Introduction to intelligent robotics

Introduction

Organisation

Course : L.Wehenkel@ulg.ac.be
Project : nvecoven@uliege.be

Website:

http://renaud-detry.net/teaching/info0948/

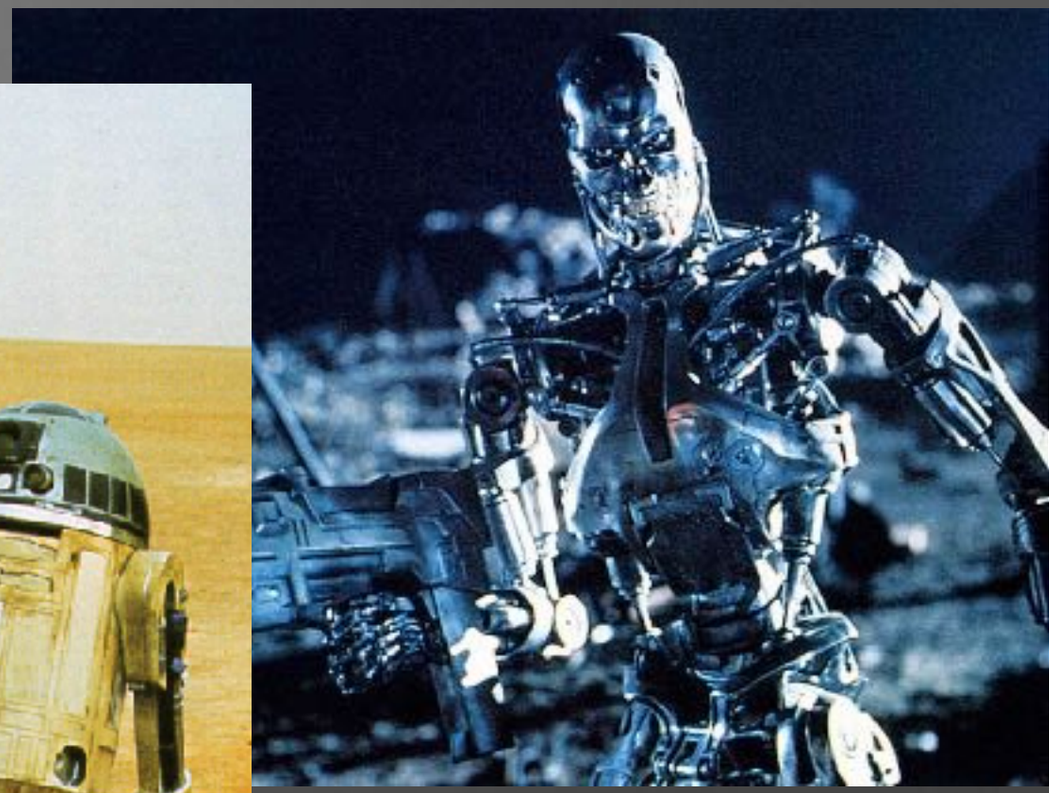
http://montefiore.ulg.ac.be/~nvecoven/ir/ir.html

