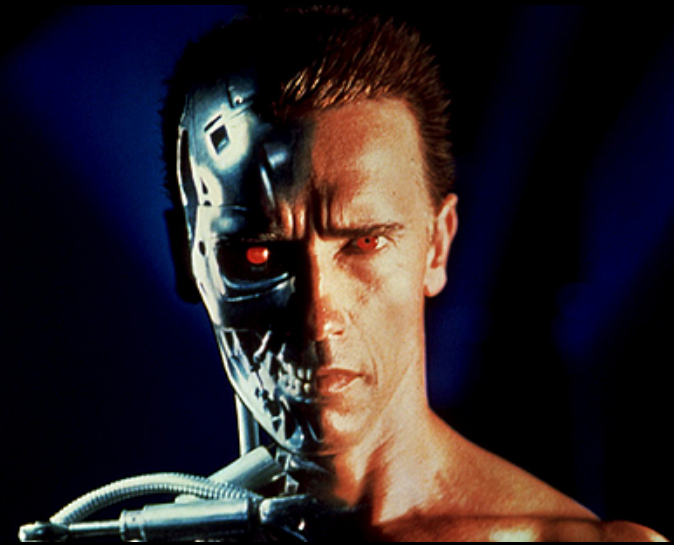


How to take over the World with Artificial Intelligence



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



I need your boots clothes and motorcycle

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)

A photograph of Arnold Schwarzenegger in a black leather jacket, holding a rifle, looking intensely at the camera. The background is dark.

2. Planning

Taking over the World
is not an easy problem

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



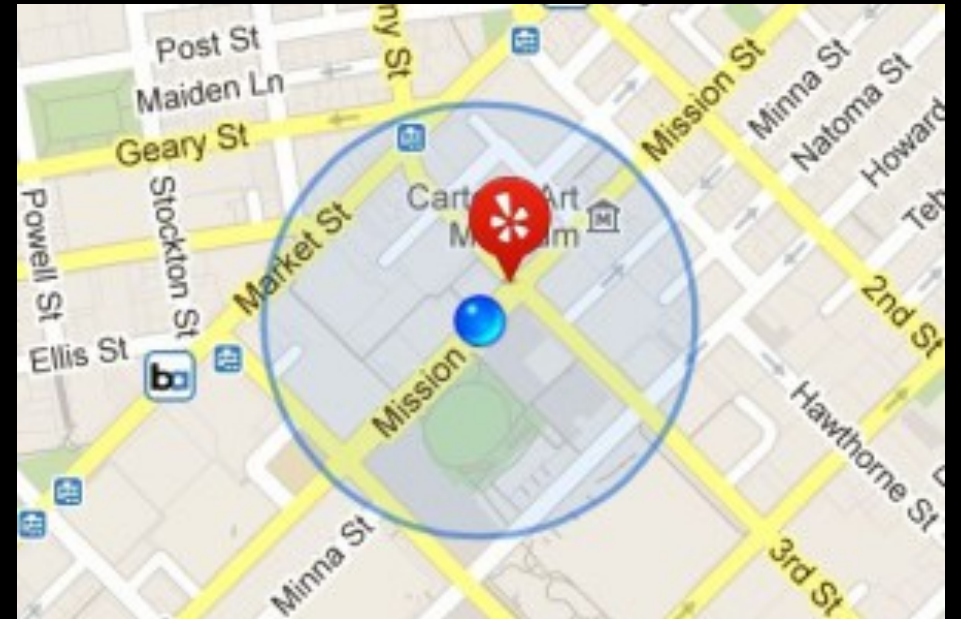
Perception

Problem statement: sensors are inaccurate

Where am I?
What is around me?

