# Minesweeper Solver Project proposal

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CS181: Artificial Intelligence I, Fall 2020





- 1 Topic and Motivation
- 2 Logic Inference
- 3 SAT Solver
- 4 CSP Probability Model
- 5 POMDP View
- 6 CNN Solver
- 7 LATEX example section





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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
- $\bullet$  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
- ullet observation function  $\Omega$ : updates the knowledge matrix according to the last action
- b<sub>0</sub>: initial probability distribution over states



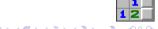


# POMDP Challenges

#### 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

This is a text in second frame. For the sake of showing an example.

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





In this slide





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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

Sample text in red box

# Examples

Sample text in green box. The title of the block is "Examples".





## Two-column slide

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$$E = mc^2$$

- First item
- Second item

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Minesweeper Solver