

Entropy-Based Strategies for Physical Exploration of the Environment's Degrees of Freedom



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many DOF
in the world

most tasks involve
the manipulation
of DOF



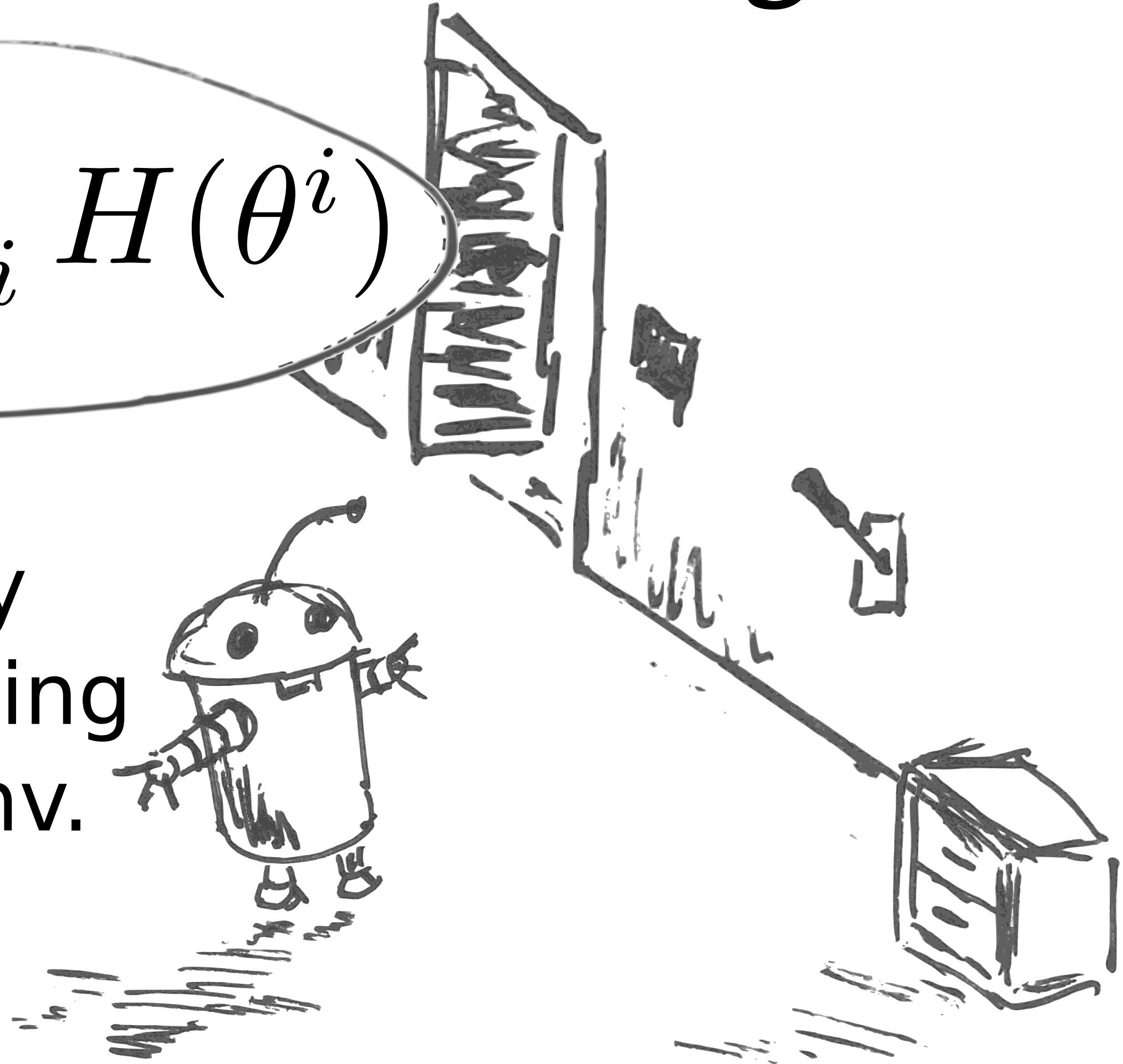
The Exploration Challenge



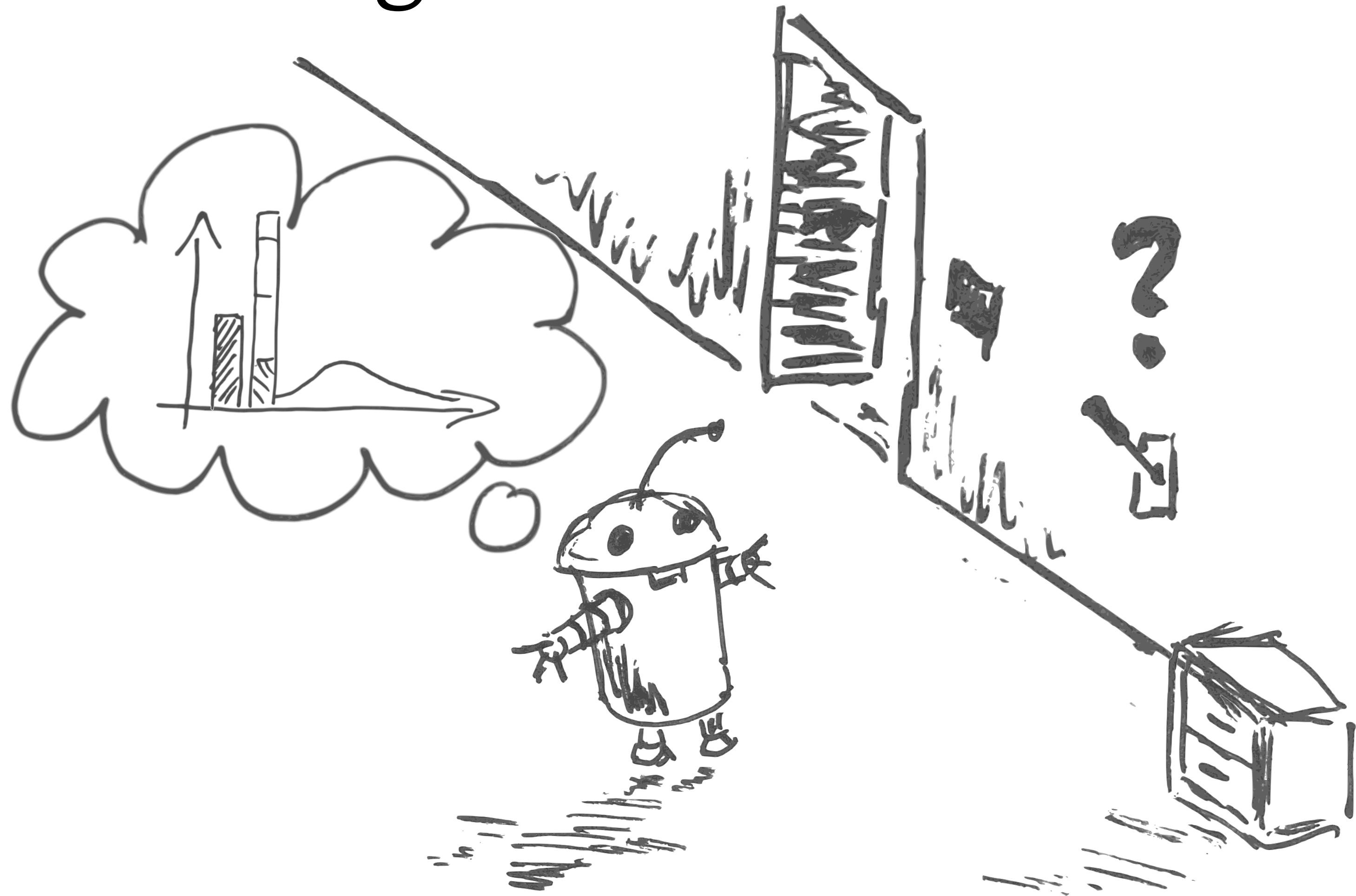
The Exploration Challenge

$$\min \sum_i H(\theta^i)$$

minimize
uncertainty
by interacting
with the env.



