MSc Thesis Projects @ BIASlab

Q3 2022-2023 and onwards

Wouter Nuijten 13-01-2023

Who are you?

- MSc student in Dept. of Electrical Engineering

- Passed/enrolled in Bayesian Machine Learning & Information Processing course

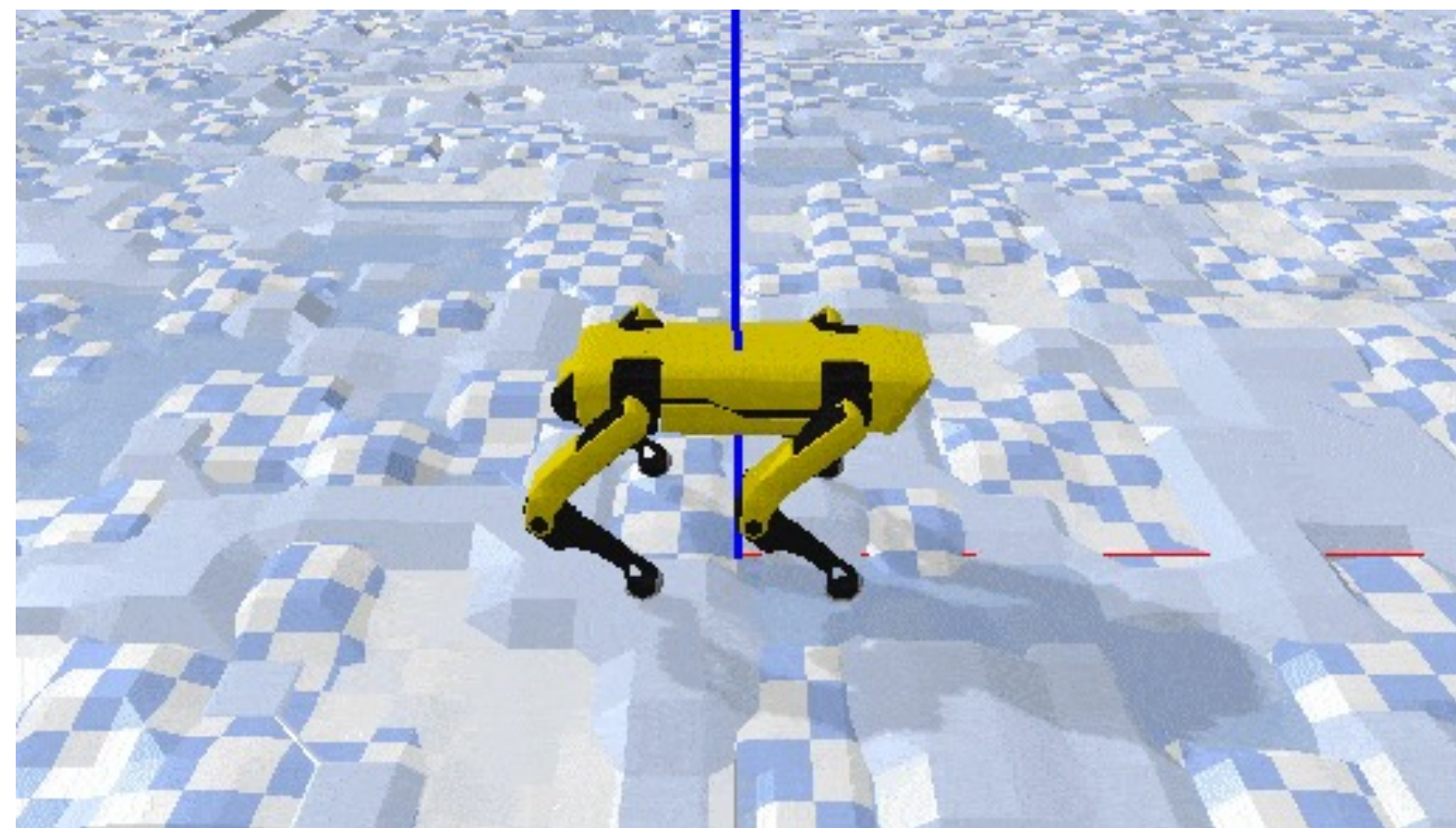- Happy with the course contents

Who are we?

