INF FAKULTÄT FÜR INFORMATIK

Computational Intelligence in Games

Emergence

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Agenda

- Dummy
- Dummy
- Dummy
- Dummy
- Dummy

Stay Alive Agent

Stay Alive by using

- the advance() method multiple times
- the grid observation
- a combination of that approaches

Figure : Advancing safe actions

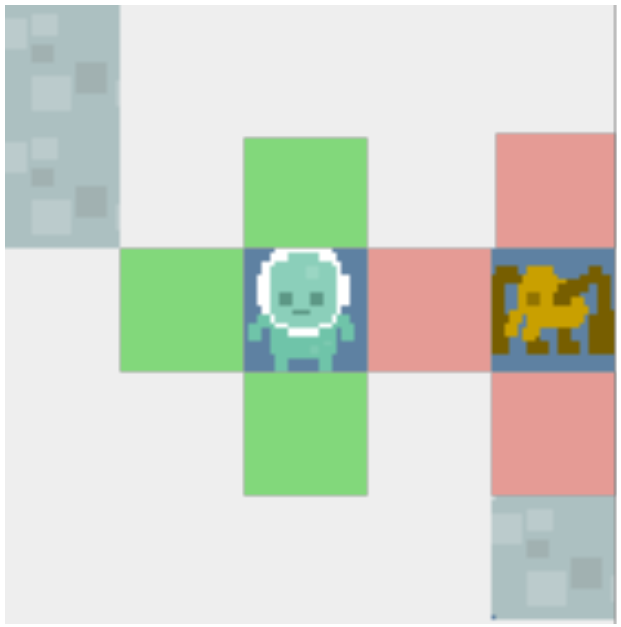


Figure : Grid search for safe actions

Heuristic Agent

- Heuristic for selecting the next best step (including the Stay Alive Strategy)
- Target is found by using an Explorer that is searching for the point of interests
- An Environment class builds up the knowledge base and safes blocking, loosing, scoring and winning objects
- A* Algorithm is used to reached the good classified objects

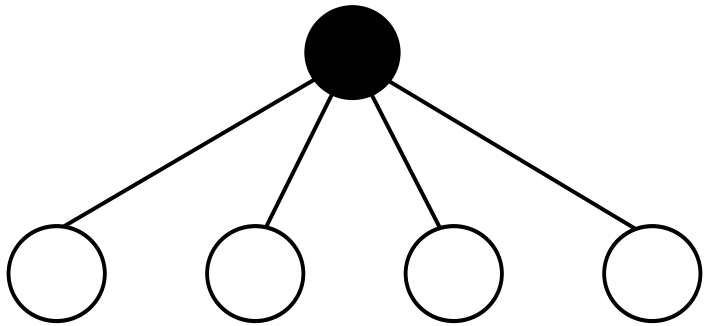


Figure : Search tree for the greedy approach

Heuristic Agent II

$$dist(u, v) = |x_1 - x_2| + |y_1 - y_2| \tag{1}$$

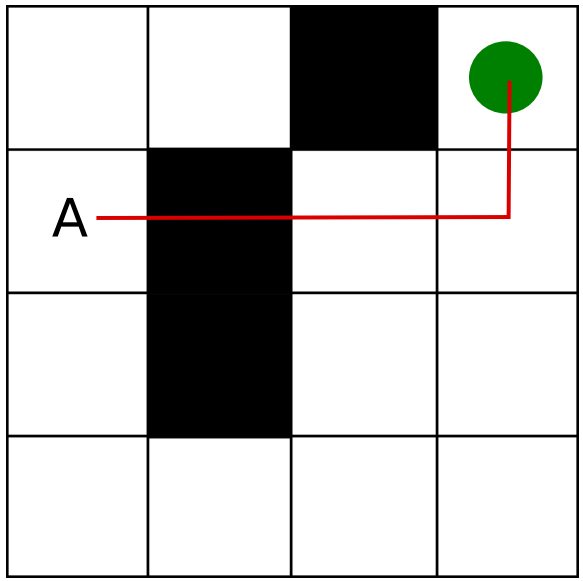


Figure : Manhatten distance for two dimensions

MCTS

- Dummy

MCTS Agent

- Dummy

MCTS Agent II

- Dummy

EA

EA Agent

DeltaScoreEvaluation function

$$s = \sum_{t=0}^{n} (H(s_t) - H(s_{t-1}))$$

is calculated by using the function

$$H(s_i, s_{i-1}) = \begin{cases} 10, & \text{if isWinner} \\ -10, & \text{if isLooser} \\ score(s_i) - score(s_{i-1}), & \text{otherwise.} \end{cases}$$

