



COMP 152: Probabilistic Robotics for Human-Robot Interaction

Instructor: Jivko Sinapov
www.cs.tufts.edu/~jsinapov

Introduction

- Welcome!
- Who am I?
- Who are you?
- A brief history of robotics

Syllabus

- The course website IS the syllabus: https://www.eecs.tufts.edu/~jsinapov/teaching/comp152_PR/

- Read the website before Thursday, there will be Q & A session to address any questions you may have

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Who am I?

Who are you?

Announcements

Title: **Cooperative Robots, Uncooperative People: how Social Appropriateness can help sustain Human-Robot Teams**

Speaker: **David Feil-Seifer, University of Nevada-Reno**

Time and Place: **Thursday Feb 4 @ 3 pm, see department email or canvas announcement for zoom link**

Reading Assignment

- Chapters 1 and 2 of “Probabilistic Robotics”
- Next week, we start with Kalman filters (Chapter 3 of PR)

A Brief History of Robotics

First introduced in the play *R.U.R. (Rossum's Universal Robots)* which opened in Prague in January 1921.

The word ‘robot’ is derived from the Czech word for forced labor or serf.

Early Depiction of Robots in Movies

What is a robot?

(breakout discussion)

Discuss the definition of a robot – in 2-3 sentences, write down your own

Can you think of any thing that people would consider a robot that doesn’t fit your definition?

Are there things that fit your definition that we wouldn’t consider to be a robot?

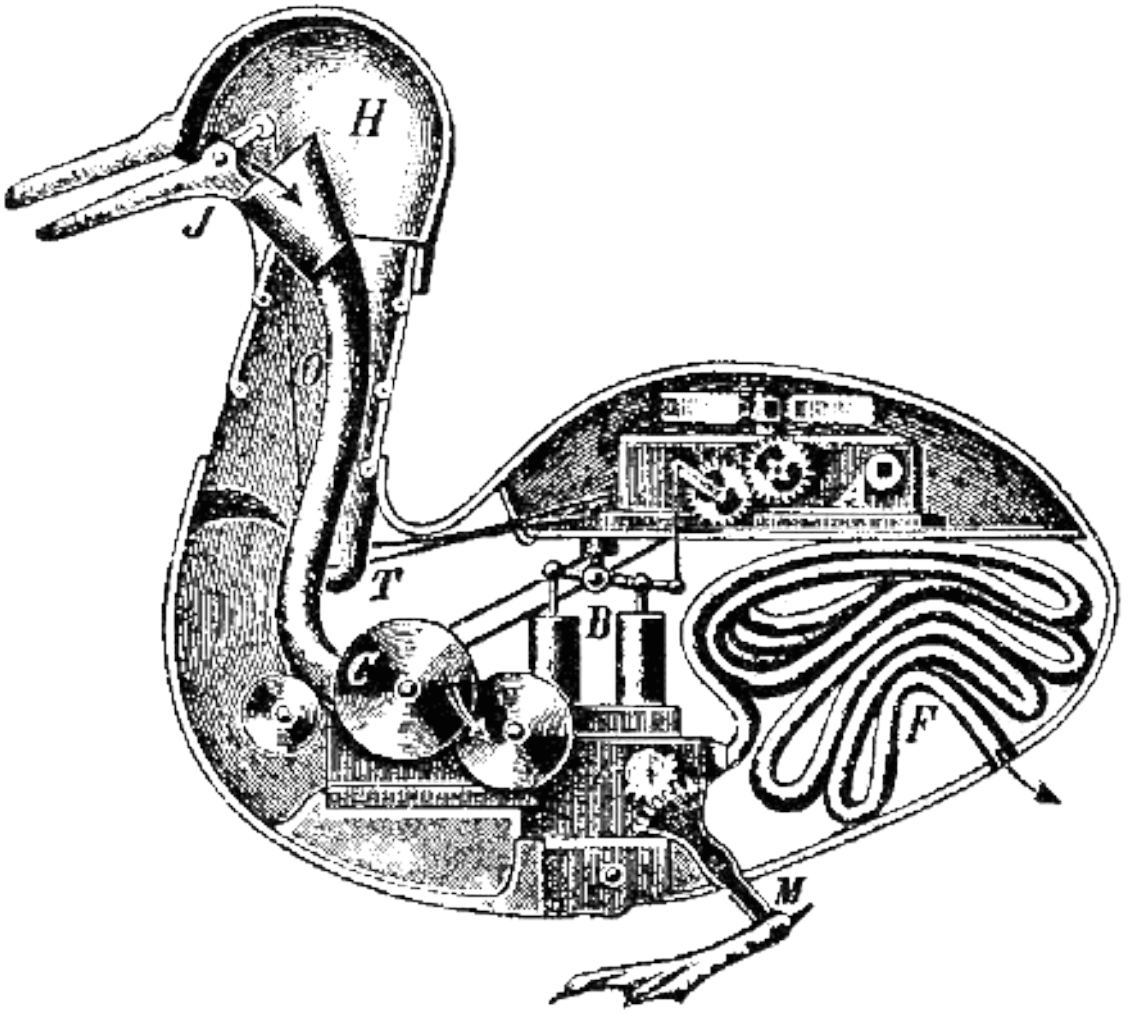
Definition

"re-programmable, multi-functional, manipulator designed to move material, parts, tools, or specialized devices through variable programmed motions for the performance of a variety of tasks"

– Robotics Industry Association (RIA)