BIASlab

- Research lab pushing the frontier in these methods

- Apply Bayesian Machine Learning/Active Inference to new problems.

AIF for SpotMicro Locomotion

- Develop intelligent agent controlling a quadrupedal robot

- Agent will learn to walk by interacting with environment

- (Theoretically) AIF should learn faster than Deep Reinforcement Learning

Drift Control in TwinScan Lithography
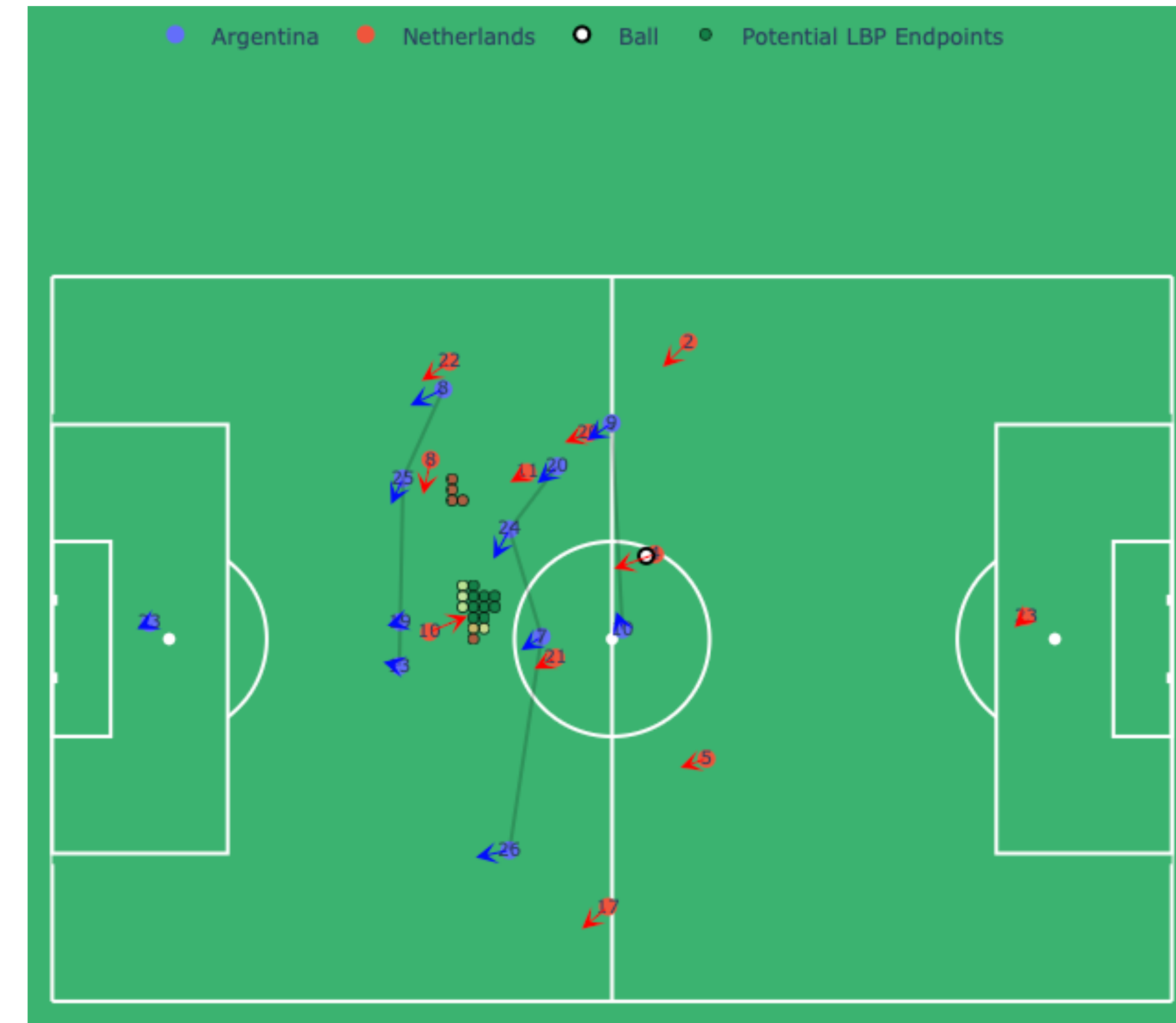## @ ASML

