



# PIR : MIXED-INITIATIVE MISSION

Thomas Vagneron

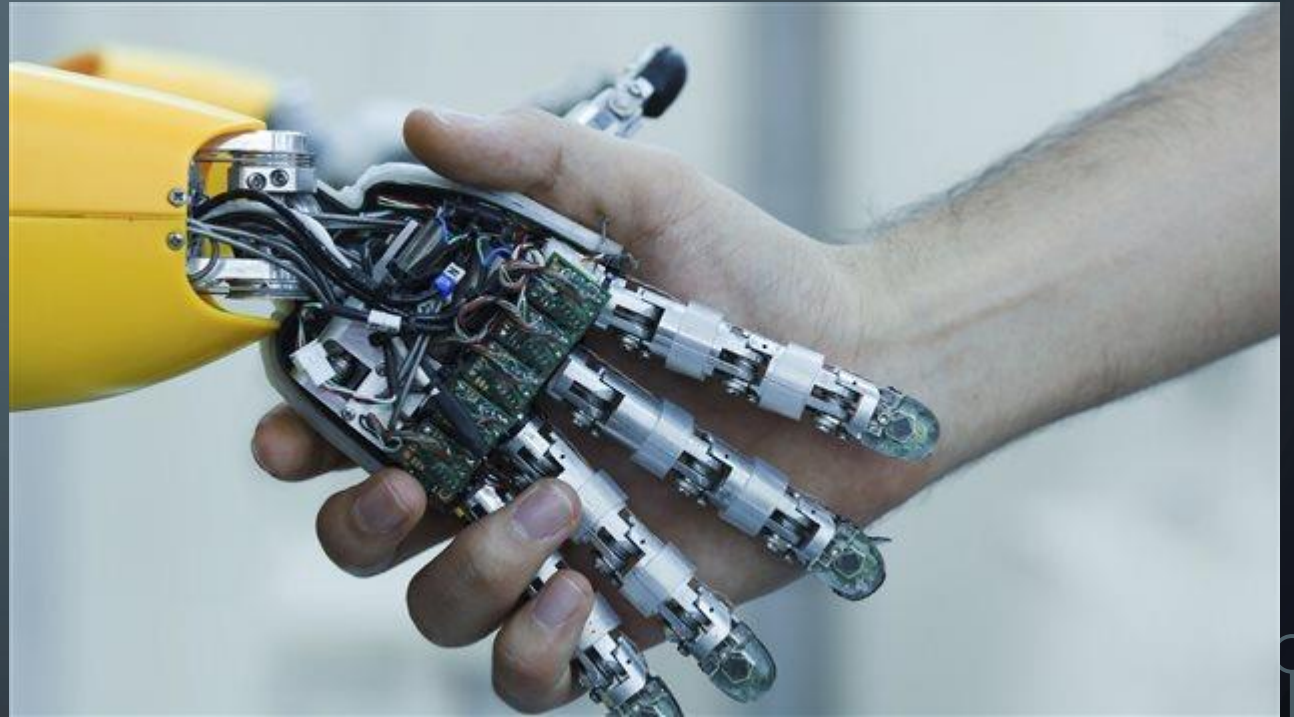
Nicolas Drougard  
Caroline P. Carvalho Chanel  
Raphaëlle N. Roy

# SUMMARY

- Introduction : What is a mixed-initiative mission?
- What is the problem?
- How are we responding to it?
- The project

# INTRODUCTION : WHAT IS A MIXED-INITIATIVE MISSION?

- Increasing autonomy of the robots
- Human and robots working together
- Optimize performance of a human-robot team for a given mission

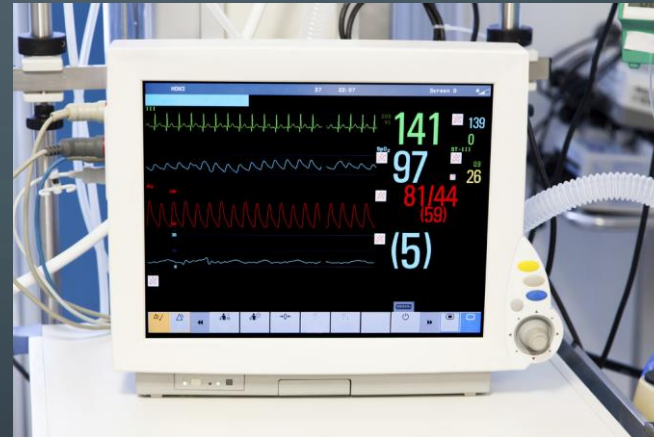


# WHAT IS THE PROBLEM?

- The operator : a supervisor
  - Asked to solve all the problems encountered by the robot
- But humans are fallible
  - Stress, panic, tunnelling, fatigue, boredom
- Weaknesses of the human operator may reduce performances of the team or produce fails

# HOW ARE WE RESPONDING TO IT?

- Integrate the human operator's state in the strategy of the robot
  - Observing the operator's states via a eye-tracker device and an electrocardiogram



- The optimized strategy of the robot consists of :
  - The function allocation (autonomous versus manual robot)
  - Optimized alarms (countermeasures)



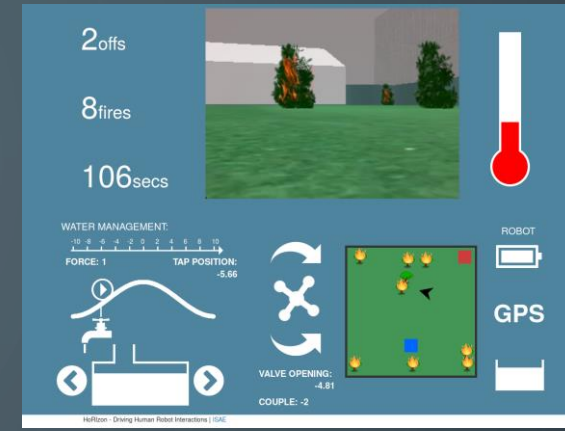
# THE PROJECT

Primary dataset from the internet site

States design (probabilistic dynamics of selected observable states of the process)

& hidden states design (cluster of human behaviors,...)

Improve



Graphical user interface of the experiments

POMDP model

Robot policy via reinforcement learning algorithm

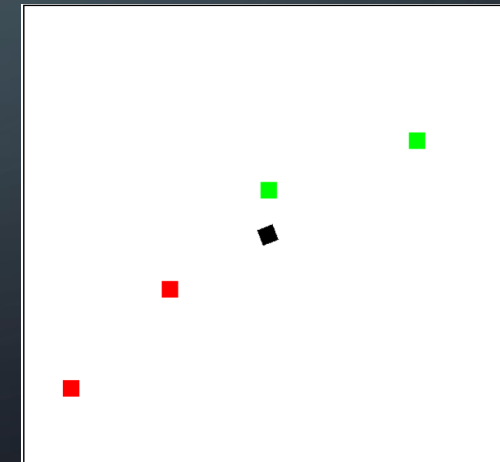
Possible actions

Probability of detecting the operator's state

Observation design

In situ experiments (design + validation)

Physiological observations



Simulation environment to test and scale RL algorithms