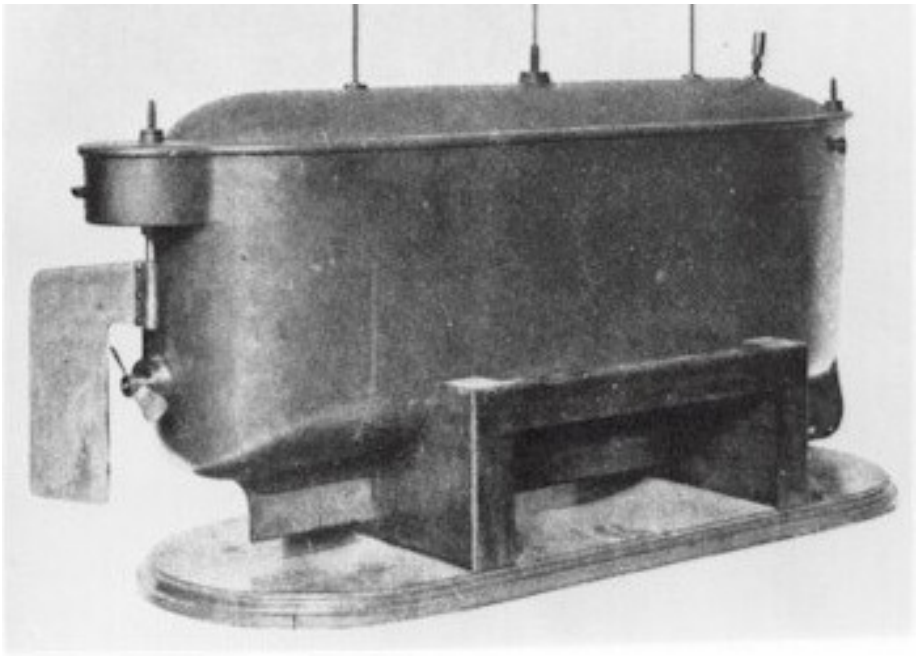
A Brief Timeline

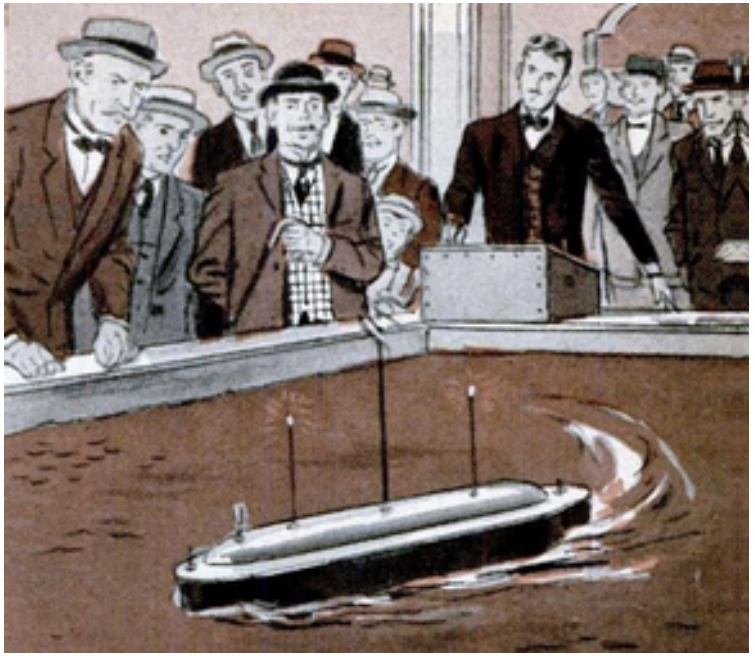
Mechanical Duck



[Jacques de Vaucanson (1709-1782)]

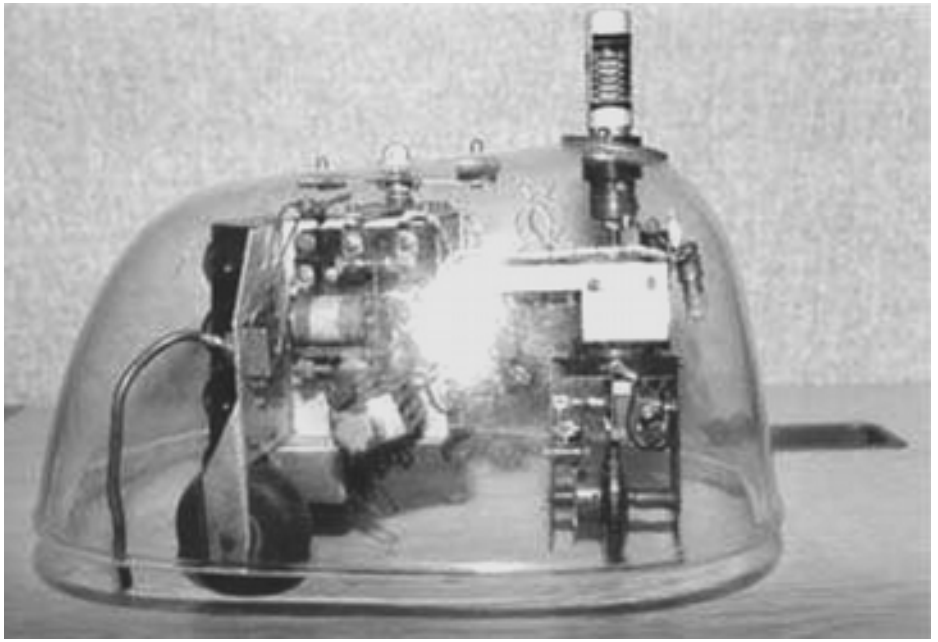
Radio-Controlled Submarine





[Nikola Tesla, 1898 (patent #613809)]