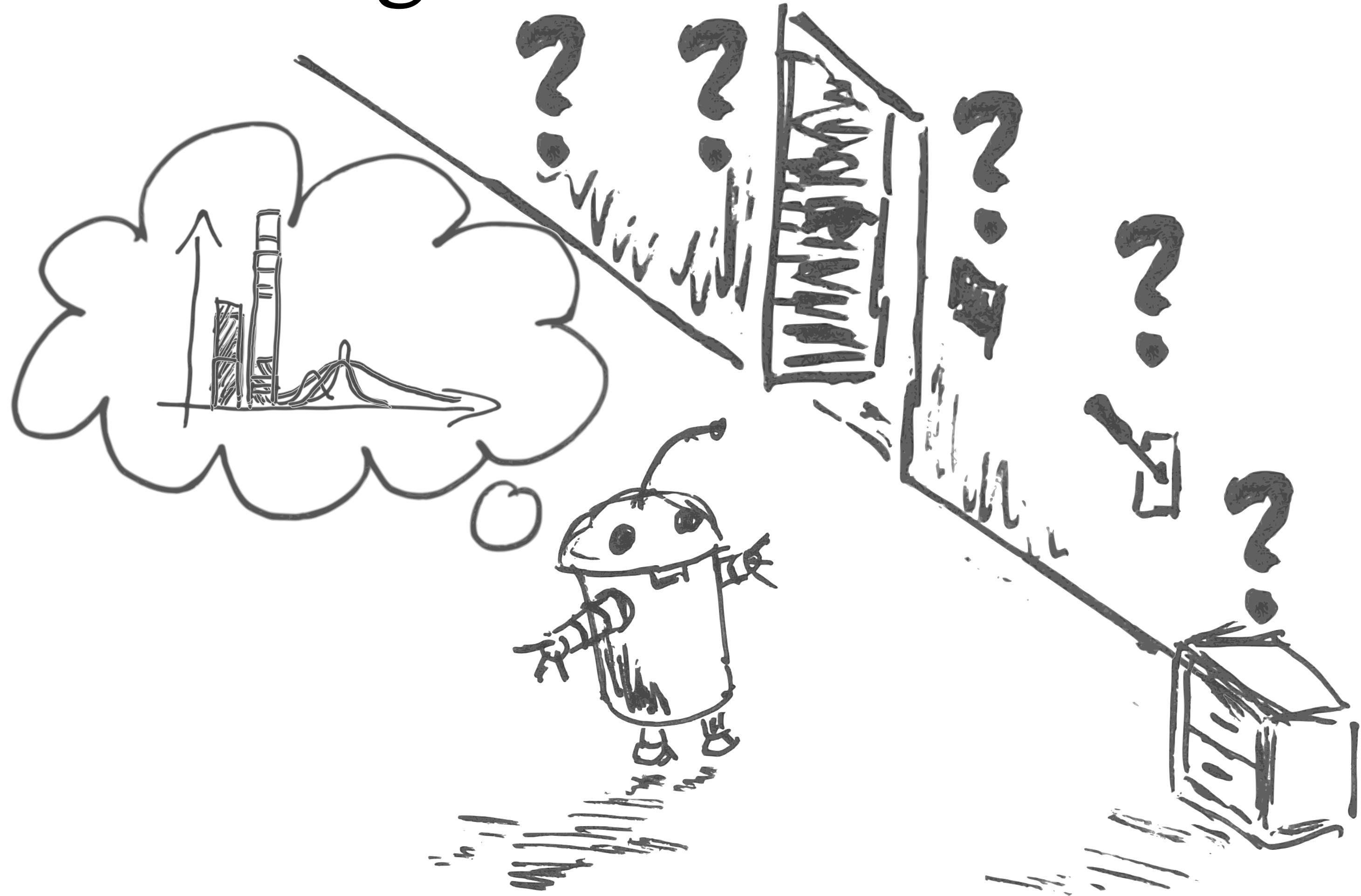
Modeling



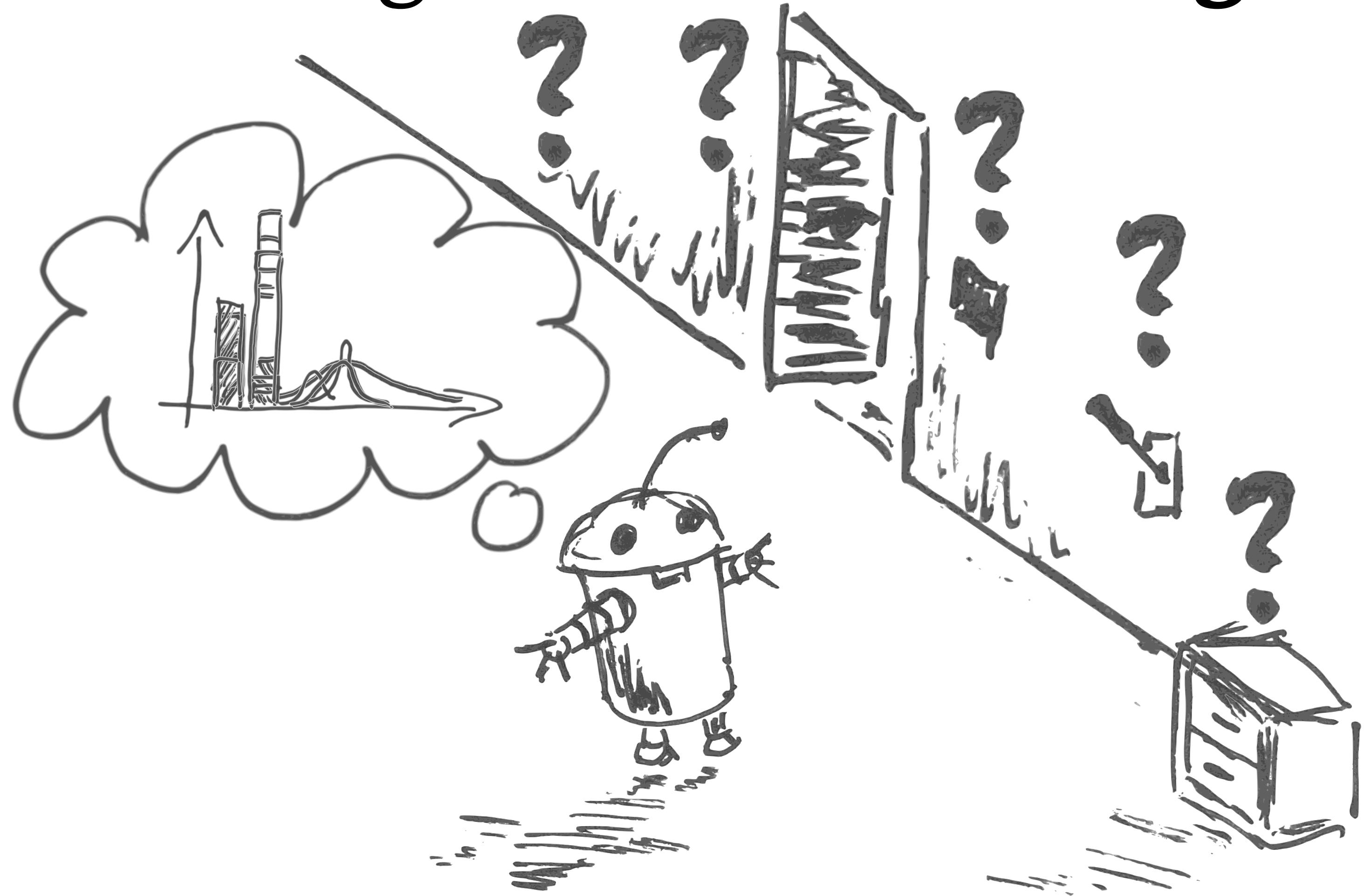
Modeling



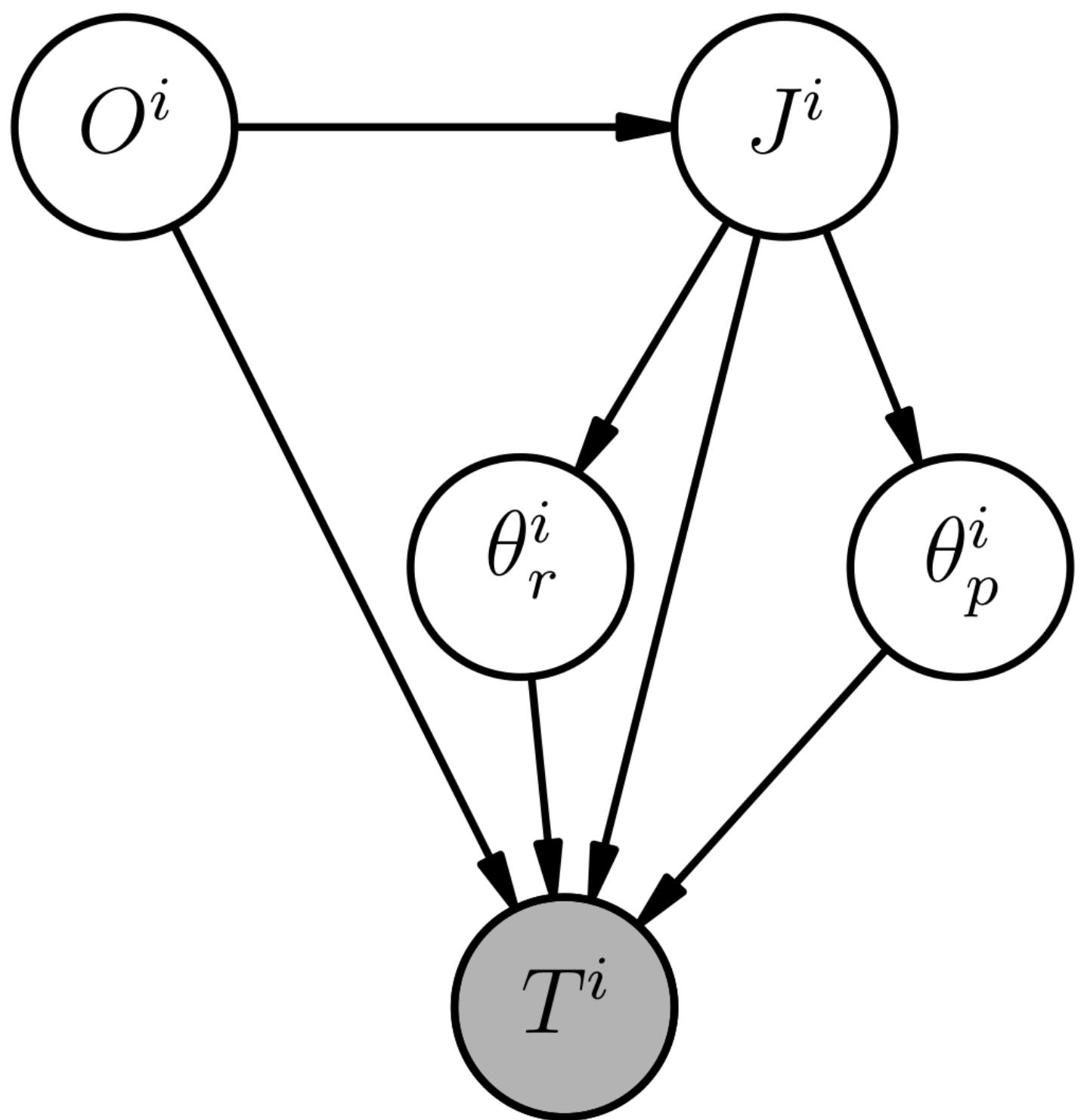
