How to take over the World with Artificial Intelligence

Taking over the World is not an easy problem

1. You have to figure out the state of the world (maybe it is already taken by someone)

Taking over the World is not an easy problem

2. You have to decide what to do with it

Taking over the World is not an easy problem

3. You have to act according to your plan (while keeping in mind that it may be wrong)

Taking over the World is not an easy problem

2. Planning

1. Perception

3. Control

Taking over the World is not an easy problem

if failure in any step…

Intelligent agent

2. Planning

1. Perception

3. Control

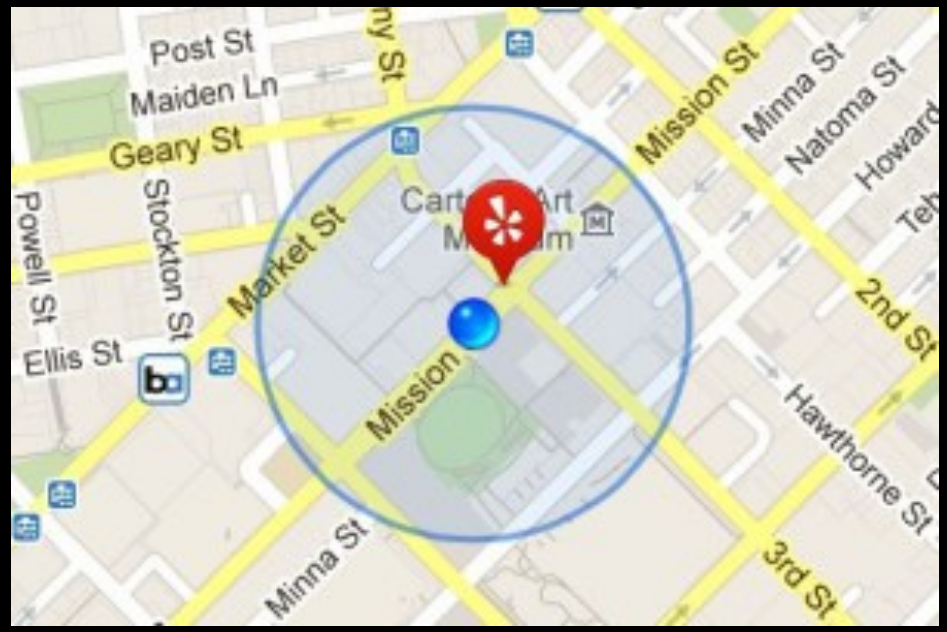
World

Perception

Problem statement: censors are inaccurate

Solution:

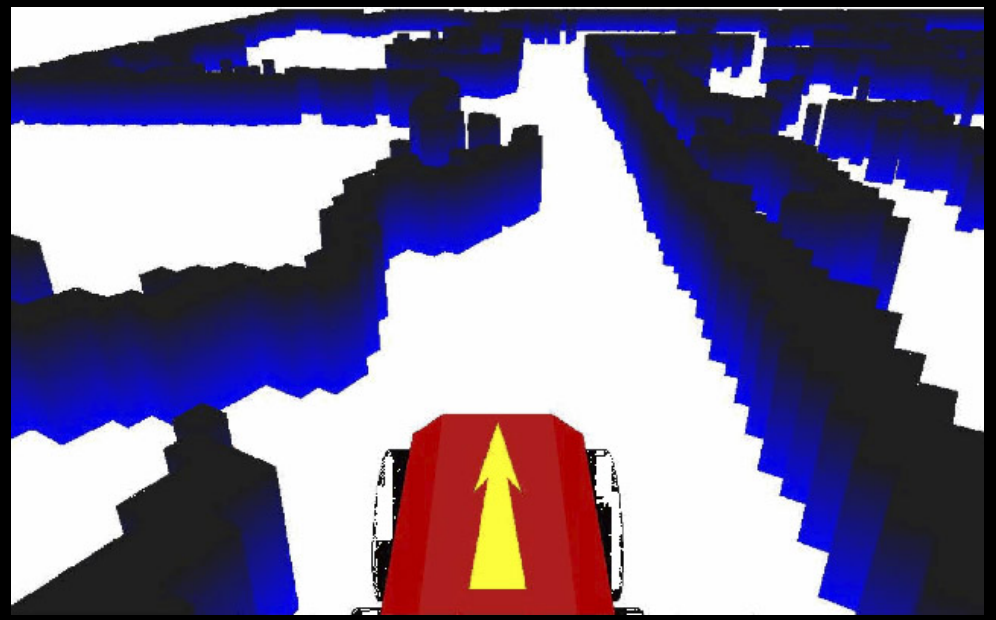
- Gaussian filter
- Particle filter
- Pattern Recognition
- others



Perception

Problem statement: censors are inaccurate

Google uses Simultaneous Localization and Mapping (SLAM) for solving perception problem in self-driving cars



SLAM Demo


SLAMwithMDT
File Scanner Socket Display BGimage Tracking Options
フレーム...
Frame #
825
81
03:00:16:537
Google Earth
File Edit View Tools Add Help
komaba
© 2010 ZENRIN
Google
Imagery Date: Mar 5, 2007 35°39'50.77" N 139°40'38.01" E elev 40 m Eye alt 100 m

