General Game Playing

Tran Trung Kien - Nguyen Thanh Binh

Technical University of Dresden

Outline

1. Algorithms
   - Single player
   - Multi player
2. Heuristics

Single player

Algorithm : Iterative Deepening Depth-First Search

- Using heuristics: nodes with highest evaluation will be visited first.
- Using a hashtable to avoid visiting some node twice.

Multi player

- Two player turn-taking zero games: Alpha-beta pruning
  - Maximal number of nodes stored : 1000
  - Depth limited : 6
- Other games: Modified Monte Carlo using heuristics
  - Number of simulations:
    - Small games (branching < 1000) : Using heuristics
    - Big games : No heuristics
  - Depth limited : 8

Heuristics

- Goal distance: unification, vector distance.
- Novelty: difference between the current node and the root node.

Combining goal distance with novelty:

- Single player games: $Eval = goalDistance + 0.125 * novelty$
- Two player turn-taking zero games: $Eval = goalDistance(ourPlayer) - 0.5 * goalDistance(opponent) + 0.25 * (novelty + mobility)$
- Other games: $Eval = goalDistance + 0.25 * novelty$