Login: **student** / Password: **asimov**

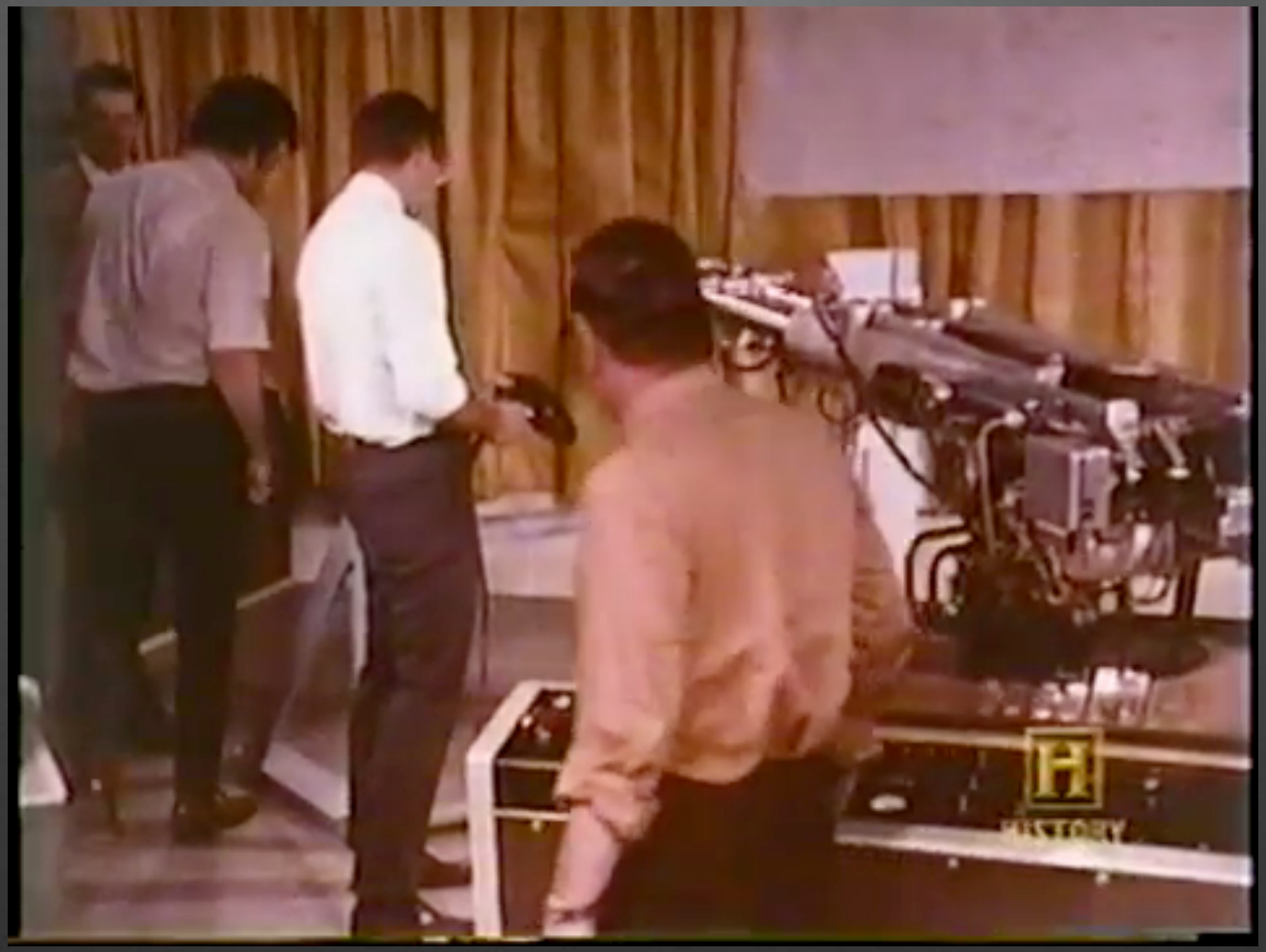
Today's plan

- Evolution of robotics
- What is missing ?
- Poses and 3D representations (after break)