Modeling



Modeling & Decision Making

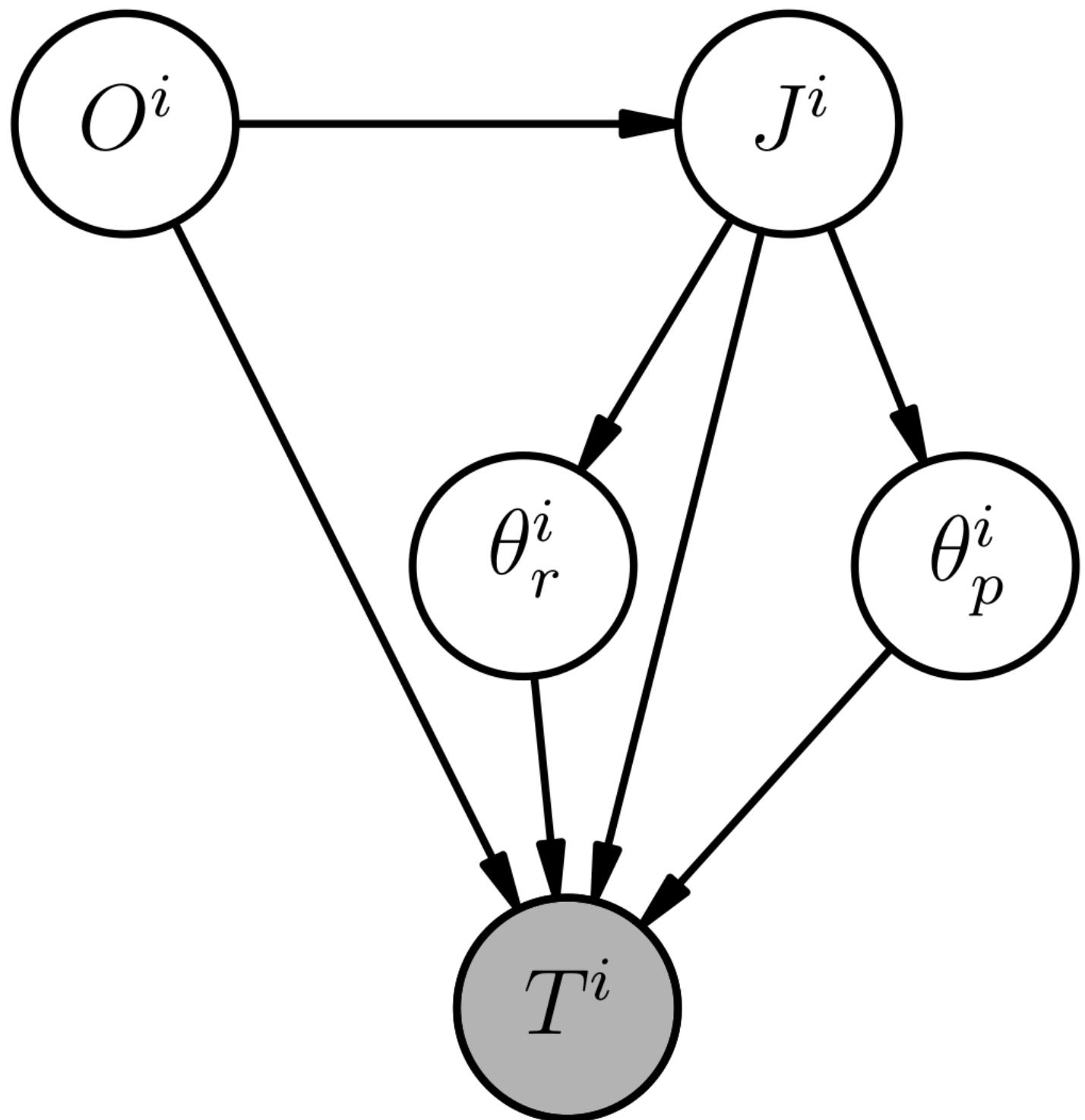


Belief



Calculate Entropy

Belief & Strategies