Walter's Turtle

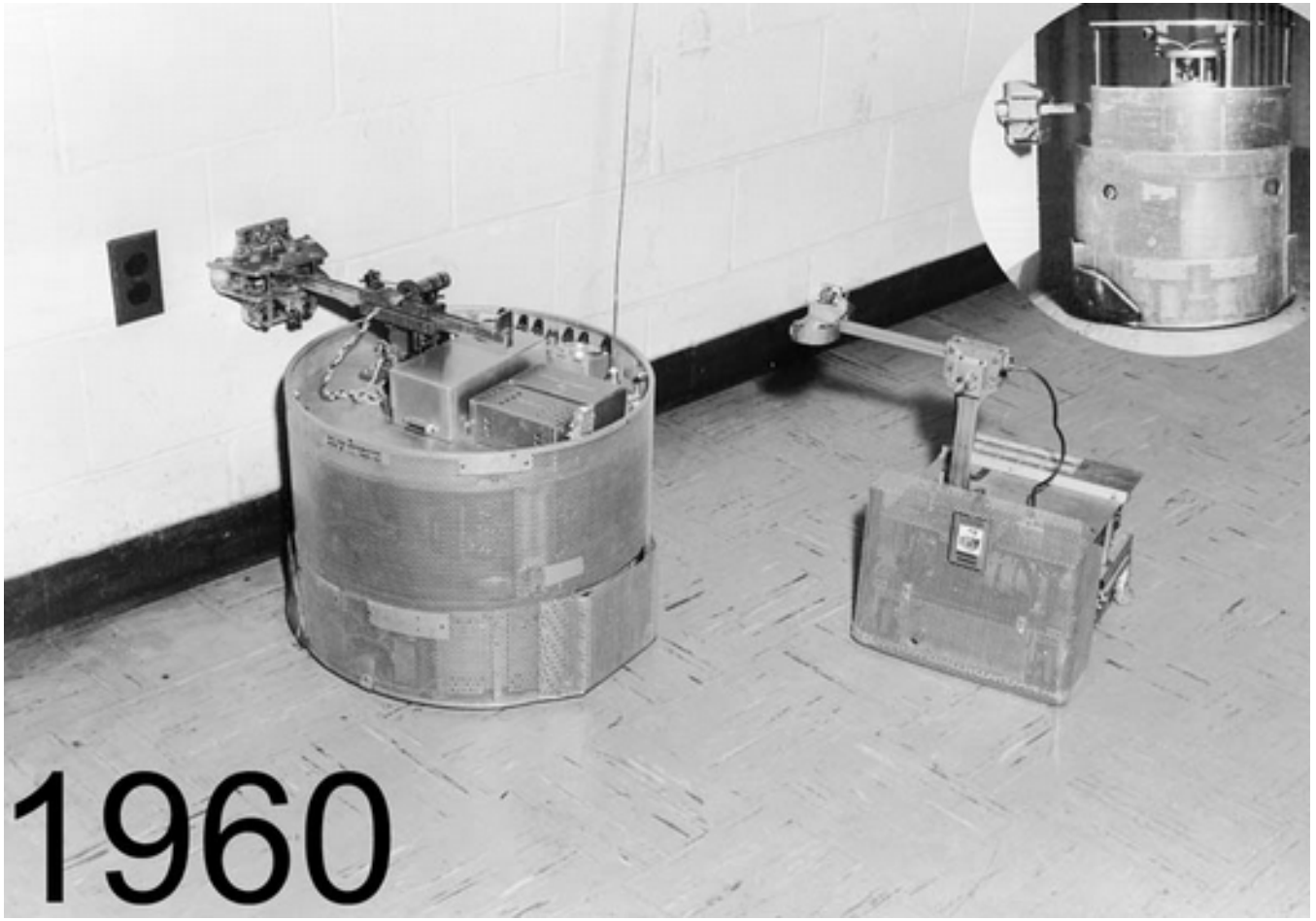


[Grey Walter, 1948-49]

Walter's Turtle

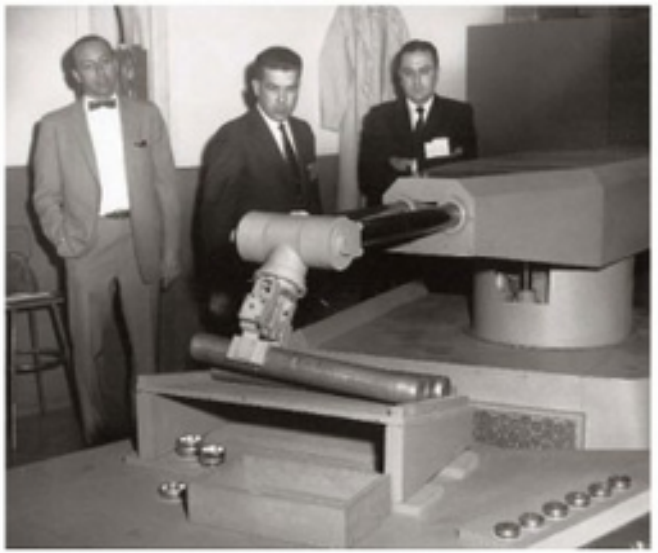
[BBC Report ~1949]

The “Beast”