Robots in our imagination



The first robot in history



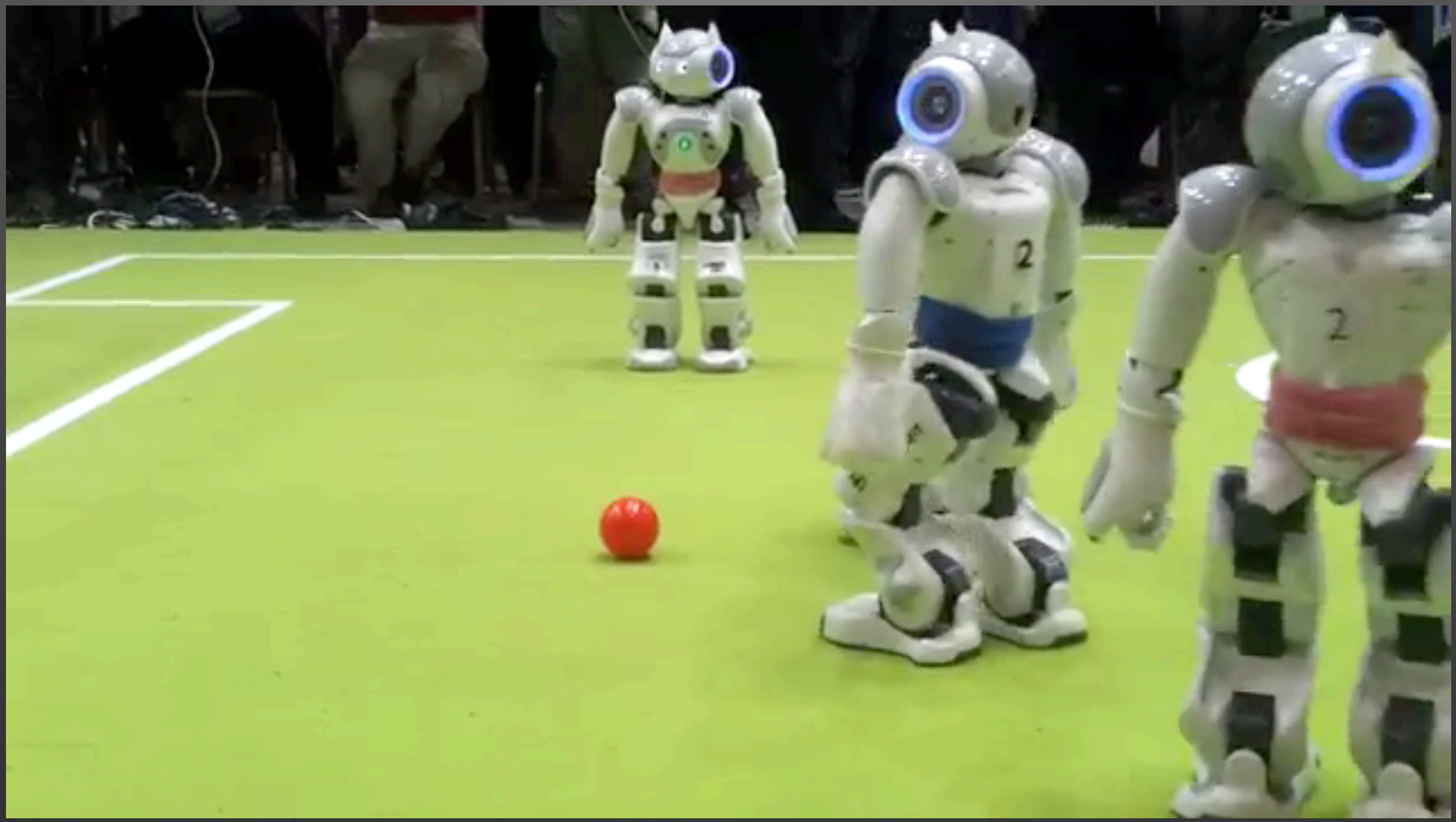
https://www.youtube.com/watch?v=eAb6cB-gklY