Solution:

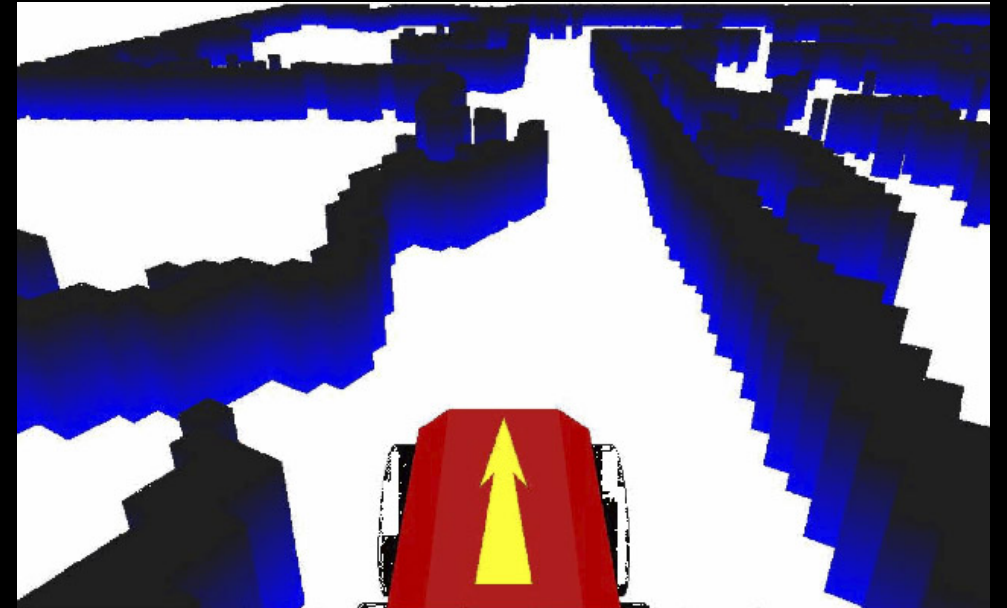
- Gaussian filter
- Particle filter
- Pattern Recognition
- others



Perception

Problem statement: sensors are inaccurate

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



SLAM Demo



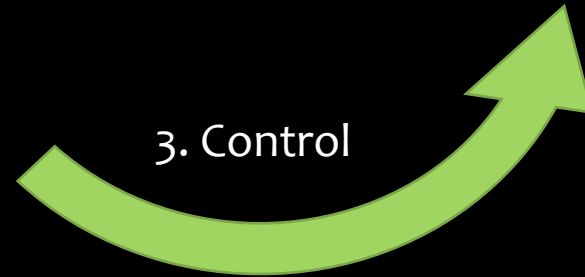
Intelligent
agent

2. Planning

1. Perception

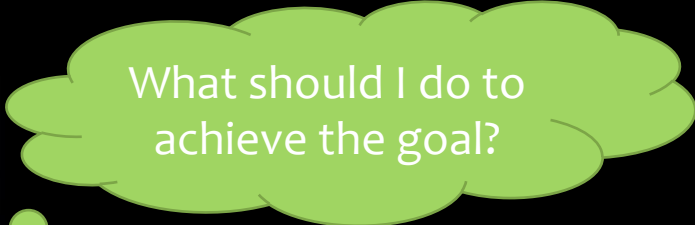
3. Control

World



Planning

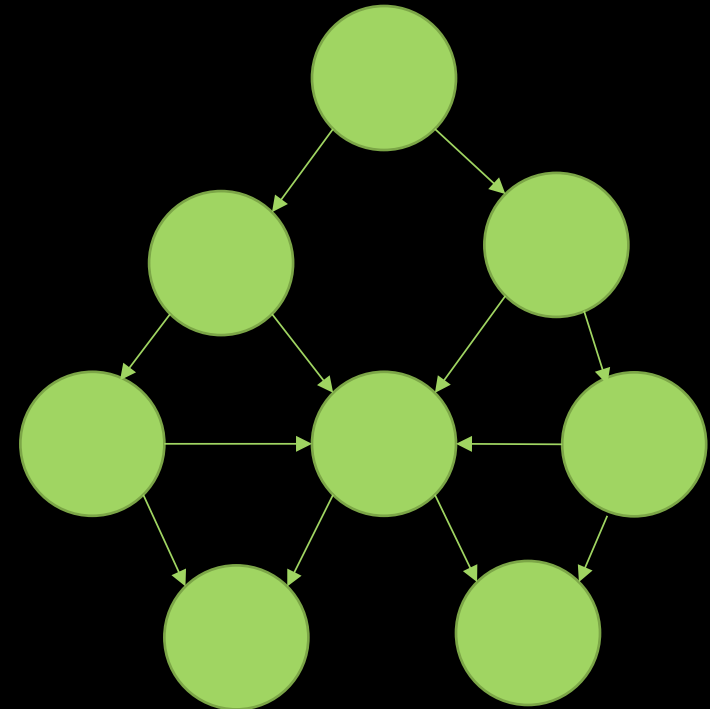
Problem statement: choose one action among them all