EA Agent II

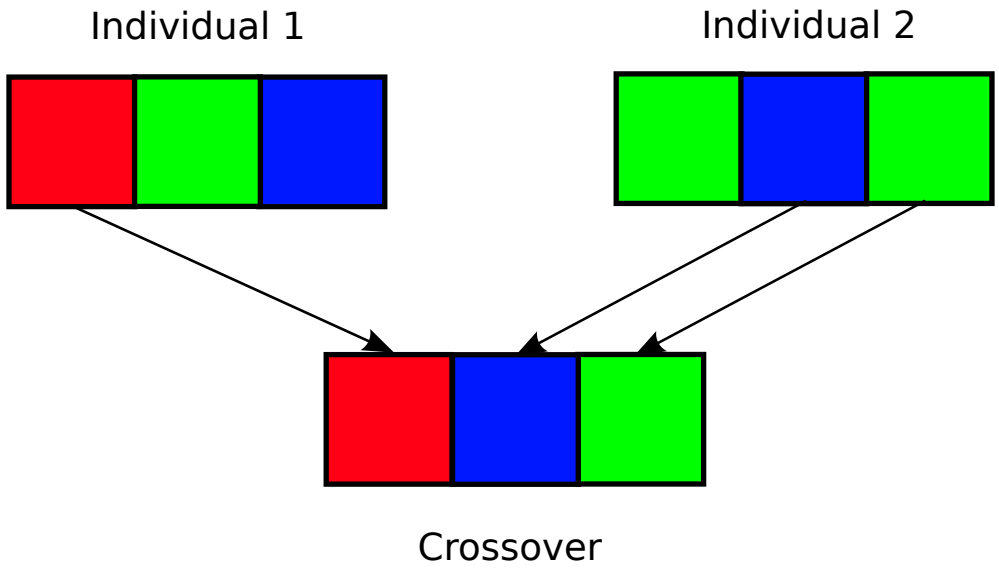


Figure : Crossover of an individual

EA Agent III

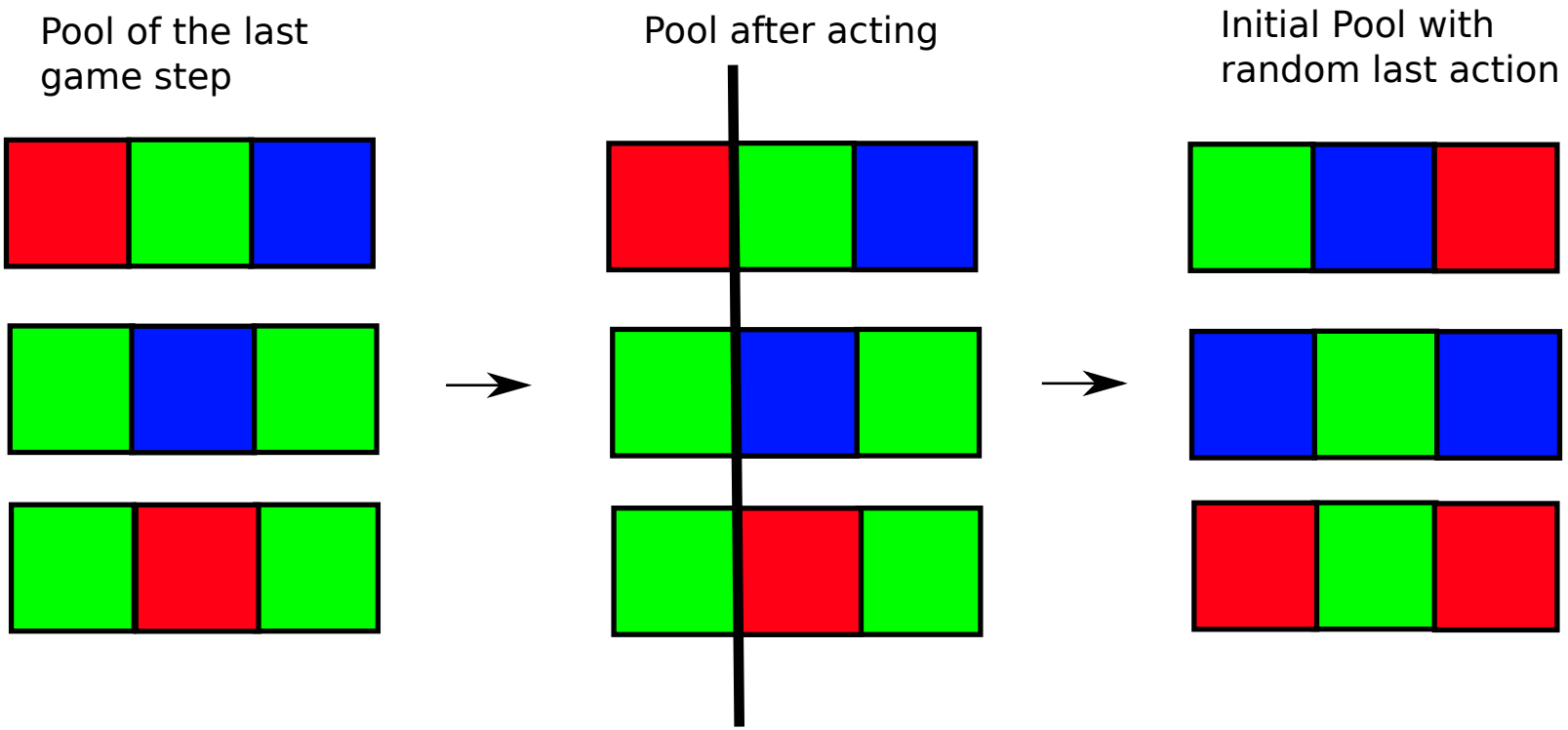


Figure : Sliding Window

Experiment Result

- Comparison among each approach to be fair (1000 games, one game 50 times, 10 times each level)
- Evaluation of the best of each algorithm (3000 games, one game 150 times, 30 times each level)