Robots nowadays

ASIMO


HARVARD
School of Engineering
and Applied Sciences
WYSS INSTITUTE

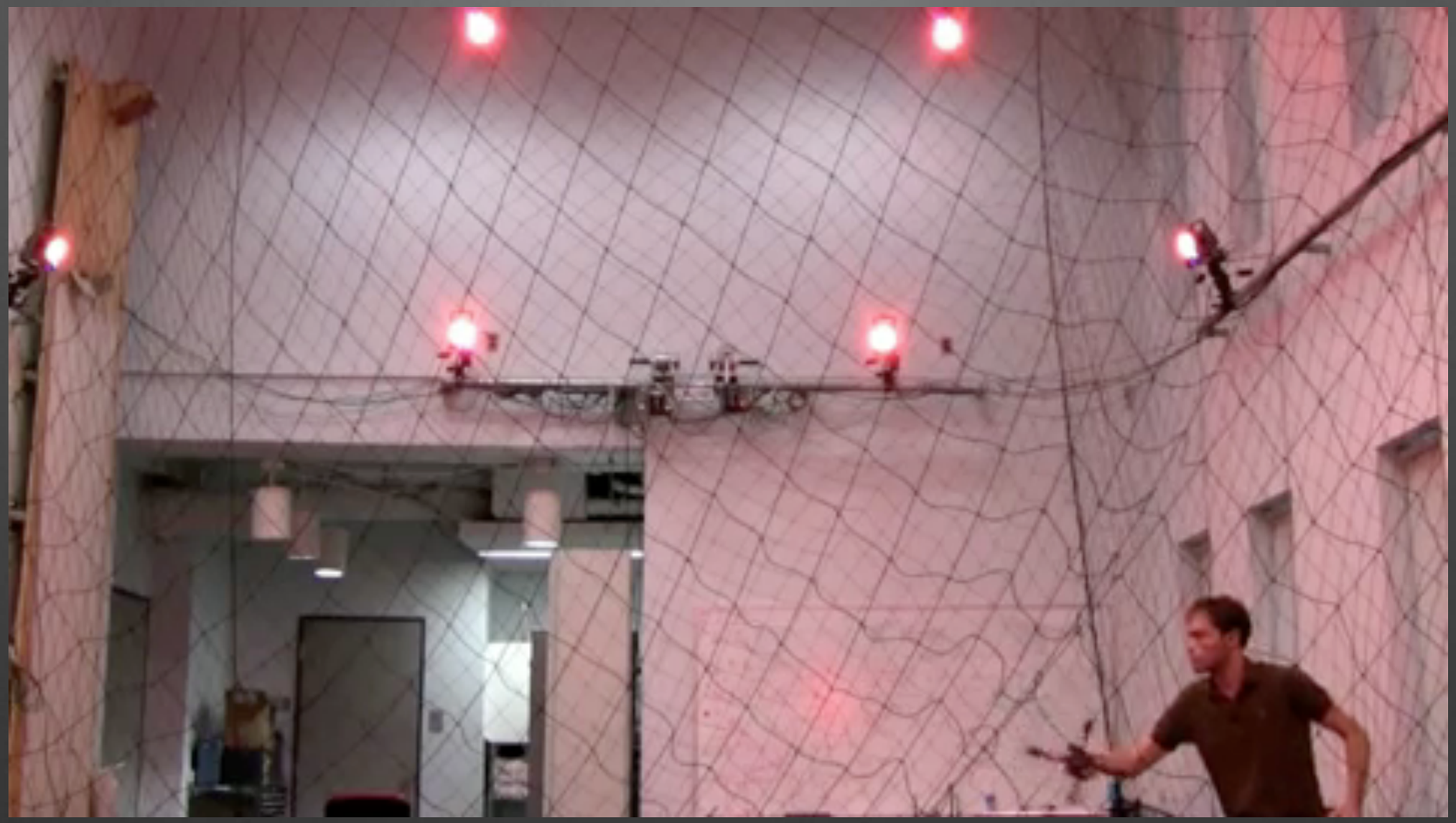
RoboCup



We have the technology to **build** humanoid robots. Why don't we see more of them in our everyday life?

Mainly, because to date, we do not have a generic way of creating motor skills. Motor skills need to be learned by the robot.

Table tennis learned by RL



Contents

Basics: SE(3) geometry, sensors, actuators, controllers, kinematics.

Mobile robots: Locomotion, localization, navigation, SLAM.

Arms and grippers: Reaching, grasping, grasp learning.