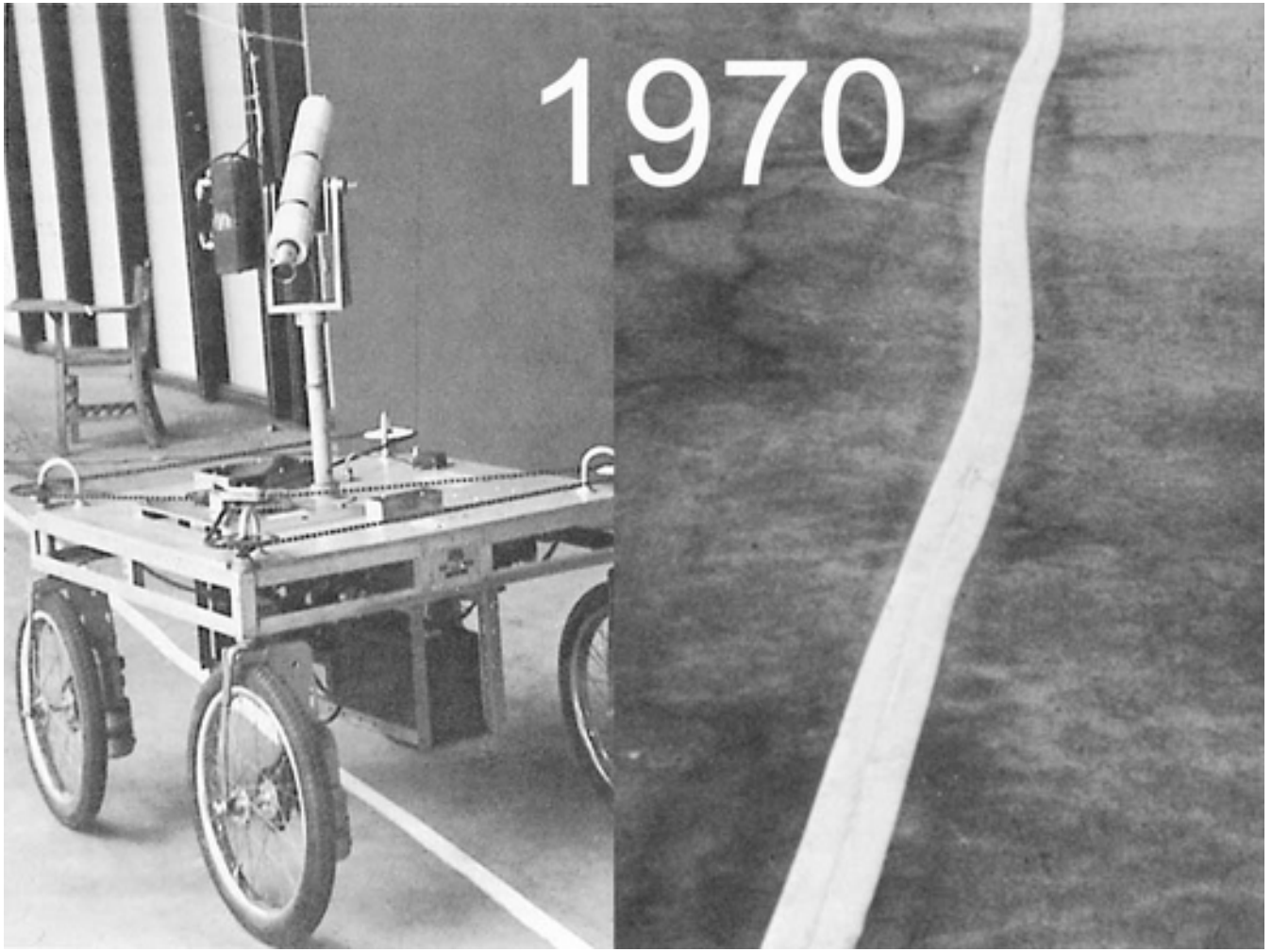
[John Hopkins University Applied Physics Lab]

First Industrial Robot



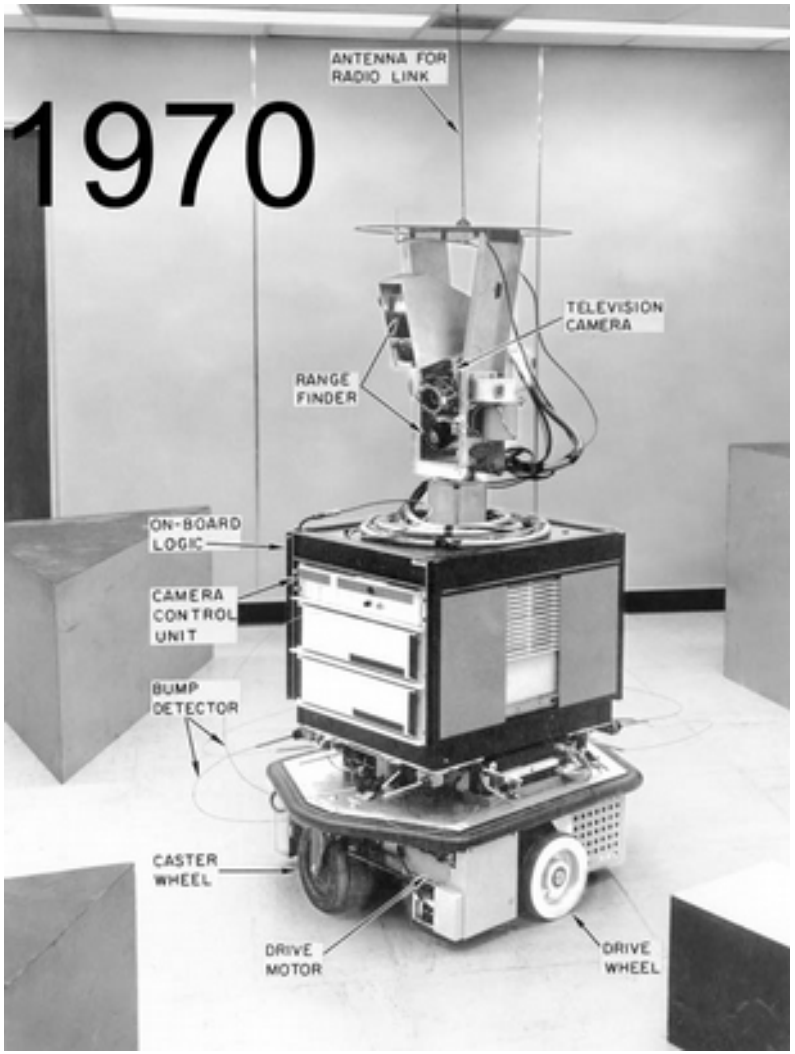
First Industrial Robot (~60s)