Intelligent agent

1. Perception

3. Control

World

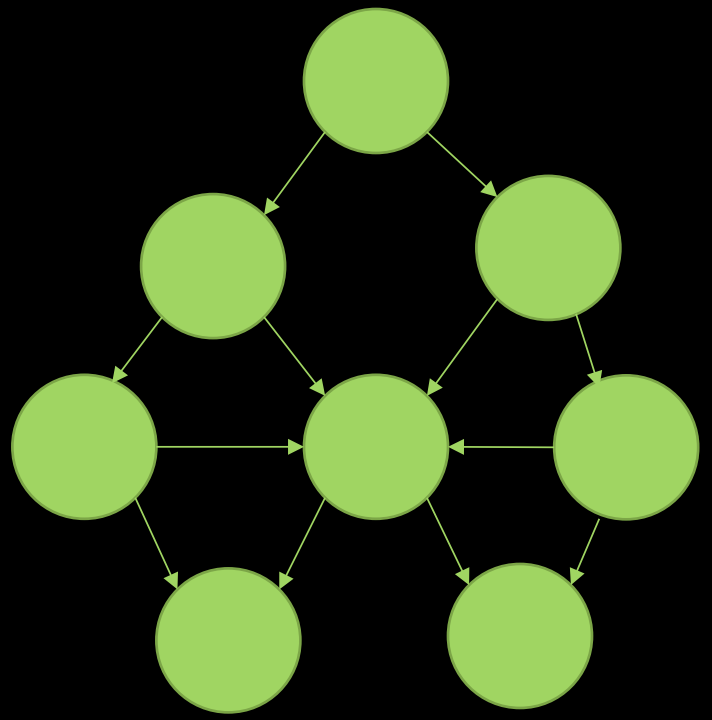
Planning

Problem statement: choose one action among them all

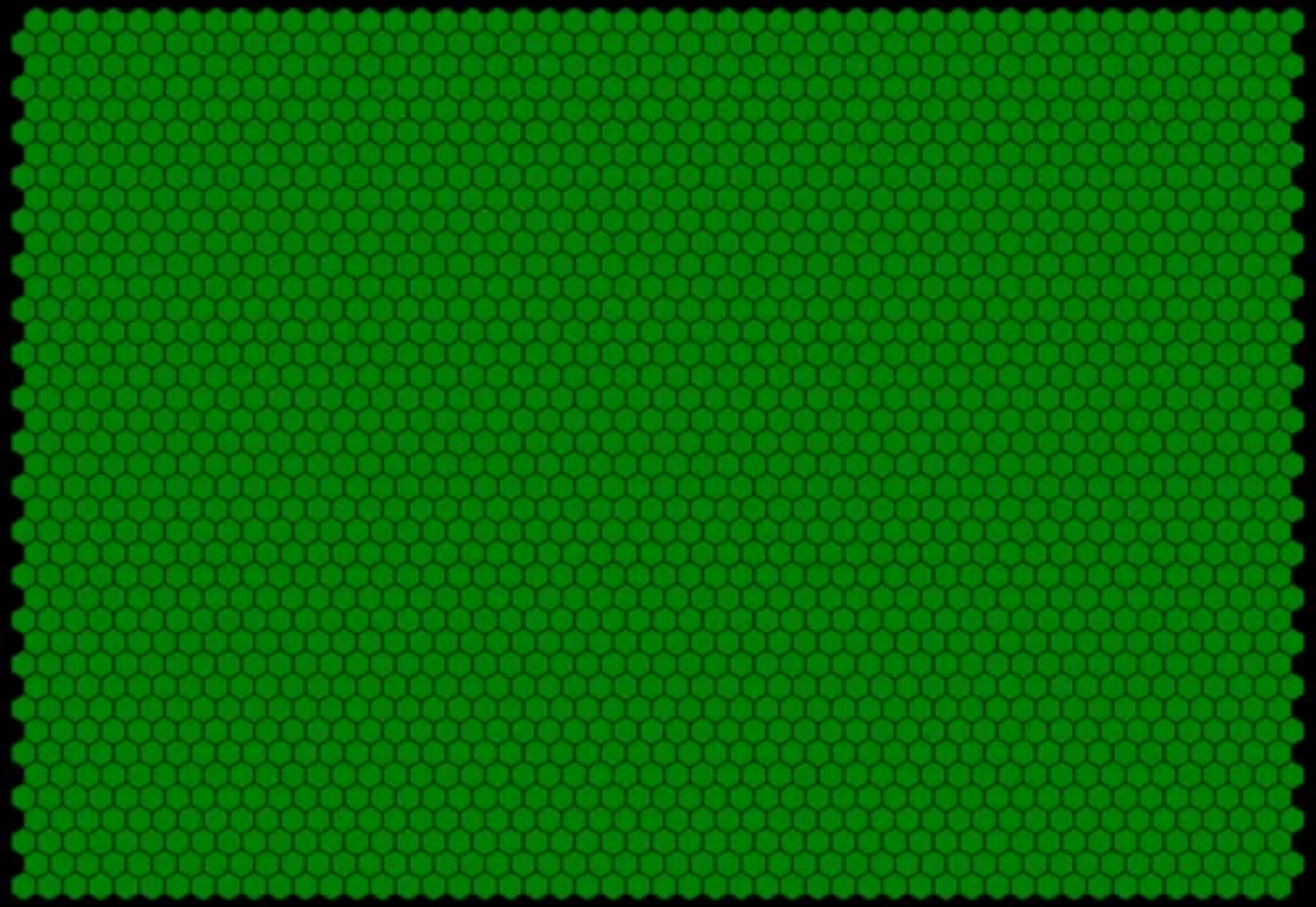
What should I do to achieve the goal?