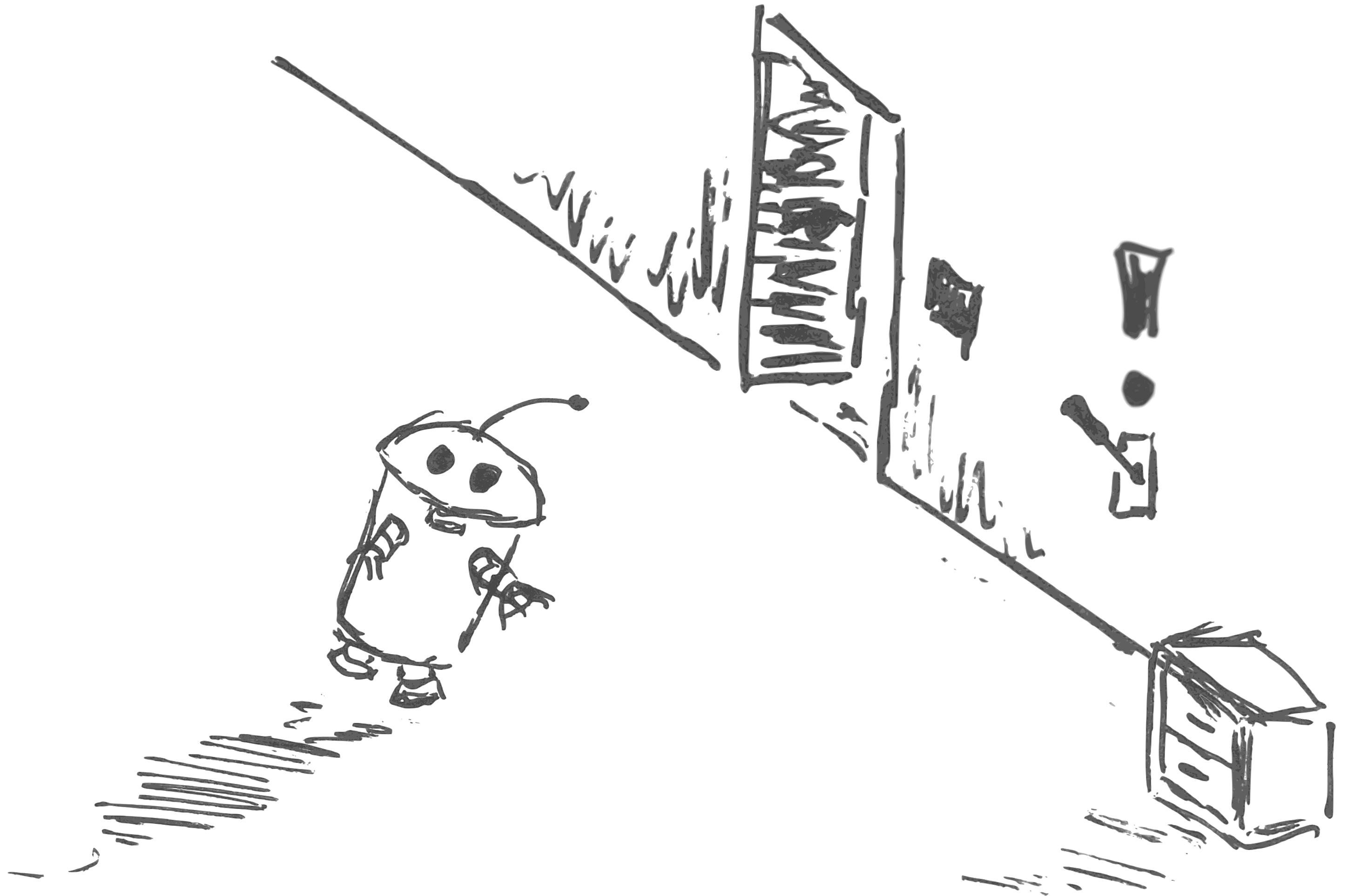


Active Learning Strategies

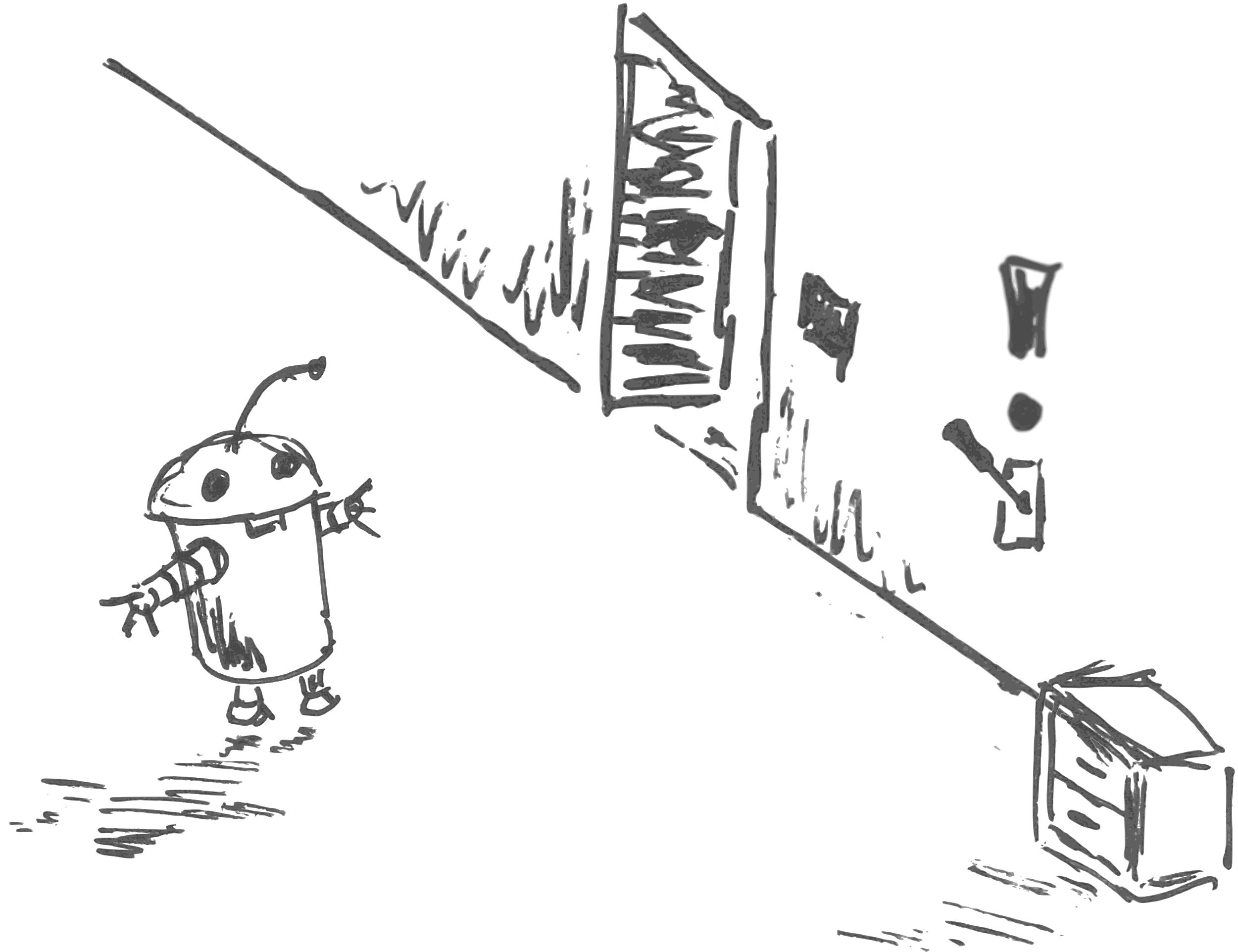
- highest entropy
- highest expected change in entropy