- Lithography systems need sub-nanometer accuracy, the systems drift

- Human experts intervene when the system needs correction

- Develop a drift controller using Machine Learning

- Develop a machine specific controller algorithm to minimize drift
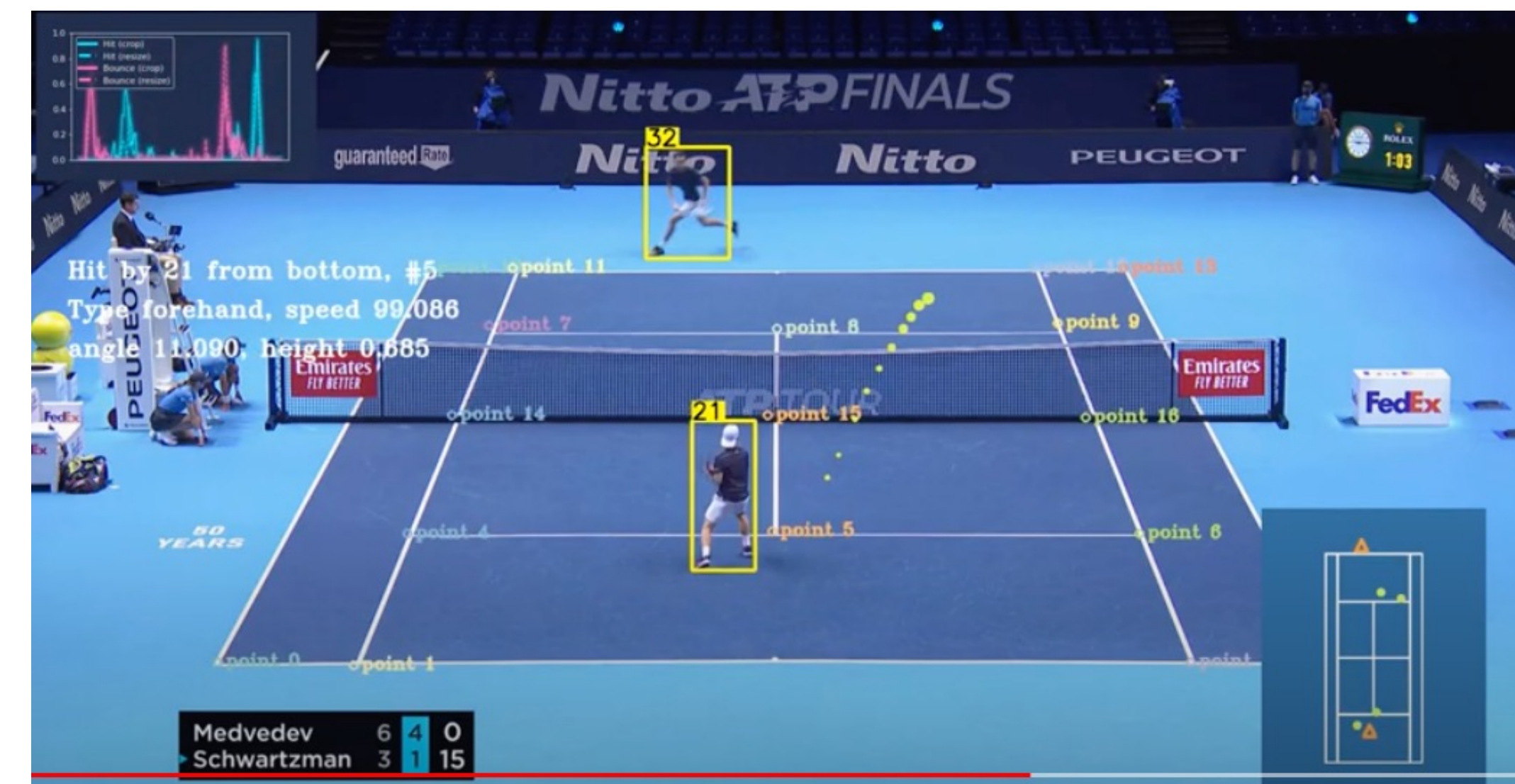
Winning the World Cup in 2026