Solution:

- Searches
- Markov Decision Process (MDP)



A* Search Demo



Intelligent agent

2. Planning

1. Perception

World

3. Control

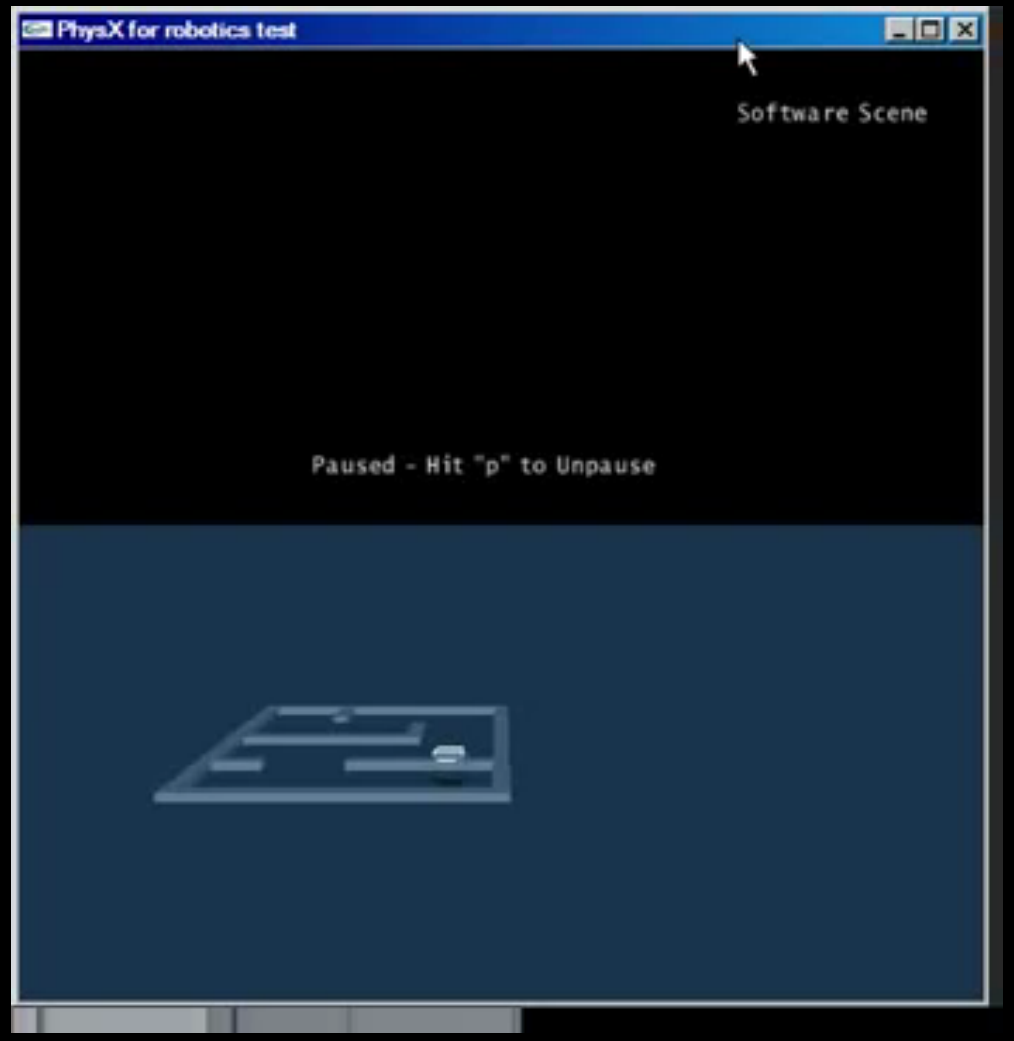
Control

Problem statement: the result of an action is random

Solution:

- PID controller
- Markov Decision Process (MDP)

PID Controller Demo



Flying a robotic helicopter

Flying a robotic helicopter

[Courtesy of David Shim]

Intelligent agent

2. Planning

- Searches
- Markov Decision Process (MDP)