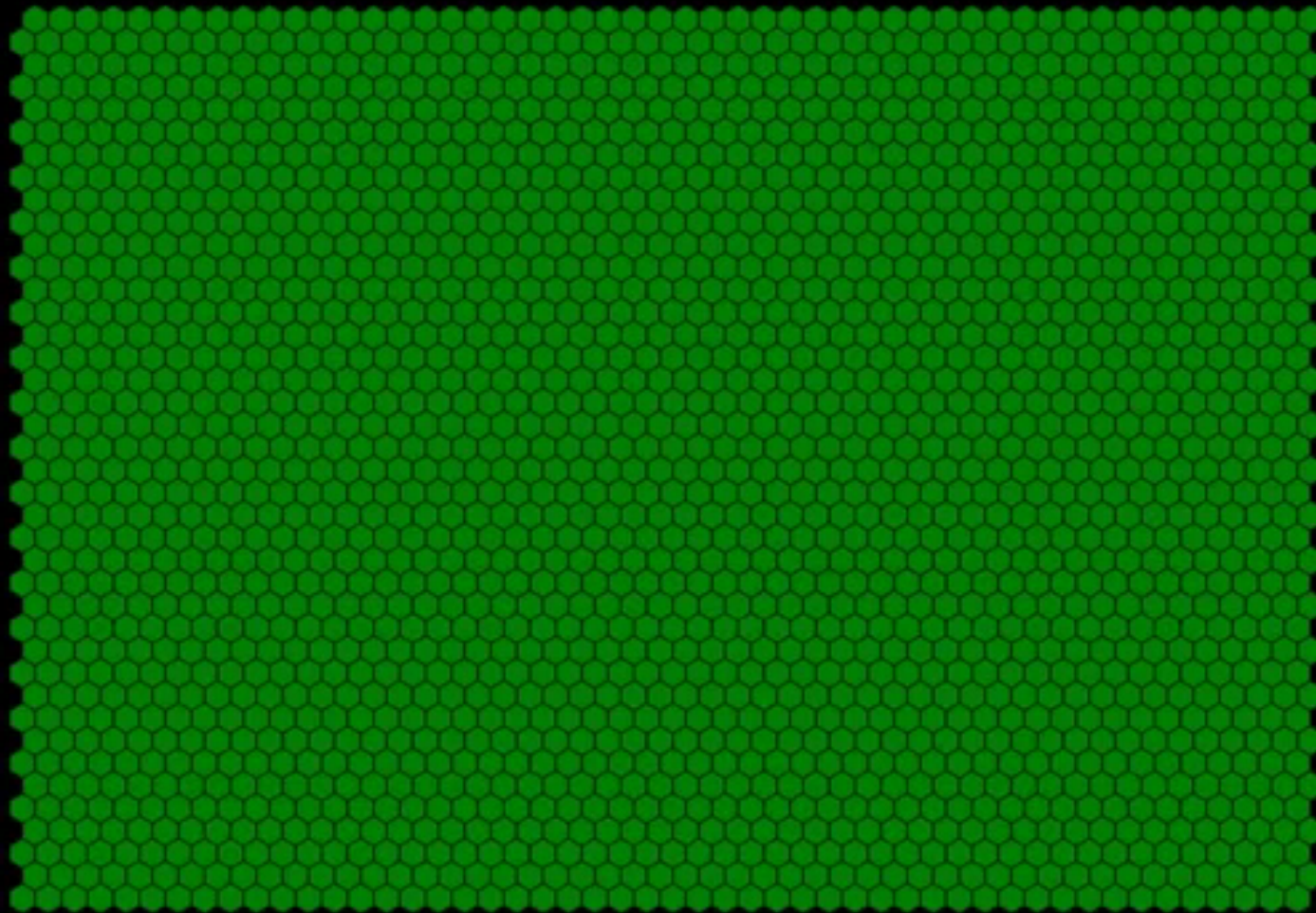
What should I do to achieve the goal?

