

# Robot Planning in Uncertain Worlds

Moritz Göbelbecker (goebelbe@informatik.uni-freiburg.de)

Group on the Foundations of Artificial Intelligence  
Department of Computer Science  
University of Freiburg

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## Planning in Open Worlds

- Solving tasks in unexplored environments
- Planning for exploration

## Self-Understanding Robots

- Explaining planning failures
- Explaining execution outcomes

## Planning and Monitoring in Open Worlds

- Objects appear (and vanish)
- Explicitly represent (lack of) knowledge
- Make (explicit and implicit) **assumptions** about the world

## Mixed Decision Theoretic and Continual Planning

- Probabilistic sensor models
- Deterministic actions

## Finding Excuses

- Planner cannot find a plan
- Excuse: A change in the initial state that makes a plan possible
- Find excuses by compilation into a planning problem.

## Explaining Execution Failures

- Planner makes assumptions about world state
- If the goal cannot be reached:
  - Which assumptions might have been wrong?
  - What is the most likely **explanation** for our observations?
  - Which wrong assumptions contributed to the task **failure**?