1. Perception

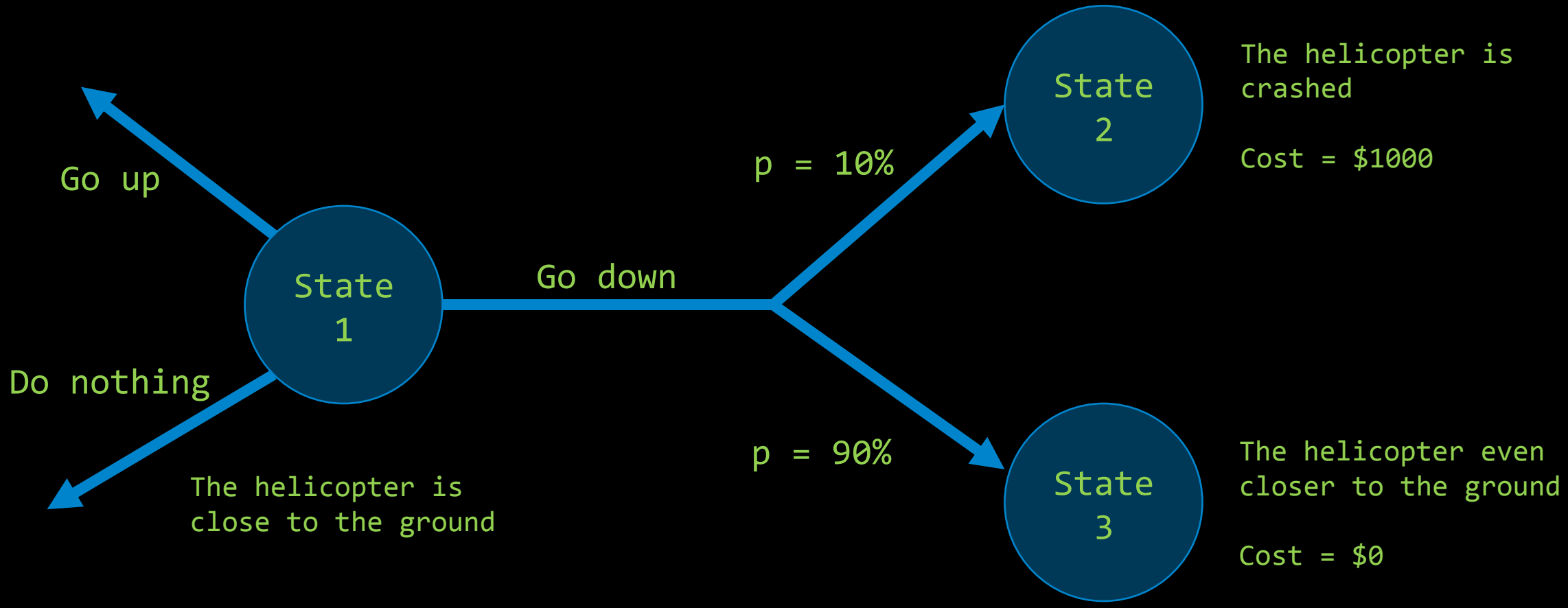
- Gaussian filter
- Particle filter
- Pattern Recognition

World

3. Control

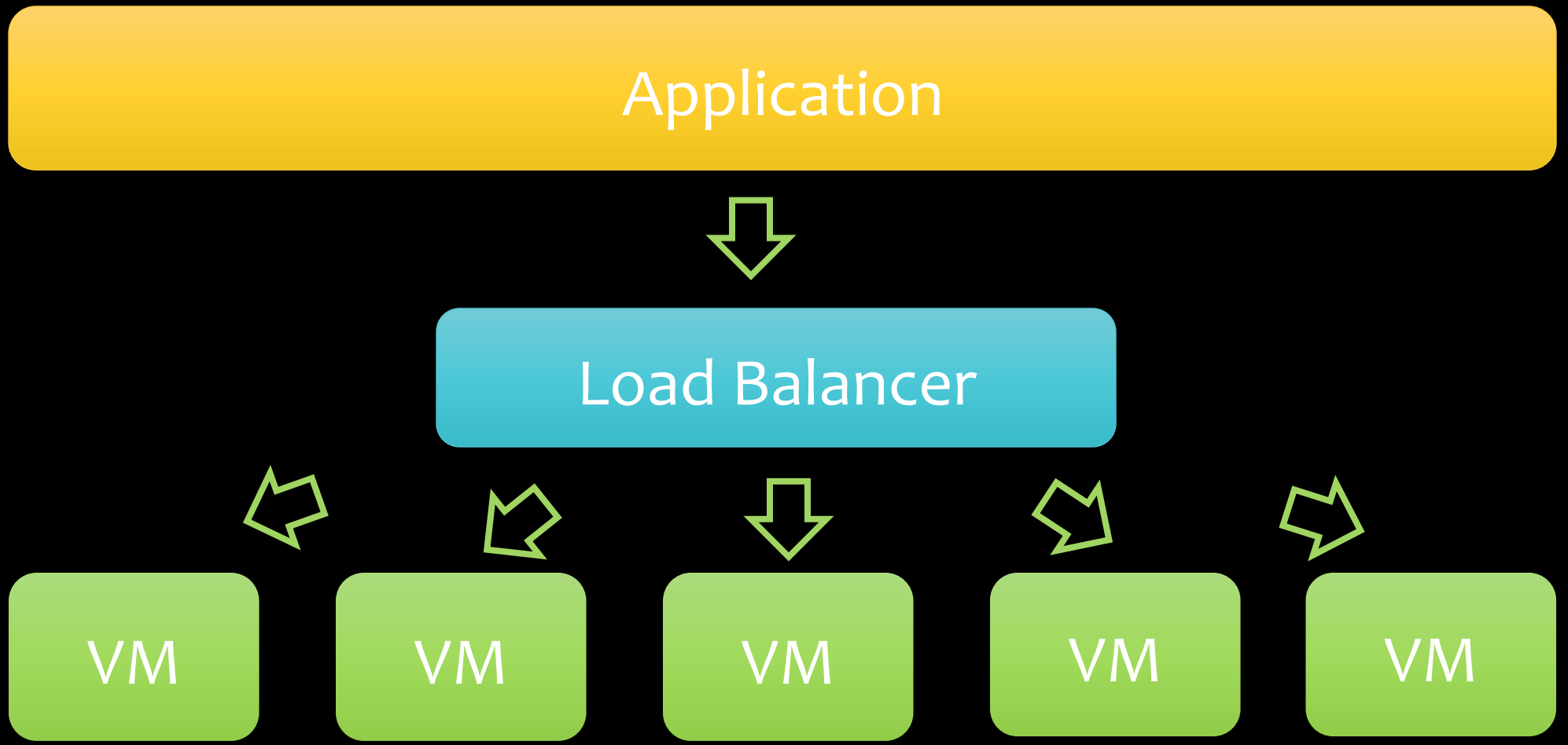
- PID controller
- Markov Decision Process (MDP)