The Stanford Cart



[Stanford University, 1970]

Shakey

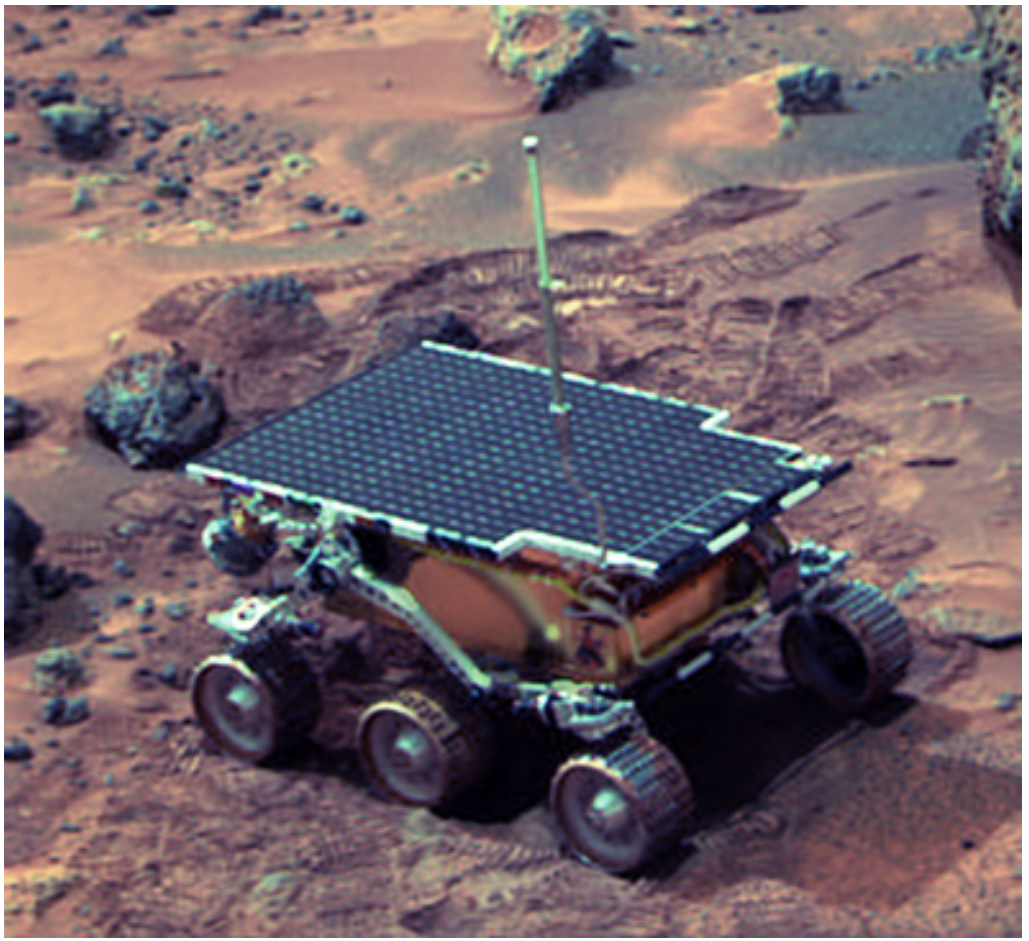


[Stanford Research Institute, 1970]

Genghis

[Rodney Brooks, MIT, 1989]

Sojourner



[NASA, 1997]

Minerva (late 90s)

Honda's Humanoids

1986 → 2011

[Honda, 1986-2011]

Honda's Humanoids

We're building a dream, one robot at a time.

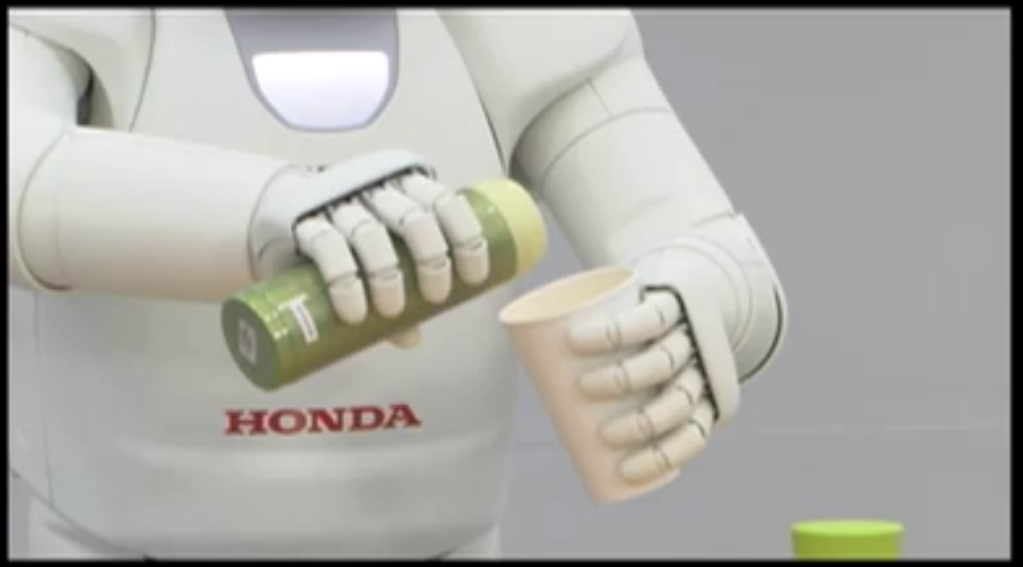
The dream was simple. Design a robot that, one day, could duplicate the complexities of human motion and actually help people. An easy task? Hardly. But after more than 15 years of research and development, the result is ASIMO, an advanced robot with unprecedented human-like abilities. ASIMO walks forward and backward, turns corners, and goes up and down stairs with ease. All with a remarkable sense of strength and balance.