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



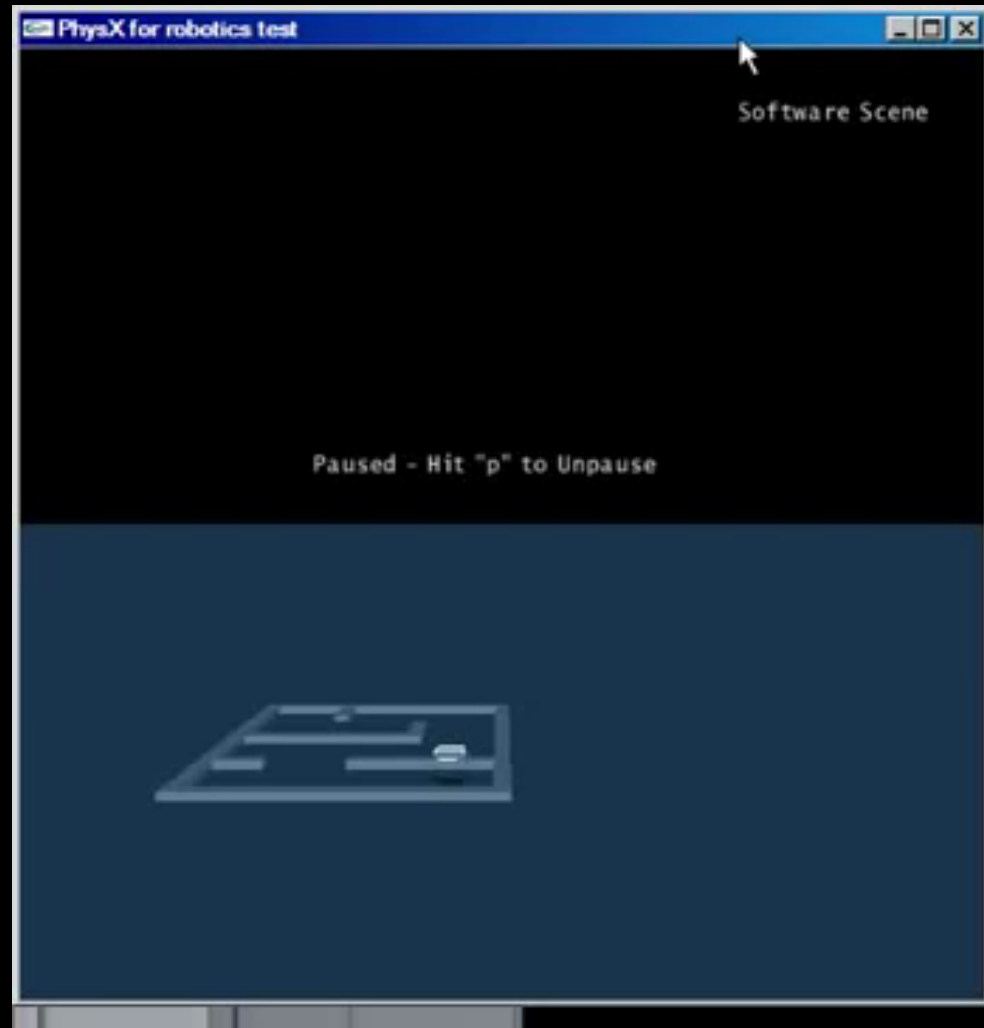
How should I act to follow the plan?

