

# **Power Grid Use cases**

Al-centric use cases for power grids

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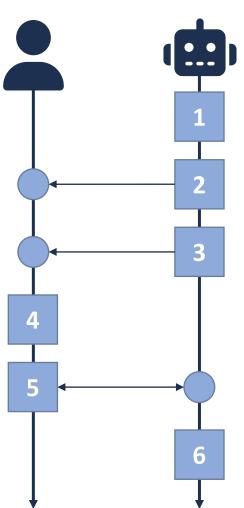






# **UC1/ Power Grid assistant**





The Al-assistant monitors the situation of the grid by using data from SCADA and EMS It categorizes issues by distinguishing the ones needing intervention by the human operator.

When anticipating issues requiring intervention, the Al-assistant raises alerts for decisions at the appropriate horizon to the human operator, in time for carrying out corresponding actions.

For a given alert, the human operator receives action recommendations from the AI-assistant Include information on predicted effect, and reasons for the decision

The human operator chooses a proposed recommendation, or requests new information or explanations, or looks for a different action via an exploration agent or manual simulations

The human operator performs needed actions according to his/her decision
The Al-assistant provides afterwards feedback to the human operators on the corresponding effects

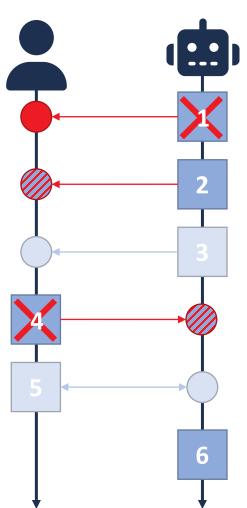
The decisions made are logged with their corresponding context Allows continuously learning and improvement of interactions between human operator and the AI-assistant





# UC2/ Sim2Real





The Al-assistant can't evaluate the need for action due to missing and bad quality data and can't determine any action recommendations

When anticipating issues requiring intervention, the AI-assistant raises alerts to the human operator. The AI assistant reflects the additional uncertainty due to noisy and partially missing data

For a given alert, the human operator receives action recommendations from the AI-assistant

The human operator can provide the AI assistant with additional information to help with assessing action recommendations

The human operator performs needed actions according to his/her decision

The difference between original context used by the AI-assistant and the enriched context are logged to continuously learn from realized actions and improve the robustness and novelty of recommendations





### **Overview of scenarios**



### **UC1** Power Grid assistant

**#UC1.1** Preventive & remedial actions in case of unplanned outage

**#UC1.2 AI assistant learns from** human operator

#UC1.3 Human operator learns from AI assistant

Use UC1.1 data, and change actions chosen by the operator

### **UC2 Sim2Real**

**#UC2.1 Adaptation to real-** world condition

Use UC1.1 data, and progressively alter data: introduce noise, replace data points by zero (or NaN)

#UC2.2 Additional information from human operator

Dedicated scenario data

Reuse of other scenarios' data

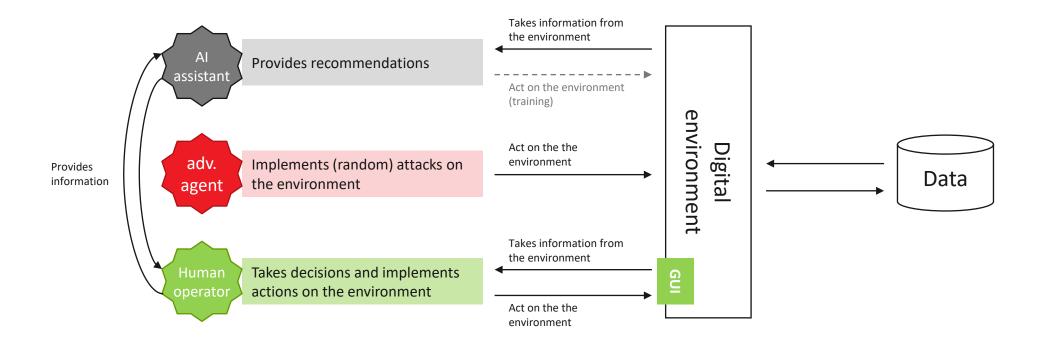
"nice to have" scenario





## **Actors - agents**











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