The future of this exciting technology is even more promising. ASIMO has the potential to respond to simple voice commands, recognize faces, carry loads and even push wheeled objects. This means that, one day, ASIMO could be quite useful in some very important tasks. Like assisting the elderly, and even helping with household chores. In essence, ASIMO might serve as another set of eyes, ears and legs for all kinds of people in need.

All of this represents the steps we're taking to develop products that make our world a better place. And in ASIMO's case, it's a giant step in the right direction.

HONDA

The power of dreams.



腕と多指ハンドを使った作業
Performing tasks using arms and multi-fingered hands
ASIMO opens a lid/pours drink into a cup

Toyota's Attempt 20 years later...

Partner Robot

Toyota's
Human Support Robot

Sony's Robot Dog


Sony Legged Robot League 2004 in Lisbon
10 :00
FINAL
Goals
Robocup in Lisbon
July 5, 2004
GERMAN TEAM
0
0
SYDNEY

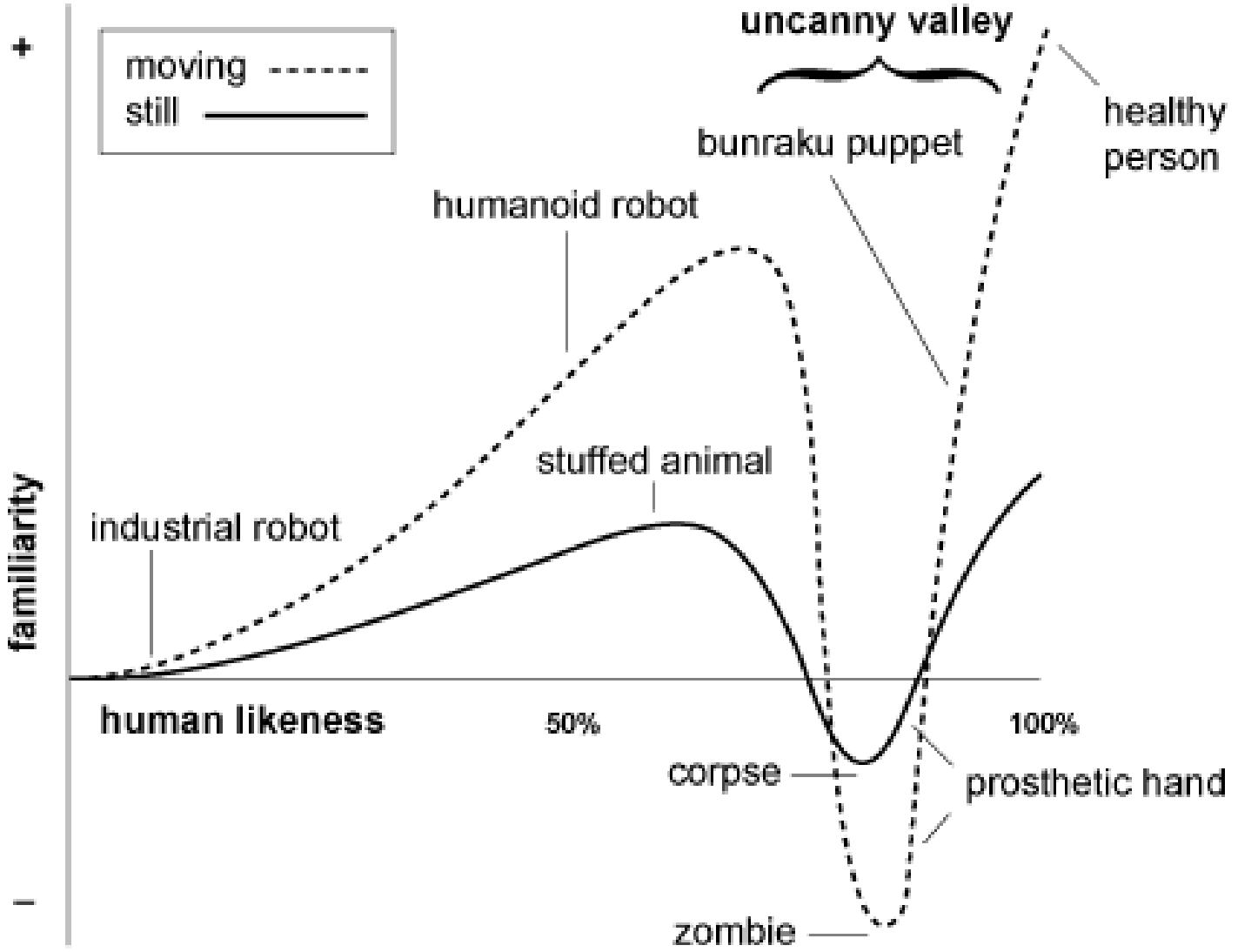
Androids

[Honda, 1986-2011]