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

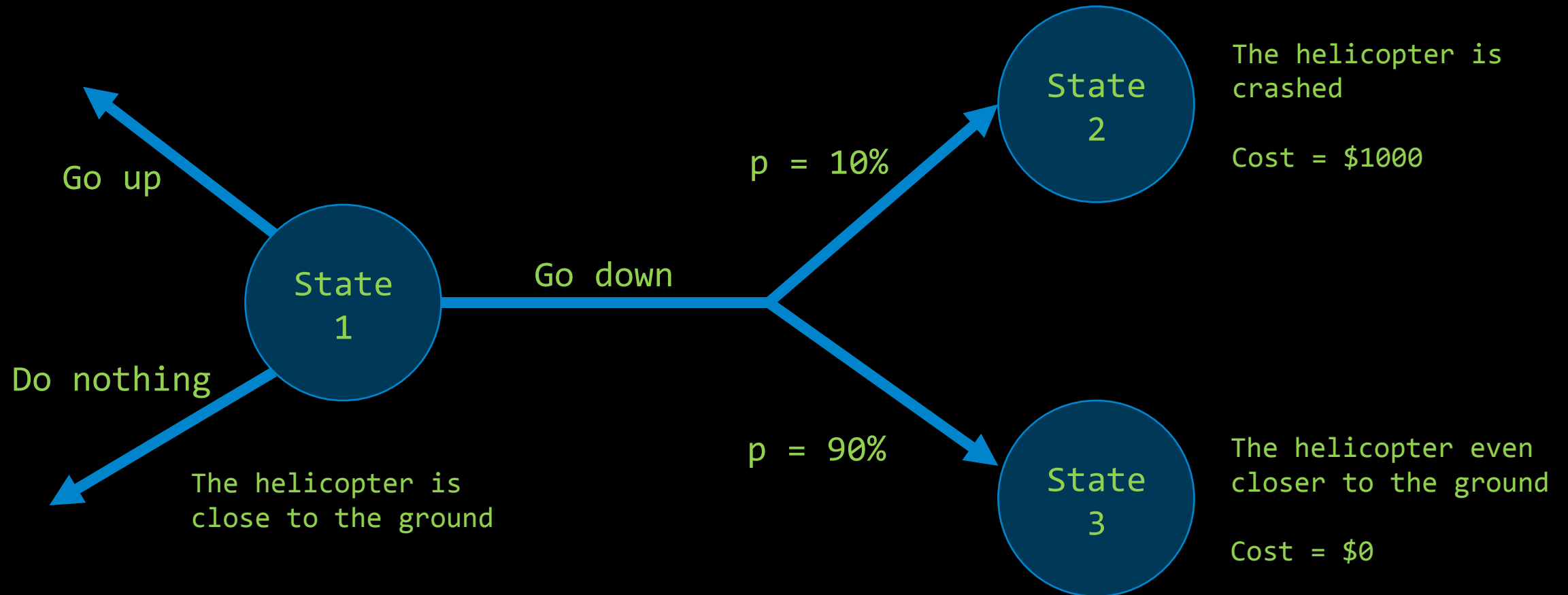
3. Control

- PID controller
- Markov Decision Process (MDP)

