Situation Dependent Spatial Abstraction in Reinforcement Learning Based on Structural Knowledge

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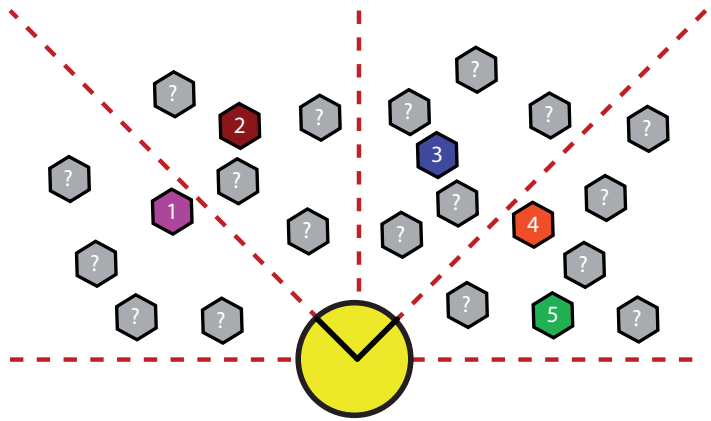
cognitivesystems

Spatial Abstraction in RL

Abstraction of the state space

- Goal: generate a manageable observation space
- For example: selection of features



Crucial question of abstraction

- Which information to retain?
- Which to drop?

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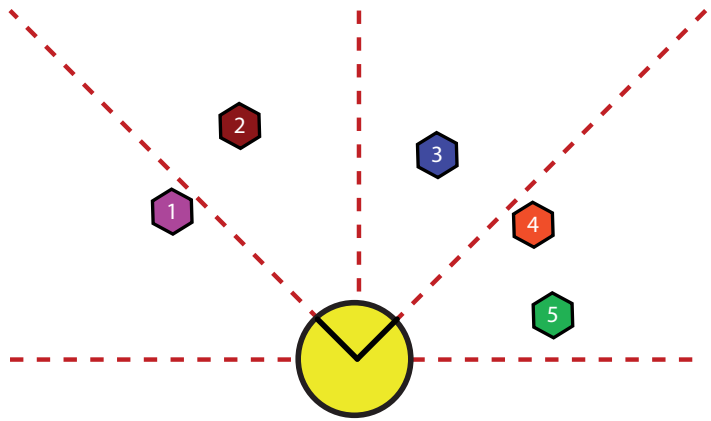

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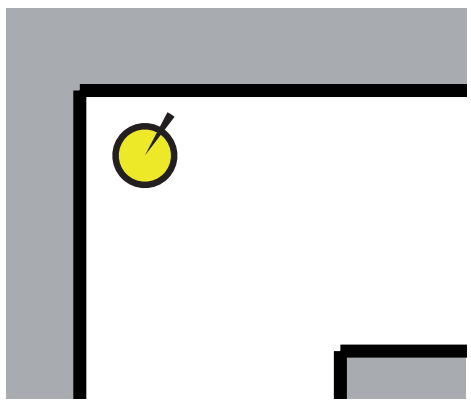
Situation Dependent Spatial Abstraction

Relevance of information

- Different levels of abstraction may be appropriate
- Not every piece of information is relevant in any situation



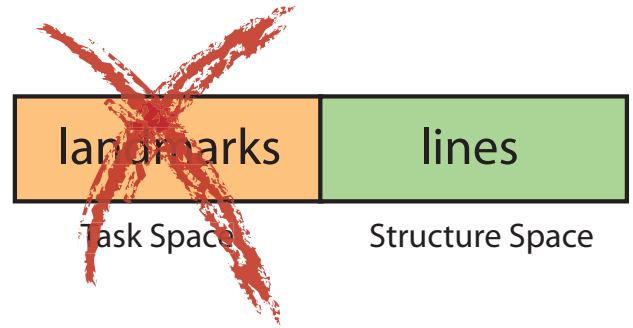
Non-decision Structures

- Action selection may be narrowed by structure of the environment
- Non-decision states: states with only one reasonable choice
- Defined by non-decision structures

Structure Induced Task Space Aspectualization

Appropriate Representation:

- Model structural features explicitly
- Structure space aspectualizable state space



SITSA:

- Identify non-decision structures in previous task
- Abstract from non-structural information in new task