w KNVB

- Cast tactical decisions/player choices as Bayesian inference problem

- Work with coaches of Dutch national team in order to improve field play

- Simulate player decisions and improve tactics

Improve your tennis skills

w TopTennis040
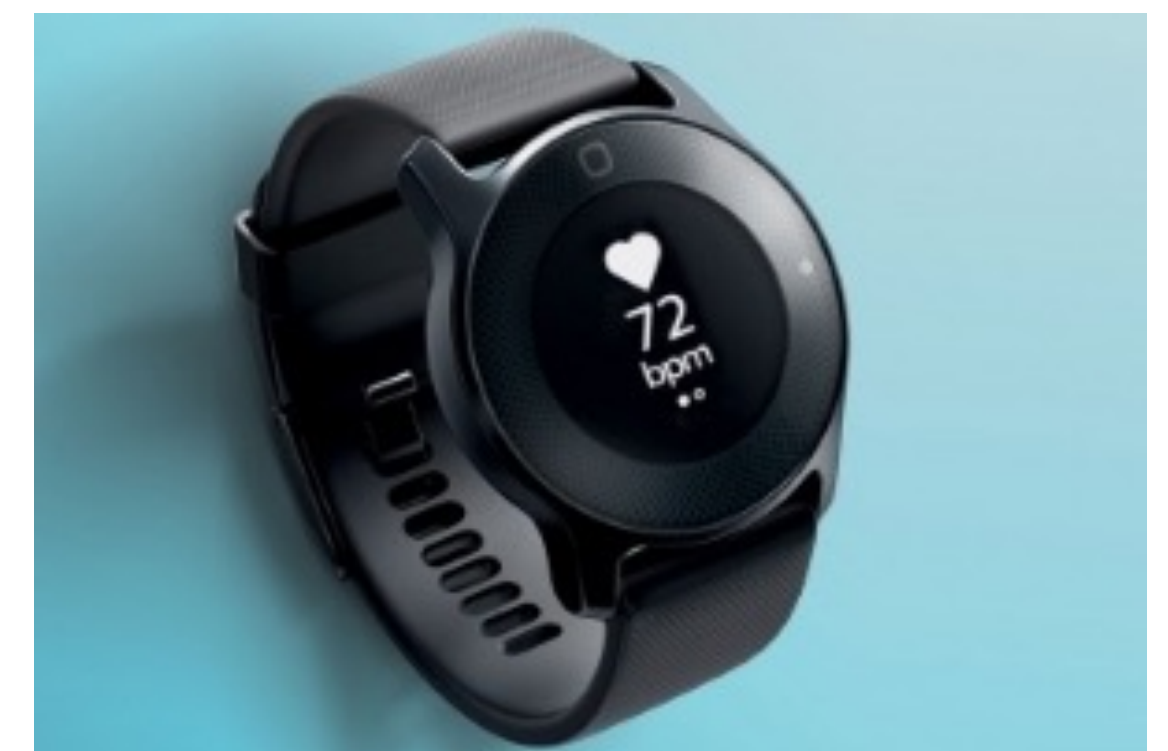
- Develop an Active Inference agent that controls a tennis cannon

- Link different sources of data together to simulate a real opponent

- Return the "perfect" practice shot to the player

- Learns weak points of player and plays this

Predict health condition

@ Philips

- Analyze smart watch data of post-surgical patients (heart rate, breath rate)

- Predict post-operative complications

- Use Active Inference to learn personalized health monitoring algorithms

Other projects

- master.ele.tue.nl for an overview of all available projects

- Own inspiration? Great! Let us know

- Discuss possible projects? Let me (w.w.l.nuijten@tue.nl) or Bert (bert.de.vries@tue.nl) know