World

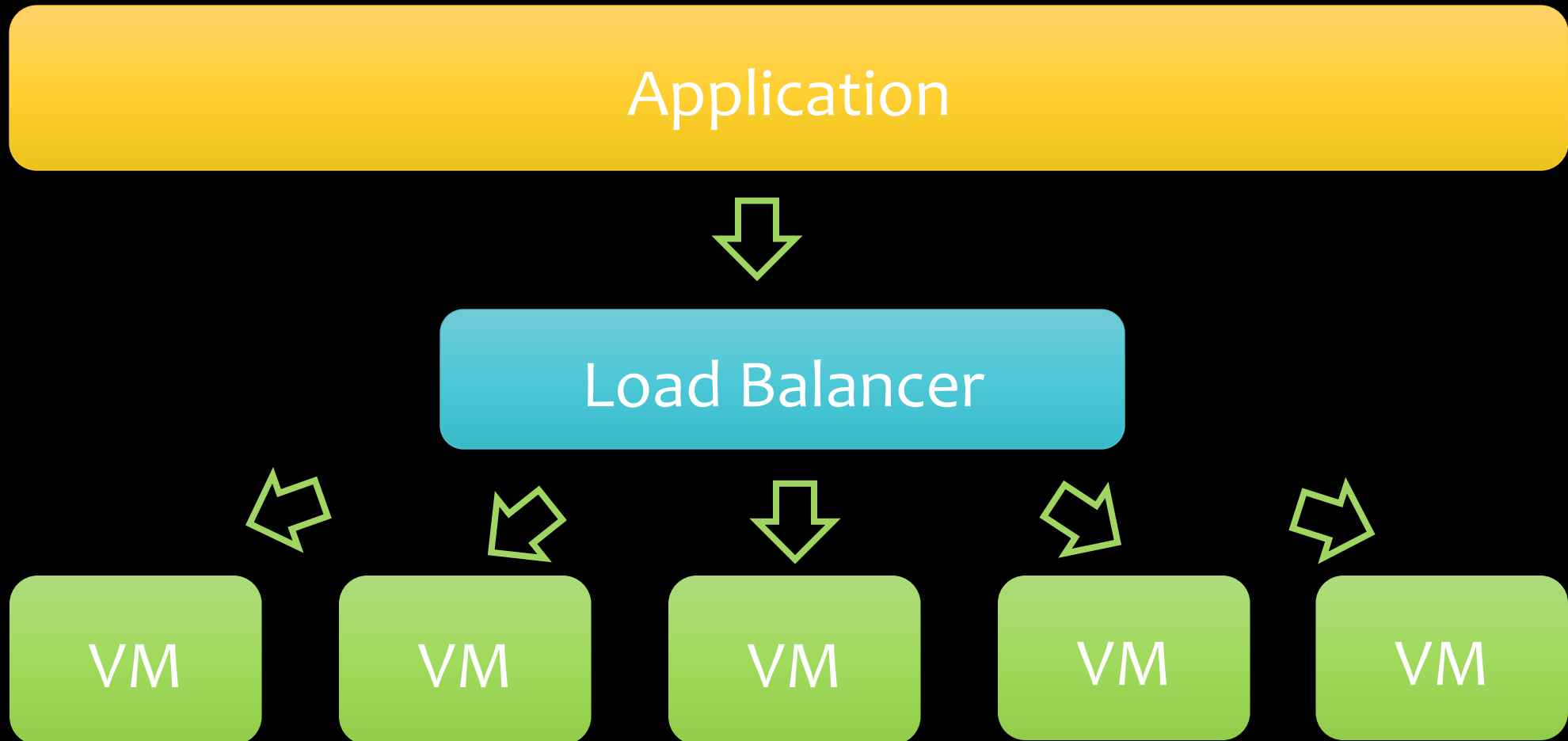


Markov Decision Process



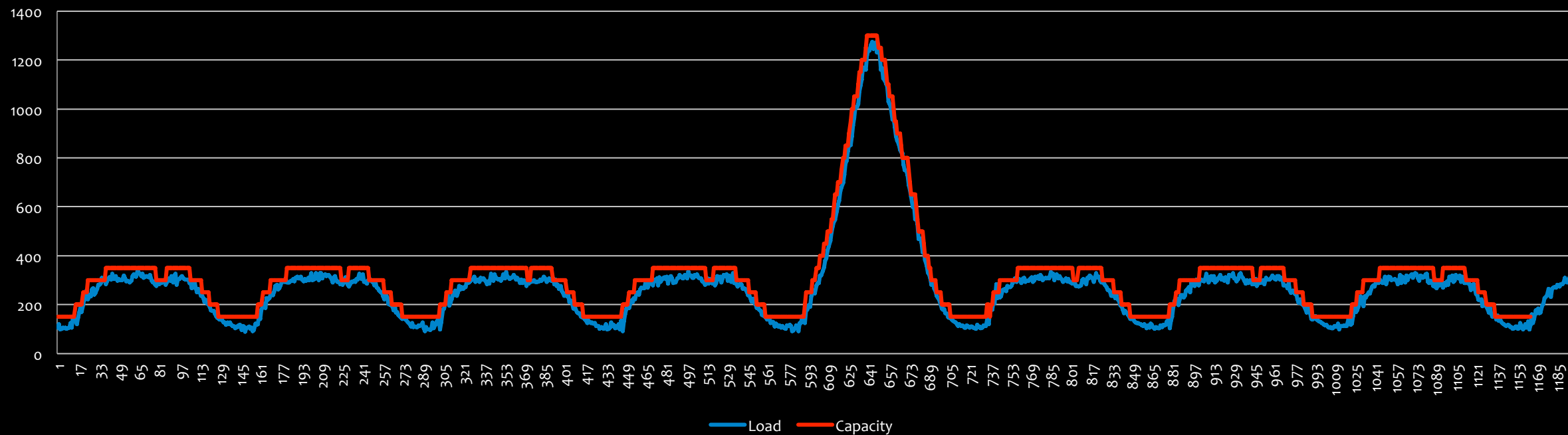
Stanford robotic helicopter

Making better data center



Making better data center

Capacity

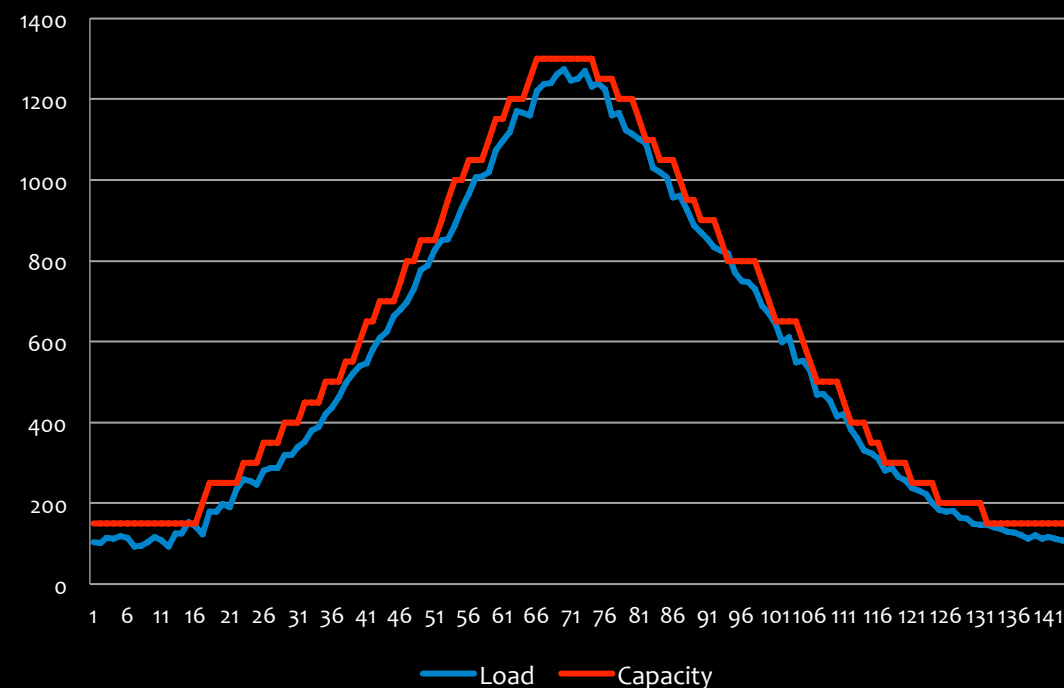


Making better data center

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



The diagram illustrates the components of an AI Data Center Manager. It features a central light blue rounded rectangle containing five colored boxes. On the