Markov Decision Process

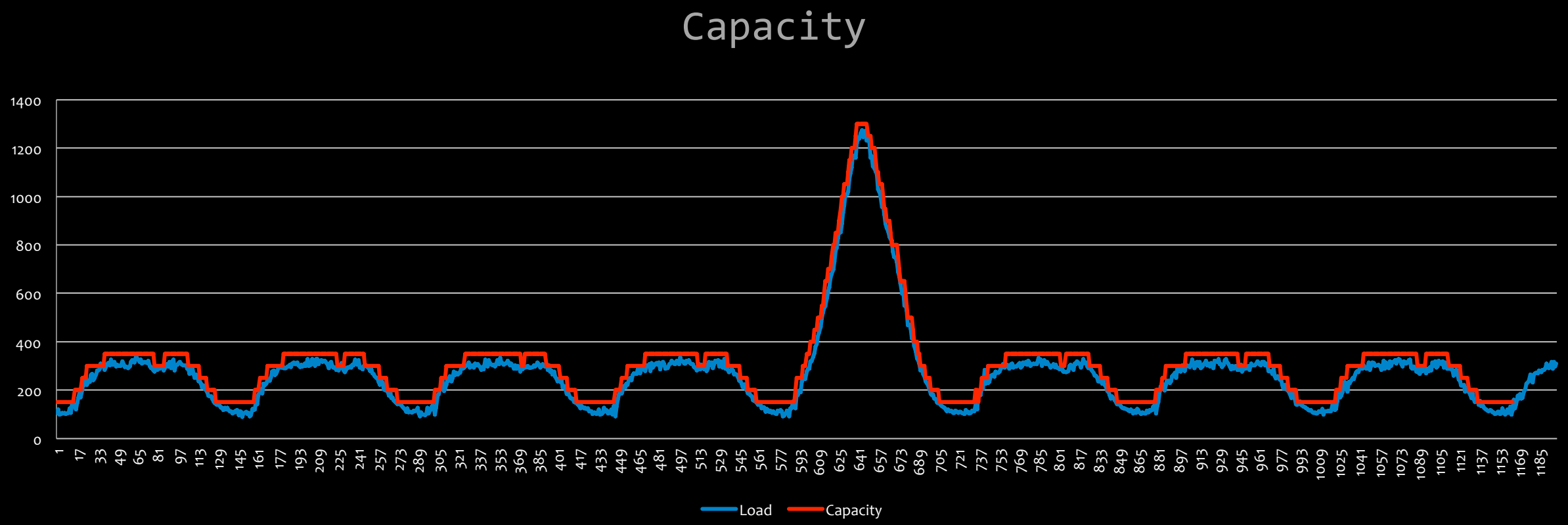


Stanford robotic helicopter

Making better data center

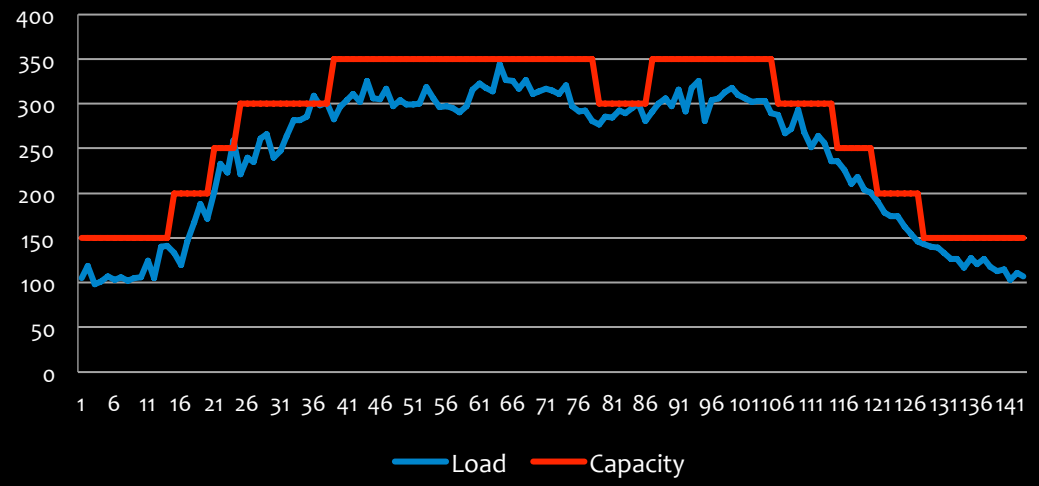


Making better data center

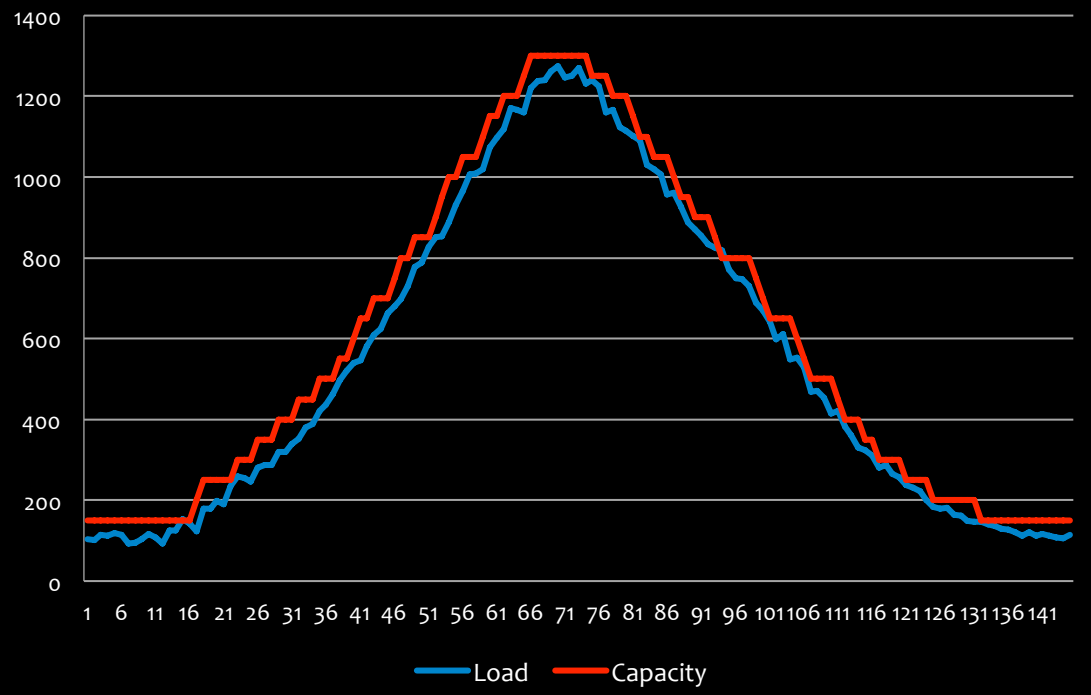


Making better data center

Capacity – regular day



Capacity – “Black Friday”