CPU	Intel i5-4210U @ 1.70Ghz
Memory	8 GB DDR3 L
Operating System	Ubuntu 14.04.1 LTS
Java Version	1.7.0_65

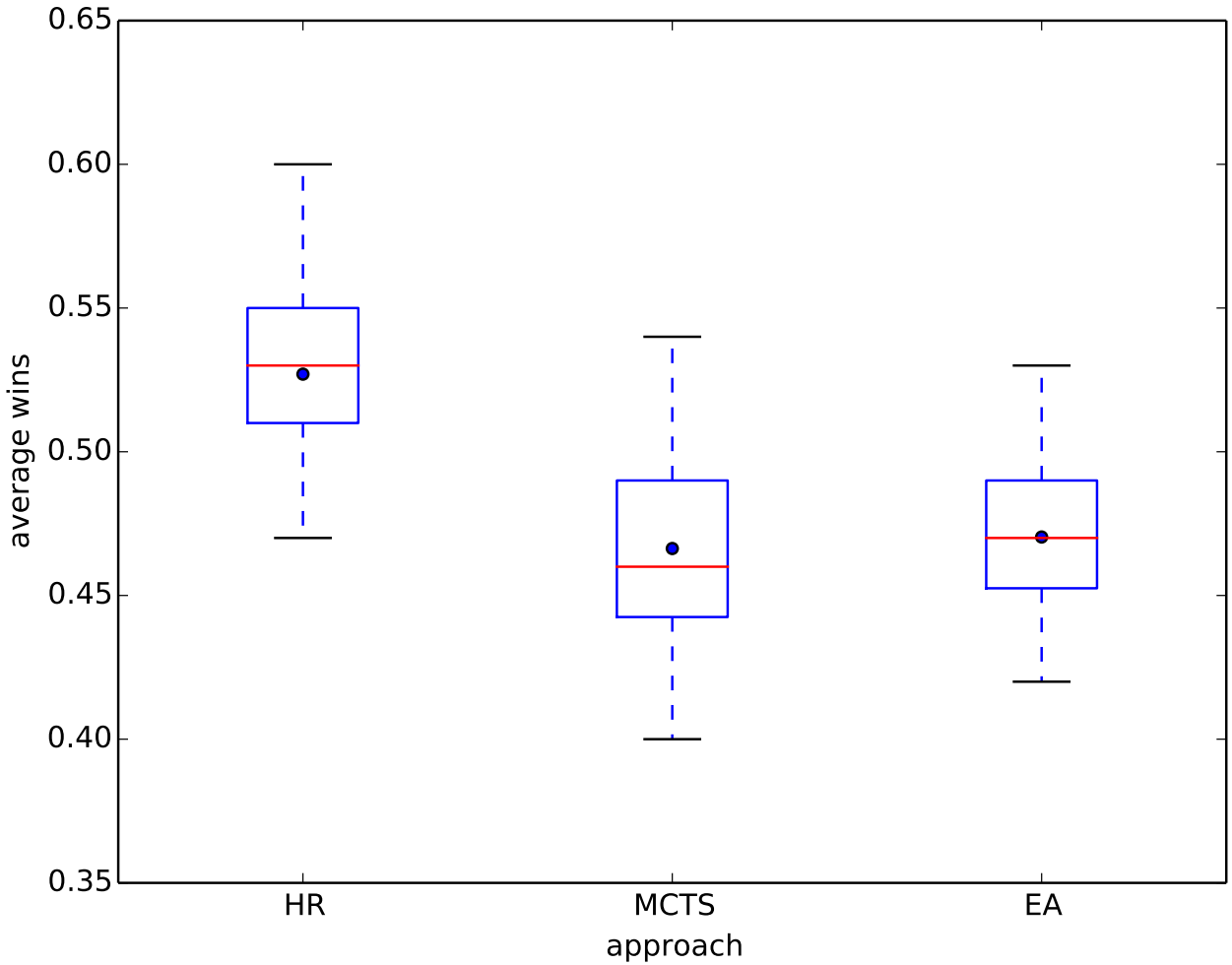
Table : experiment setup

Experiment Result II

Approach	Avg Wins	Std Wins	Avg Score	Std Score	Avg time steps	Std time steps
HR	**0.527**	0.029	165.05	59.51	**695.86**	36.17
MCTS	0.467	0.034	**230.69**	74.64	942.06	**34.00**
EA	0.470	**0.026**	178.33	**51.85**	818.72	38.47

Table : results of all algorithms

Experiment Result III



Development Process

- Dummy

Main Problems Difficulties

- Dummy

Conclusion & Future Work

- Dummy

Thank you for your attention!