left, three boxes are stacked vertically: a green box for 'Virtual Machines', a cyan box for 'Physical Hardware', and a yellow box for 'Power Supply'. To the right of these, there are two vertical bars: a red one for 'QOS' and an orange one for 'Security'. All text is in white.

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

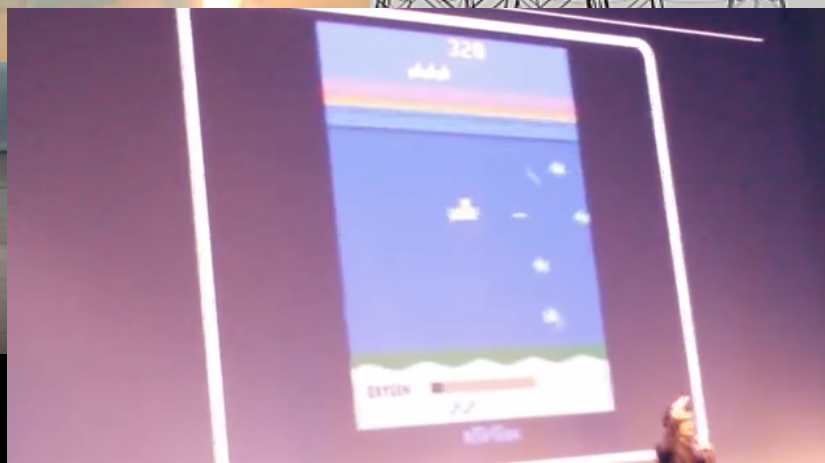
3. Control

- PID controller
- Markov Decision Process (MDP)

World



You can do with AI



Why did you build a death ray?