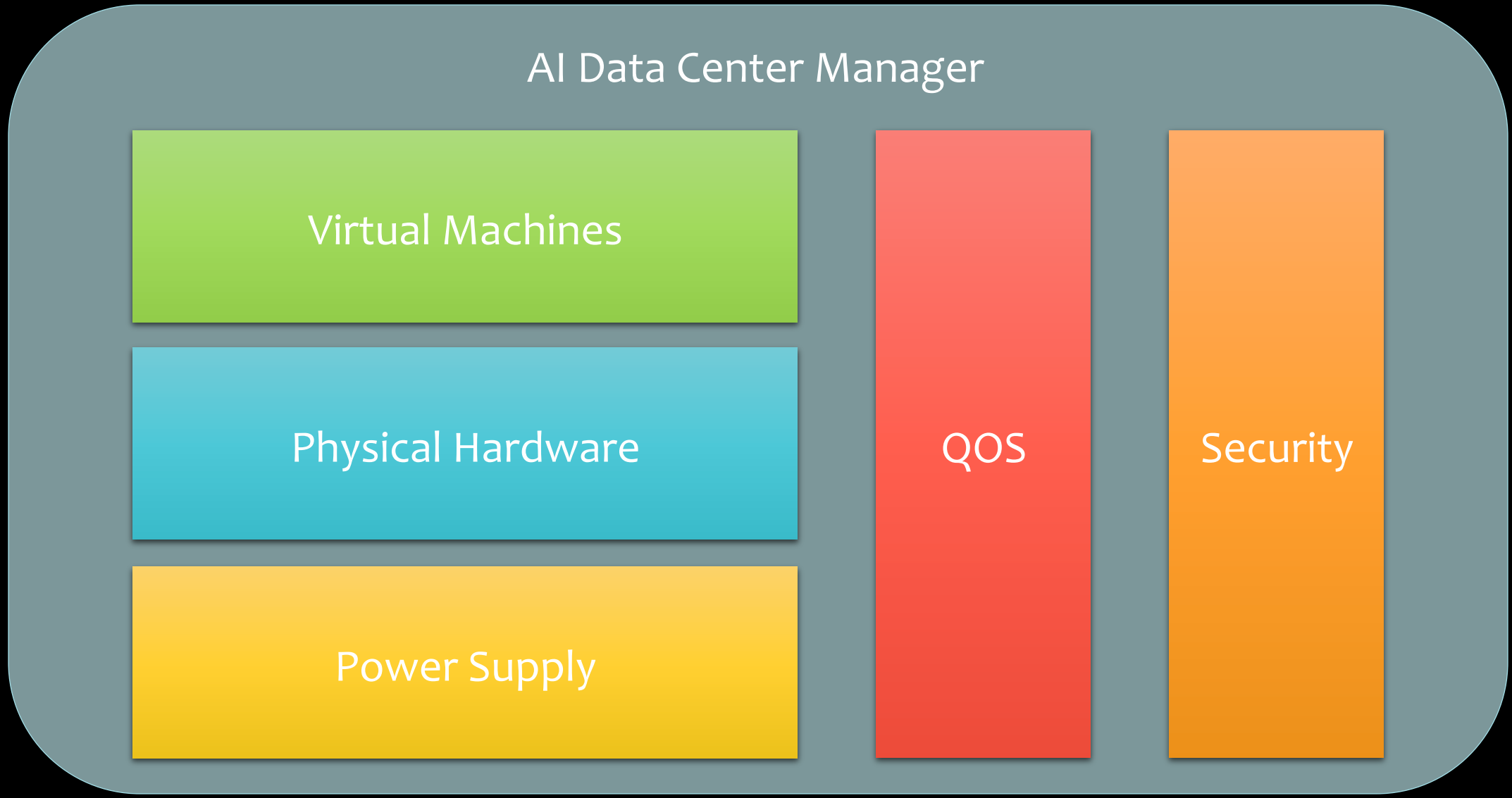


“Black Friday” week
SLA: 99,996%
Mean resource utilization: 85,8%

Making better data center

In US only:

- 3 million data centers
- 12 million machines
- 30 percent of them are drawing power without actually doing anything
- $3.8 billion and 39 billion kilowatt-hours annually are wasted