Calculate Entropy

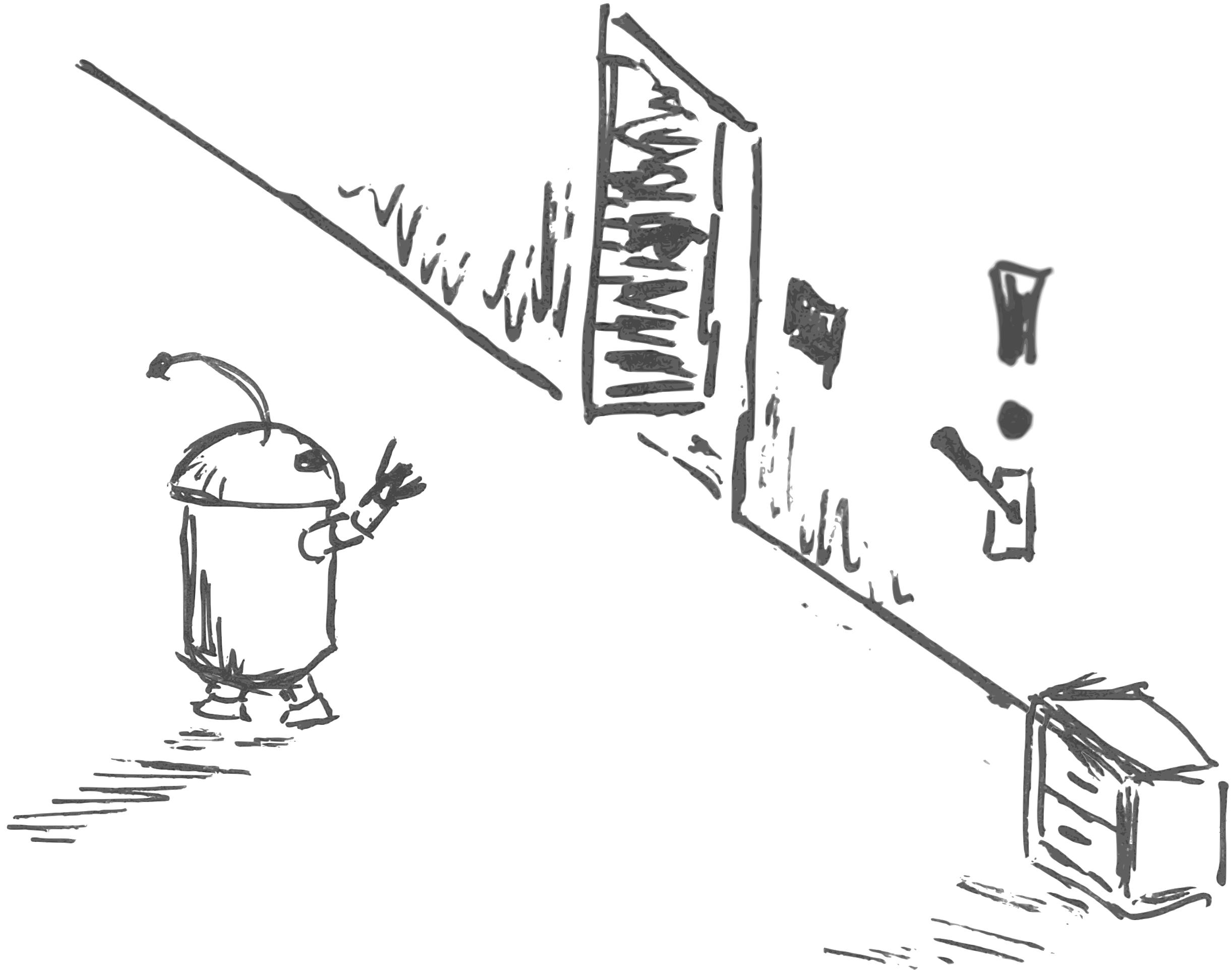
Motion Generation



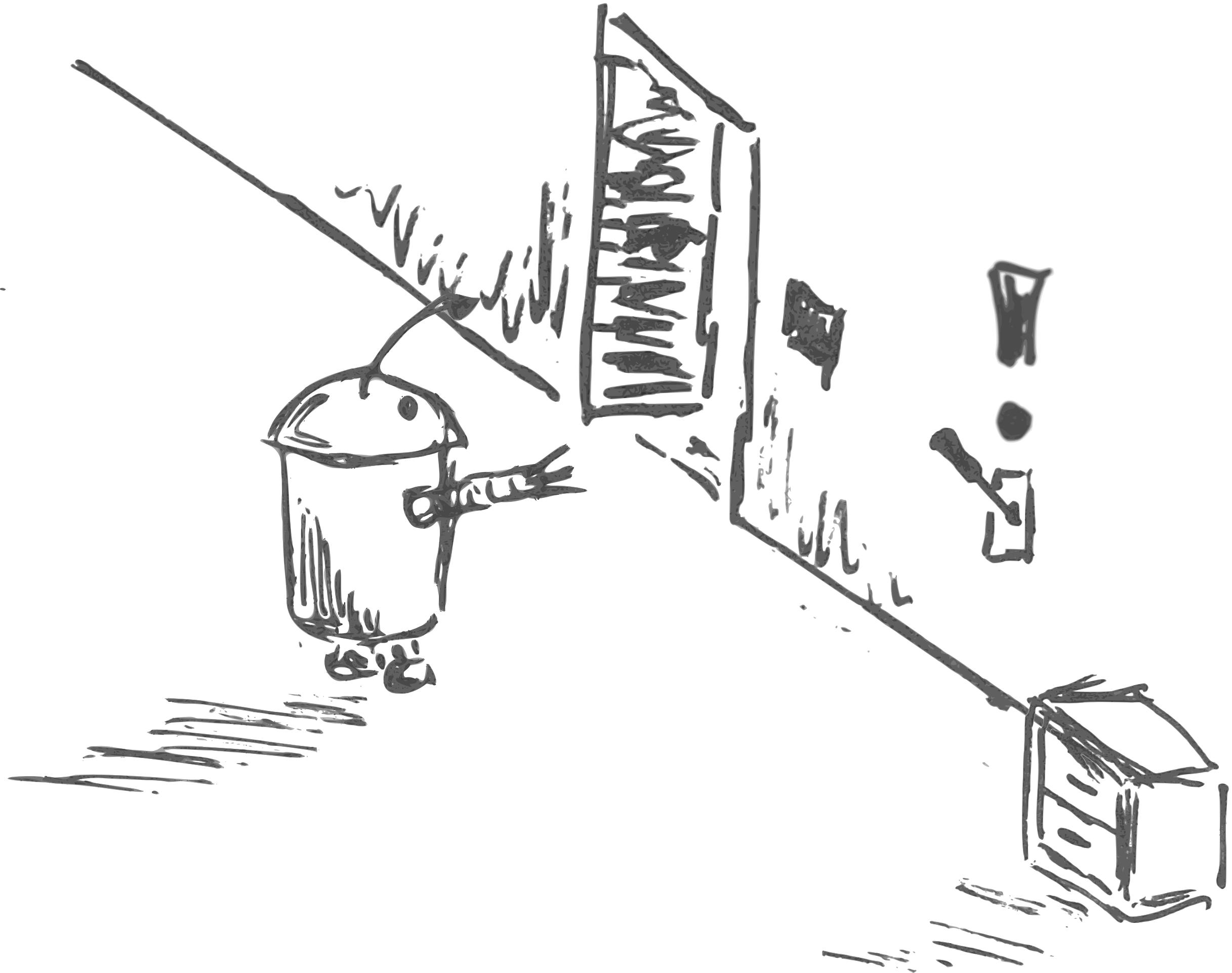
Motion Generation