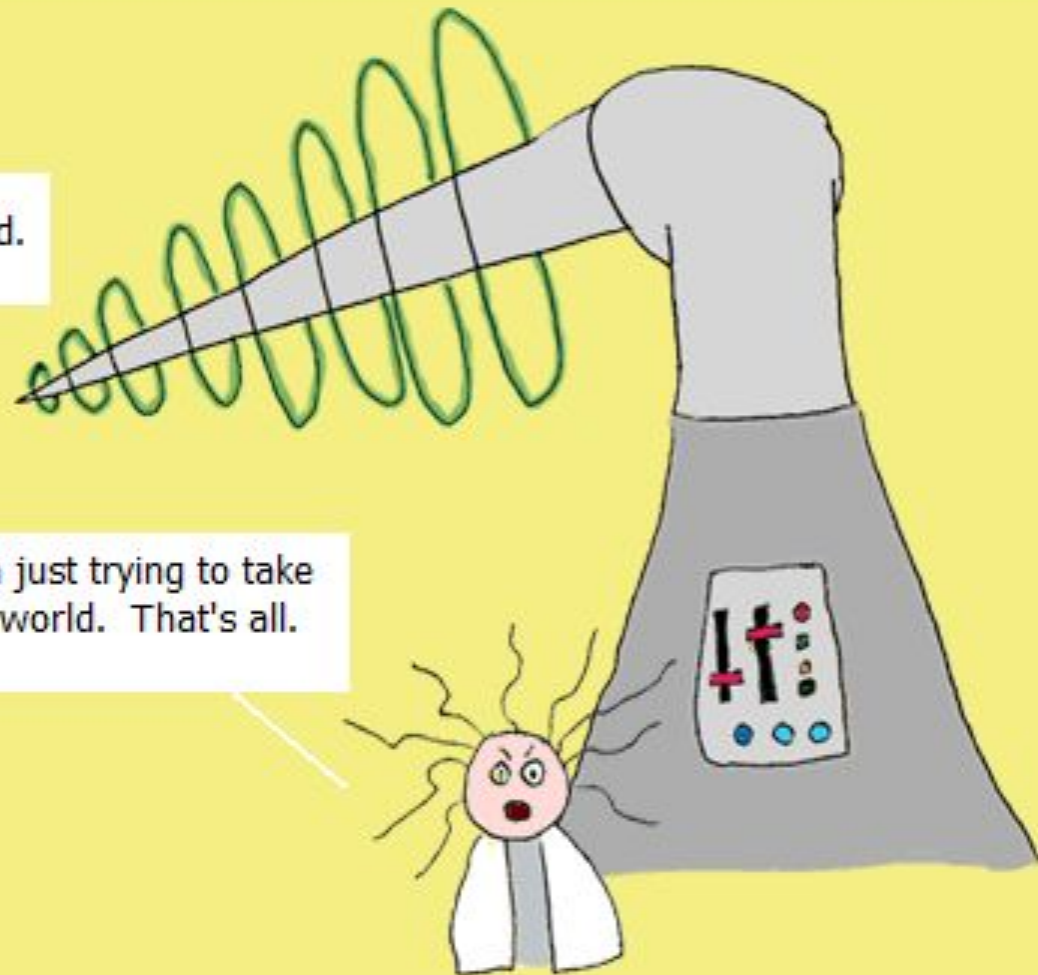
To take over the world.

No, I mean what mad hypothesis are you testing?

Are you just making mad observations?

You at least are going to leave some of the world as a mad control group, right?

Look, I'm just trying to take over the world. That's all.



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



Thank you 😊