- Wasted electricity is enough to power 3.5 million American homes


AI Data Center Manager
Virtual Machines
Physical Hardware
Power Supply
QOS
Security

Intelligent agent

2. Planning

- Searches
- Markov Decision Process (MDP)

1. Perception

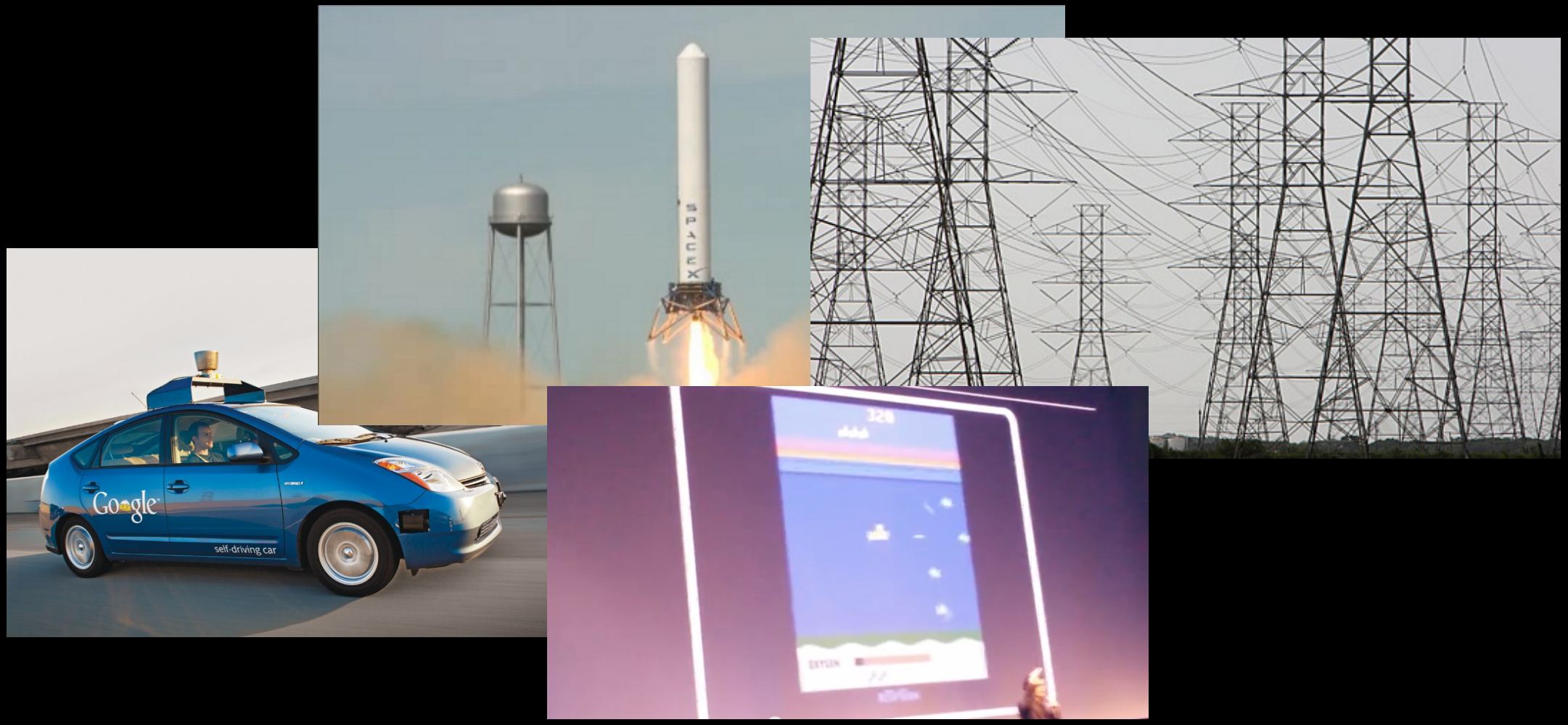
- Gaussian filter
- Particle filter
- Pattern Recognition