Computer Vision: Feature extraction (Edge, Harris), Fitting (Ransac, Hough), Tracking (Kalman, Nonparametric), Object recognition (PCA, probabilistic model)

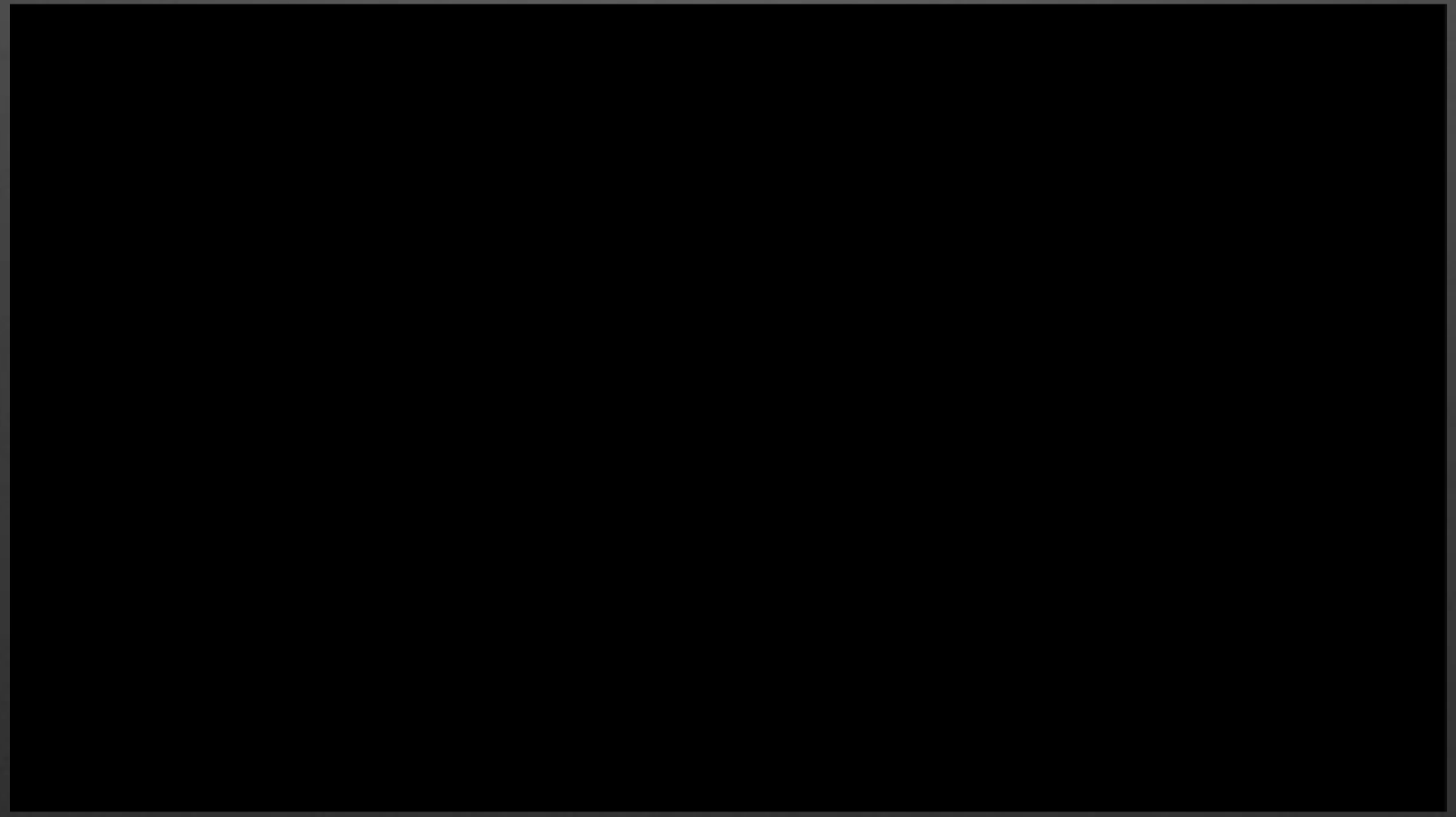
Objectives

At the end of the course, you will be able to solve the following problems:

1. Extract information from video streams.
2. Infer a useful behavior from sensory data (navigation and grasping)
3. Generate a set of robot commands that implement the desired behaviour