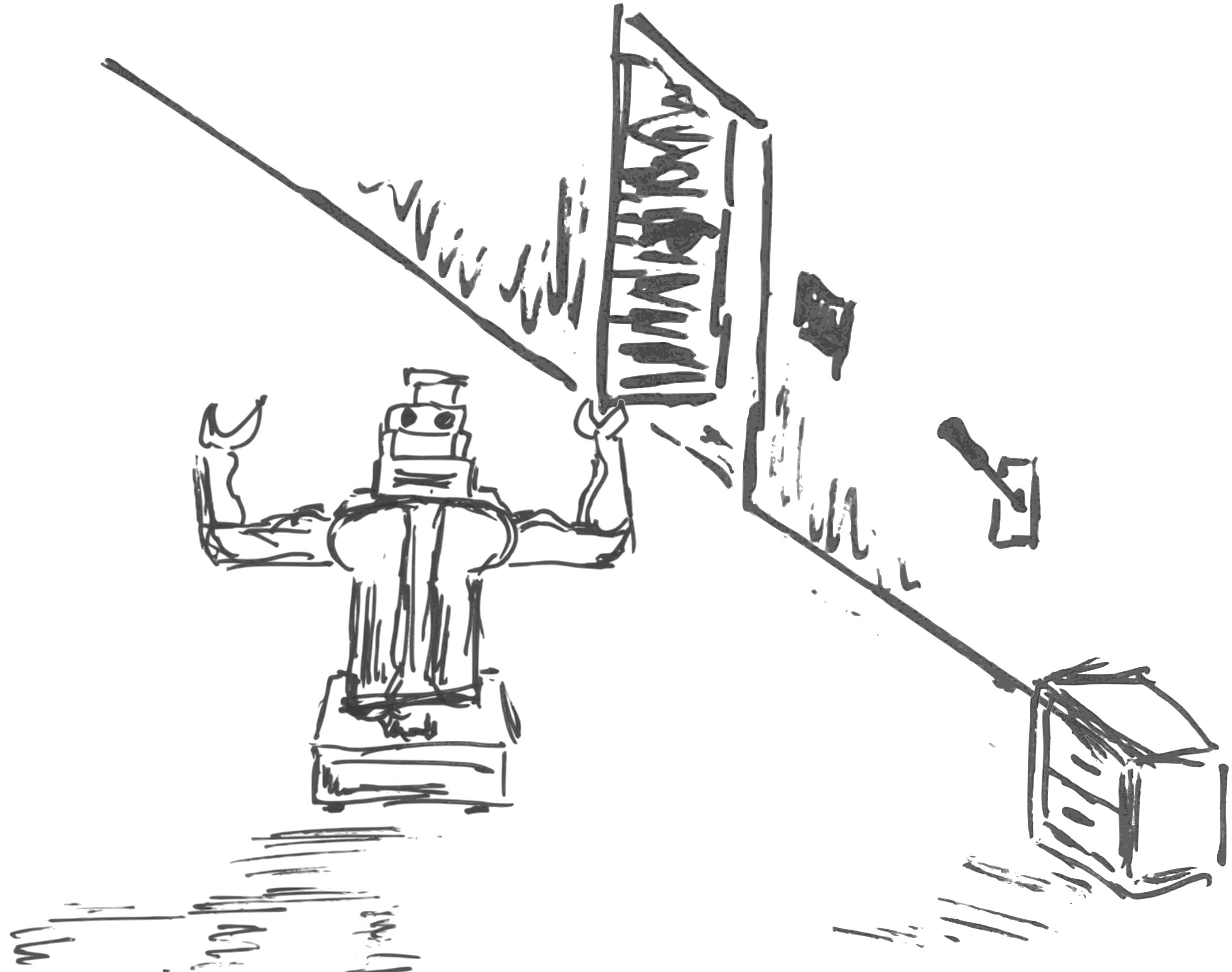
Motion Generation



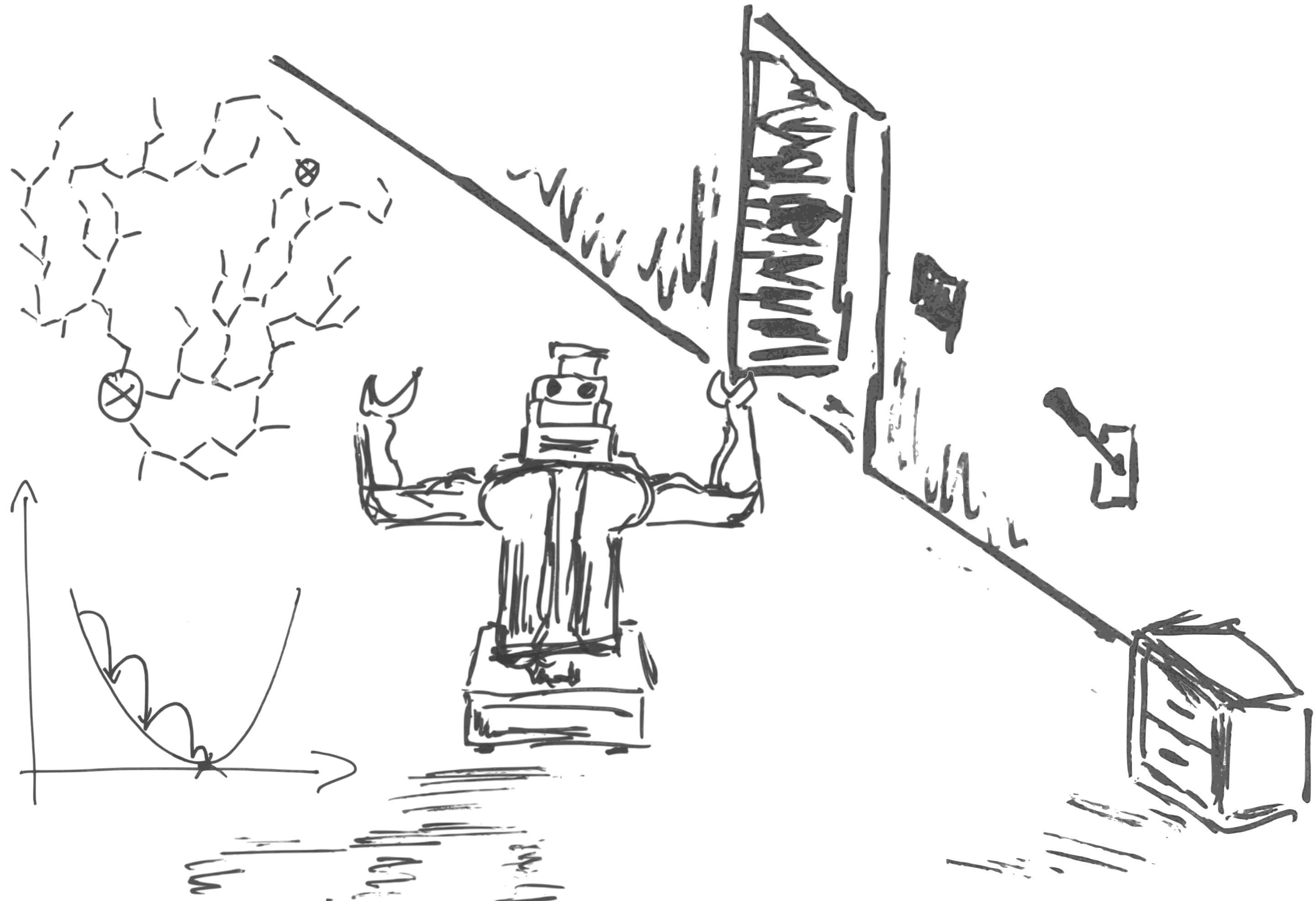
Motion Generation



Motion Generation



