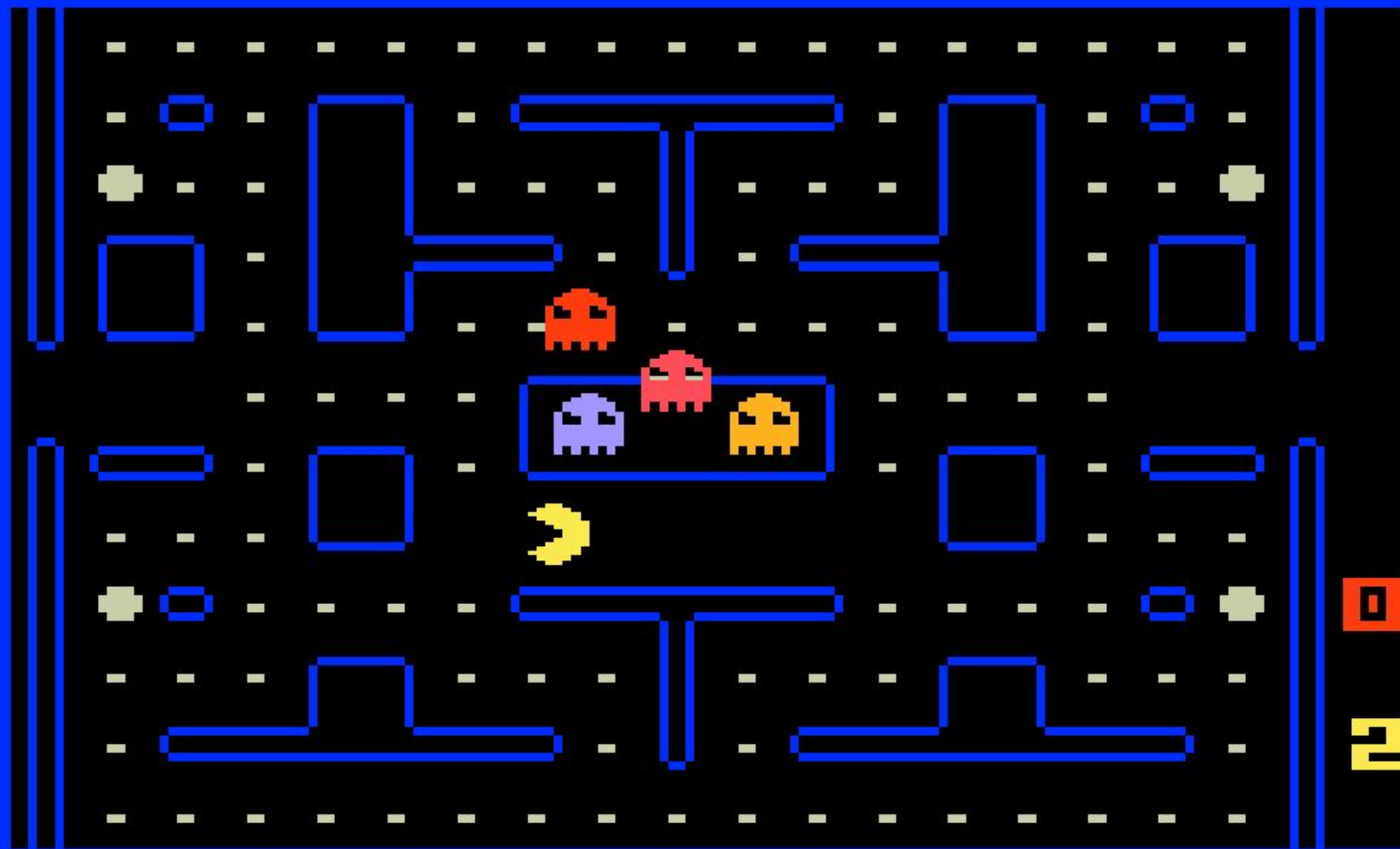


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General Video Game Playing AI Competition

Tom Vodopivec

IADS Analytics, Data Science & Decision Making Summer School 2022
2022-08-01



Your level: 0
Full lines: 1

SCORE 60

H E L P

7:Left
9:Right
8:Rotate
1:Draw next
6:Speed up
4:Drop
SPACE:Drop

Next:

Play TETRIS !

SCORE <1>
0000

HI-SCORE
1040

SCORE <2>



CREDIT 00

STATISTICS

1	1
2	0
3	1
4	2
5	1
Σ	6

The GVG-AI Competition

Since 2014

One of the most popular Game AI competitions

300+ games

[Examples on youtube](#)

Framework in Java available, easy to use <http://www.gvgai.net/>

2021 edition: <https://aingames.cn/gvgai/cog2021/>

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The Games

Real-time: 40 milliseconds per move

One-player and two-player games

Each game unique story, goal, challenges

The player (agent):

- receives observations of state and a reward signal
- selects one of available moves

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Competition Tracks

Playing

- Single-player and Two-player
- Learning and Planning
- Ranked by win rate and score on sets of 10 games by 5 levels each

Level generation

Game generation

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Best Agents

Genetic algorithms, random walks, A*

Iterative Widening, heuristic danger avoidance

Temporal-difference learning, Sarsa, UCT

MCTS, BFS, sprite-targeting heuristic

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The ToVo2 Agent

Reinforcement learning within Monte Carlo tree search

Track	Competition	Rank improvement*	Number of competitors
single-player	CIG 2015	29 → 11	52
	CEEC 2015	23 → 16	55
	GECCO 2016	14 → 9	30
	CIG 2016	20 → 26	29
	GECCO 2017	16 → 9	22
two-player	WCCI 2016	6 → 1	14
	CIG 2016	6 → 8	13
	CEEC 2017	10 → 1	18

Why is this useful?

Games are excellent benchmarks for decision-making AI

Research: towards general / human-like AI

Video game industry

- easy-to-implement out-of-the-box algorithms
- believable NPC behaviour
- procedural content generation

User-facing software: automated testing and optimization

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