Minesweeper Solver

Project proposal

Chunxu Guo Jiahao Huang Qianyu Liu
Chenyang Zhang Tianyi Zhang

ShanghaiTech University

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POMDP Model

POMDP: Partially Observable Markov Decision Process

- Generalization of a Markov decision process (MDP)
- Agent cannot directly observe the underlying state
- Maintain a probability distribution over the set of possible states

Minesweeper POMDP Model

Minesweeper game can be modeled as a POMDP $< S, S_e, A, T, R, O, \Omega, b_0 >$ where:

- set of states S: init state, normal states, failure state
- terminal state S_e: success state, failure state
- actions in A: try hidden cell c
- transition function T
- reward $R(s, a, s')$
- observations in O
- observation function Ω: updates the knowledge matrix according to the last action
- b_0: initial probability distribution over states

POMDP Challenges

Belief space is huge:

- $2^{W \times H}$ states!
- Solving POMDPs exactly is computationally intractable
- MOMDP: Mixed Observability Markov Decision Process
  - we can derive a compact lower-dimensional representation of the belief space
- Monte-Carlo Tree Search

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Sample frame title

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- Text 1
- Text 2
- Text 3
- Text 4

In this slide

In this slide
the text will be partially visible

In this slide
the text will be partially visible
And finally everything will be there

Sample frame title

In this slide, some important text will be highlighted because it's important. Please, don't abuse it.

Remark

Sample text

Important theorem

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Examples

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Two-column slide

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$$E = mc^2$$

- First item
- Second item

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