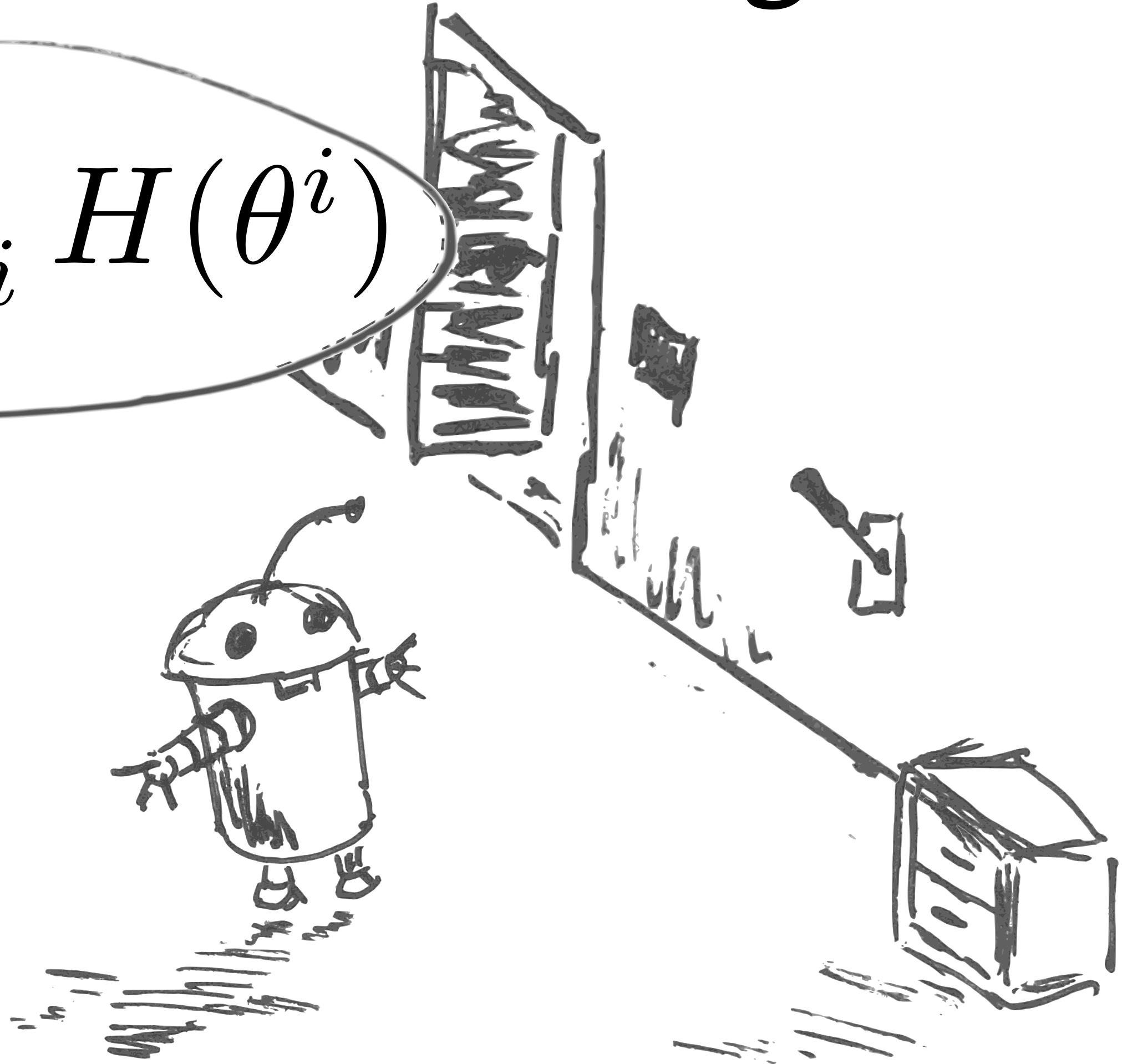
Motion Generation

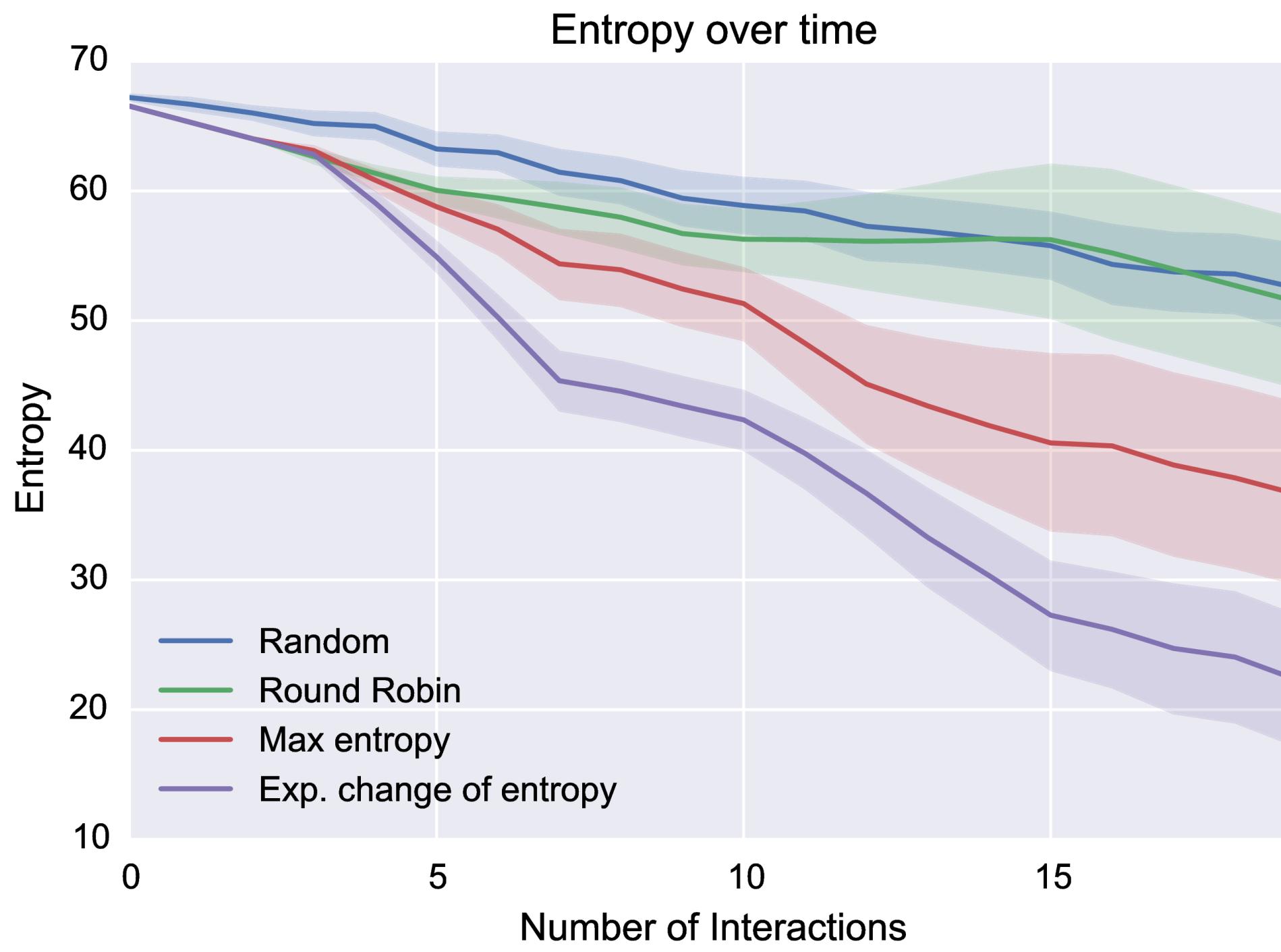
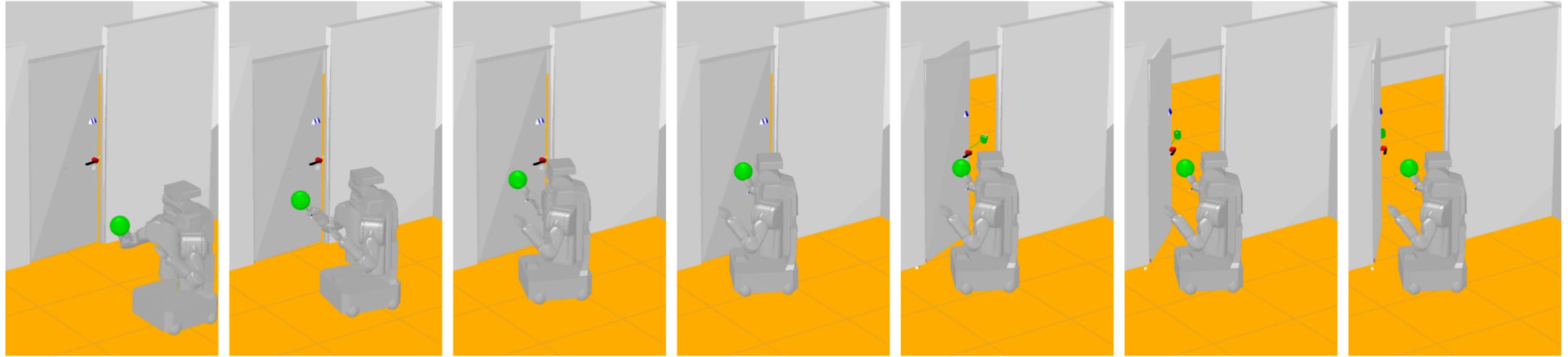