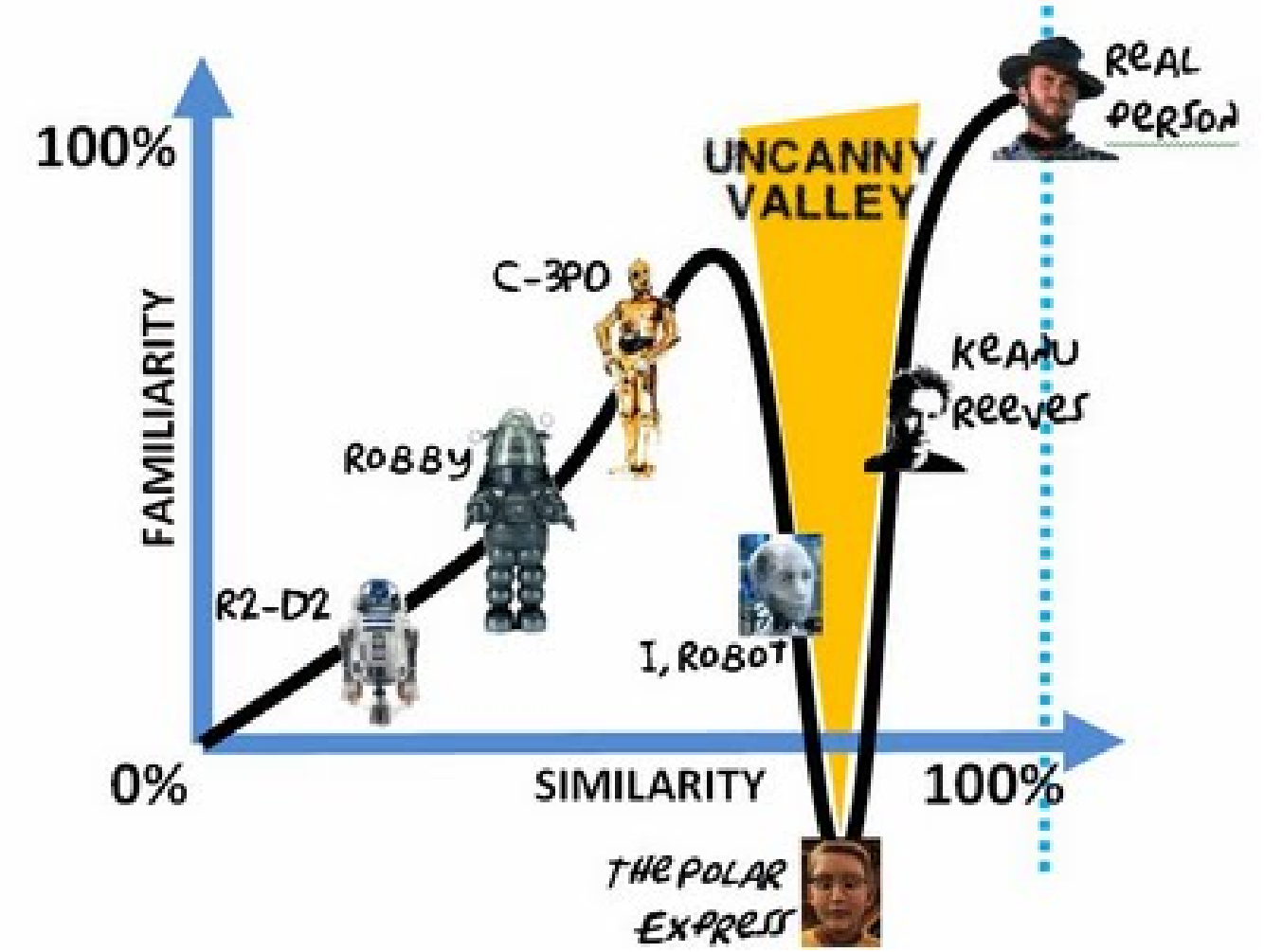

MADE IN JAPAN

Geminoid Summit

The Uncanny Valley

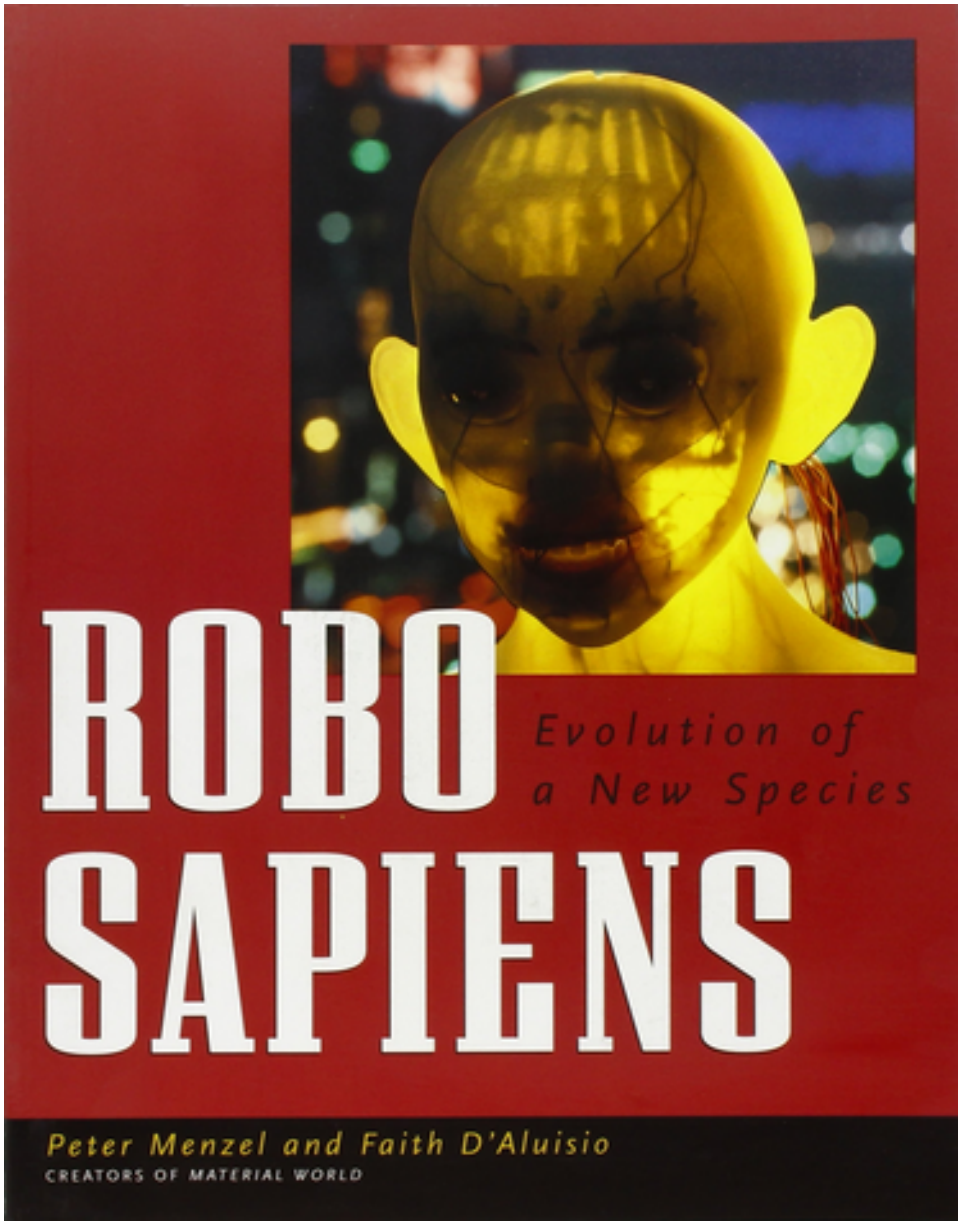


The Uncanny Valley



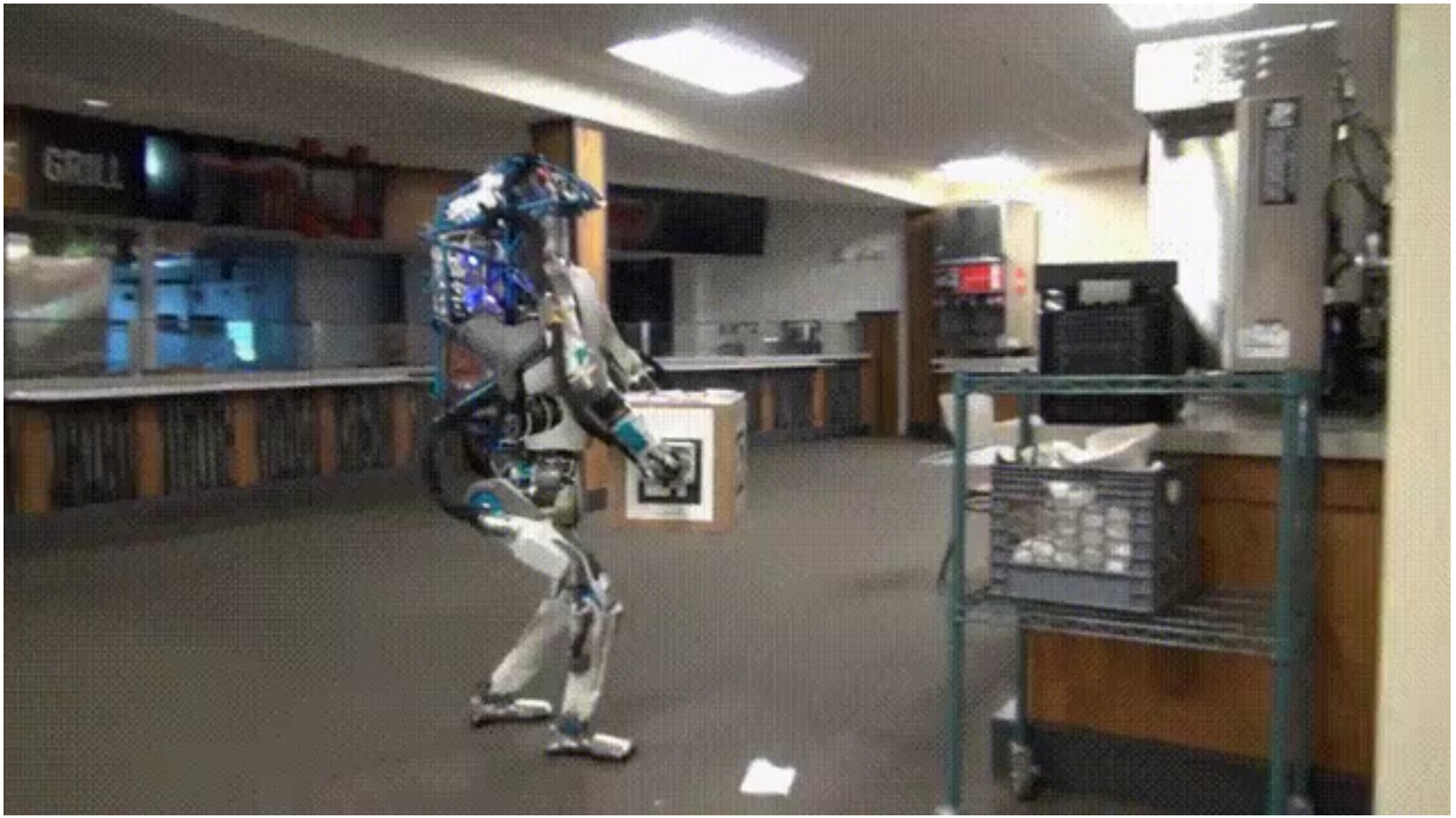

DIGITAL
CONTENT
EXPO


CONTENT
EXPO


ROBO SAPIENS
Evolution of a New Species
Peter Menzel and Faith D'Aluisio
CREATORS OF MATERIAL WORLD

Where are we now?

Where are we now?



Breakout #2

Next time...

- Sensor and Motion Models
- Kalman Filters for tracking
- ...