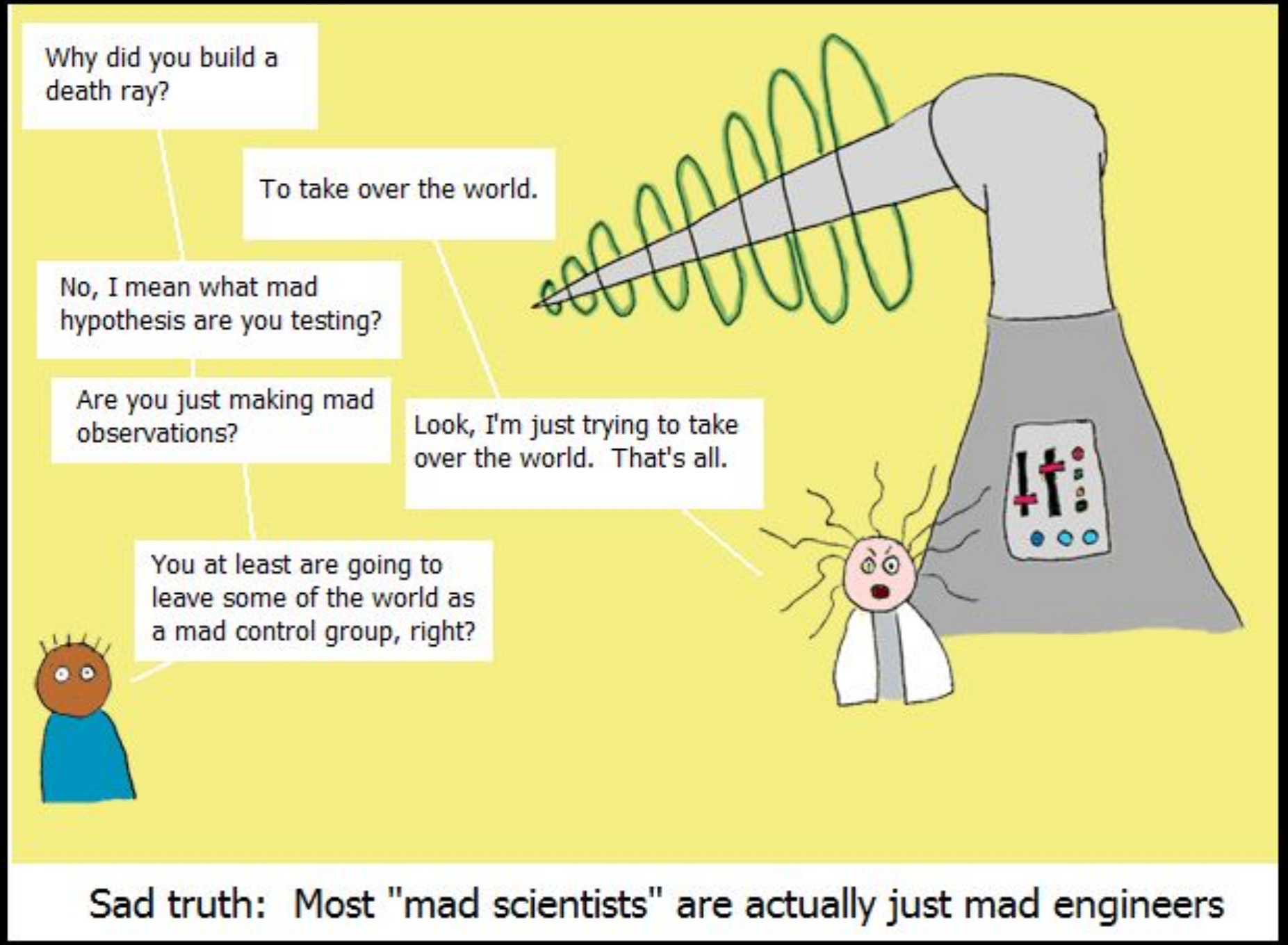
World

3. Control

- PID controller
- Markov Decision Process (MDP)

You can do with AI





Sad truth: Most "mad scientists" are actually just mad engineers

Thank you ☺