The Exploration Challenge

$$\min \sum_i H(\theta^i)$$

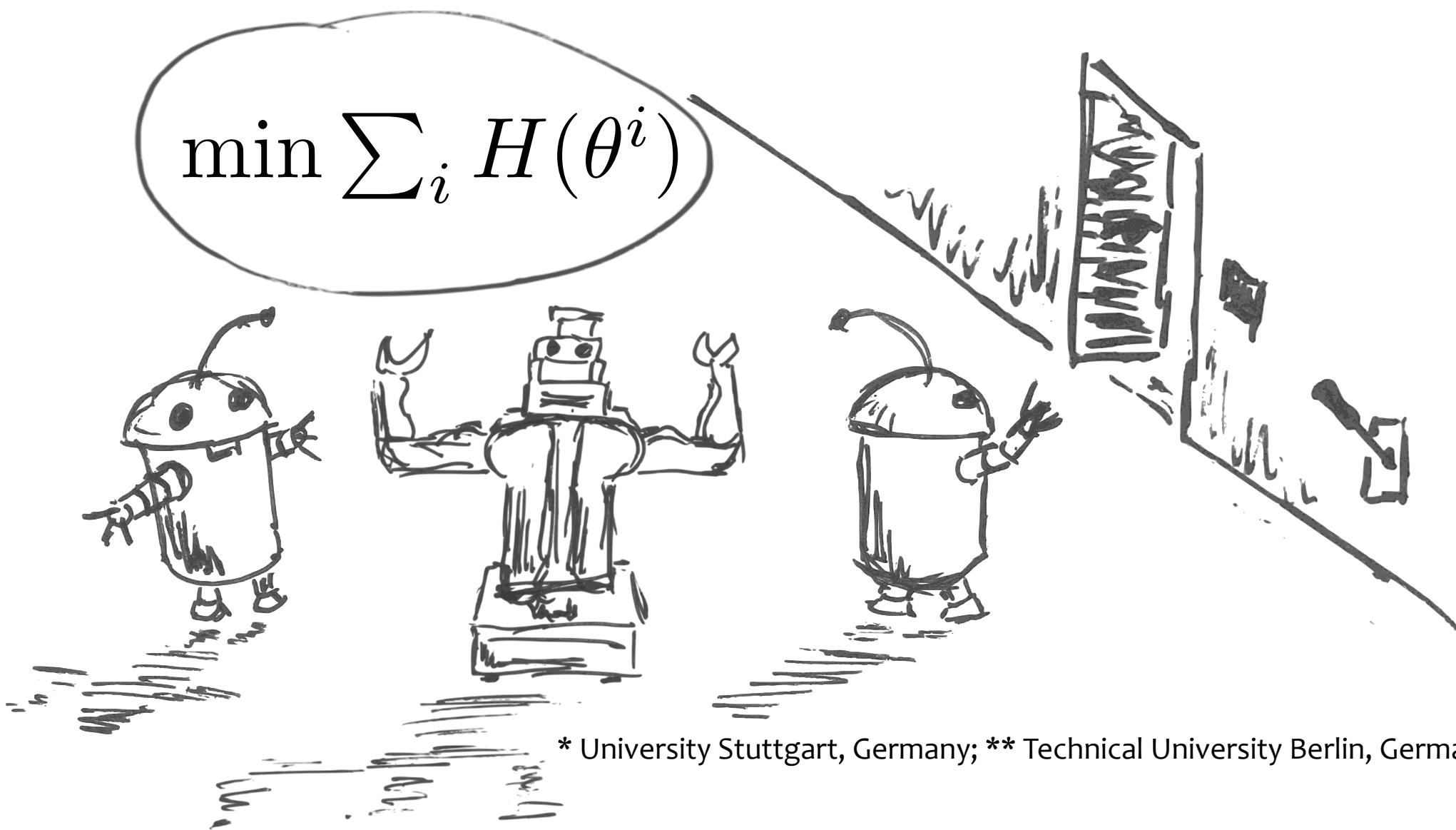
- belief
- strategies
- motion



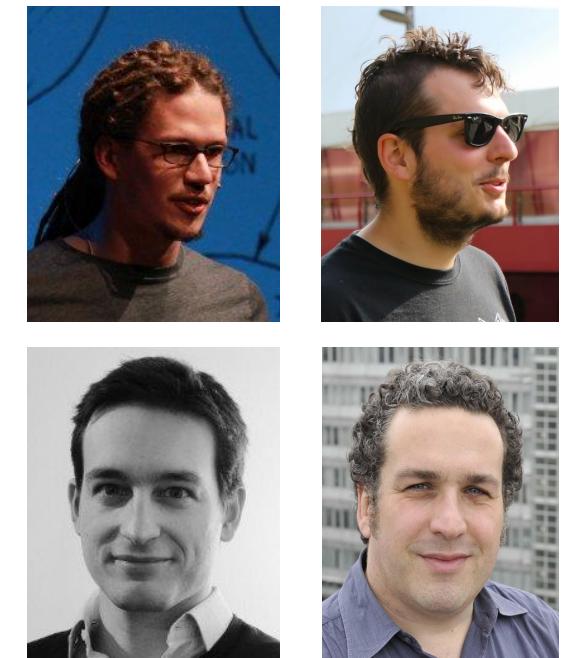


Interested in the Exploration Challenge? Talk to me!

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