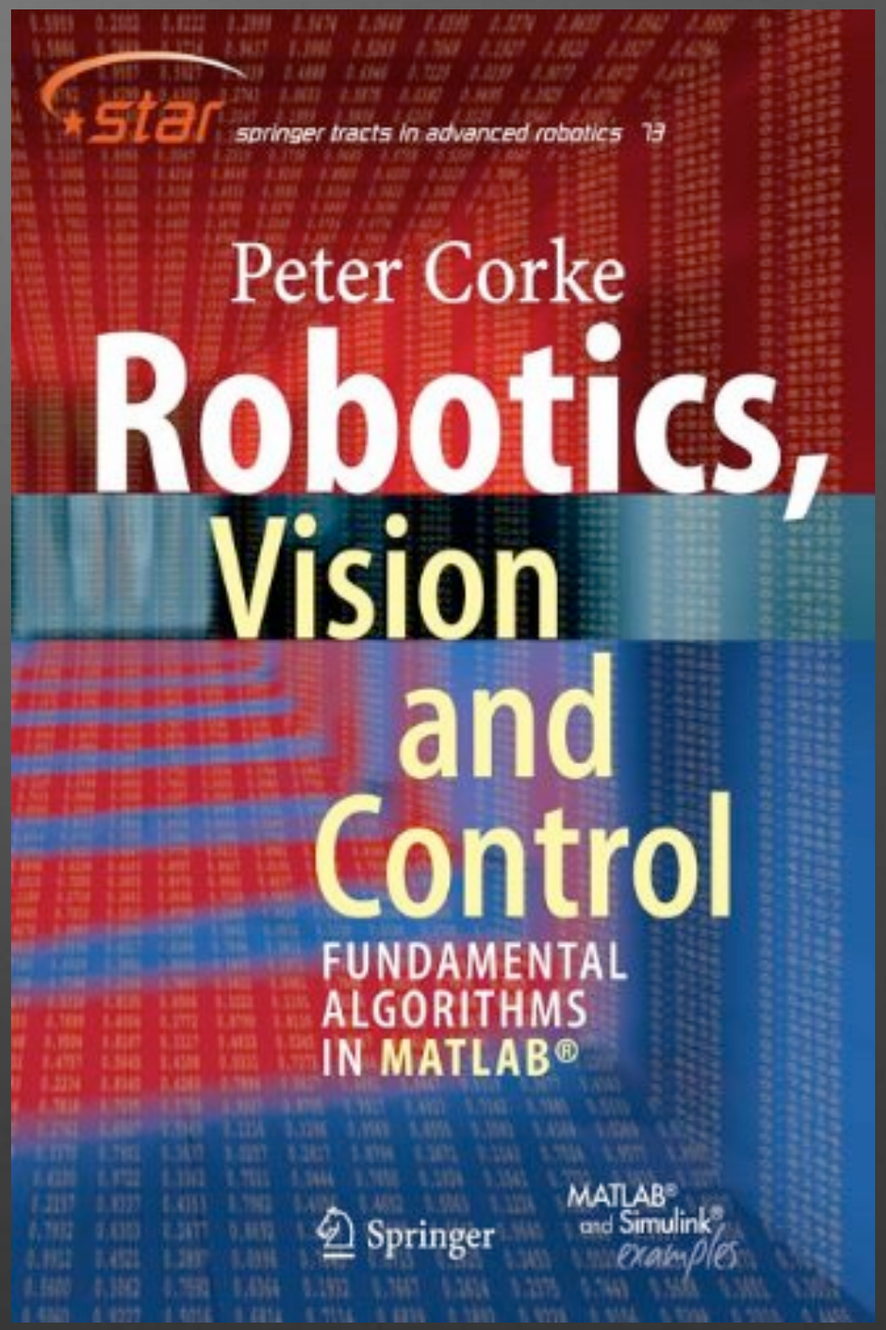
You will program a robotic agent that processes images, plans a task based on the image data, and executes a set of motor commands that complete the task.

The robot will be simulated in the V-REP simulator.



Book

The course is based on the book *Robotics, Vision and Control: Fundamental Algorithms in MATLAB*, by Peter Corke, published by Springer in 2011.



http://www.petercorke.com/RVC/

No Exam!

Group Project:

- Presentation 1: 25%
- Presentation 2: 75%

Plan

BREAK ?