Multi-Agent System and Digital Twin Models for Security Study of Cyber-Physical System

Individual Plan
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Keywords: MAS, Digital Twins

1   Background & objective

The research work should provide the following outcomes:

- State of the art of most important security issues of cyber-physical systems;

- Development of a simple model for security analysis of Cyber-Physical systems using Digital Twins and Multi-Agent Systems, in a combined way;

- Experimental analysis and evaluation of the proposed model by simulation

During the thesis work, I will provide preliminary results to the research questions bellow such as highlighting main features of both models with regards to a security study.

2   Research question & method

2.1   Questions

The aim of this internship project is to investigate three research questions:

1. What are the interesting features of both digital twins and multi-agent systems for studying security of cyber-physical systems?

2. How could digital twins and multi-agent systems be combined to offer a better support for a security study of cyber-physical systems?

3. What security claims of a system can be made from integrating multi-agent systems and digital twins?

2.2   Objectives

From the three questions above, we can derive these objectives:

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2.3   Tasks

Here are the tasks we will have to do to reach our objectives:

2.4   Method

2.5   Ethics and Sustainability

2.6   Limitations

Both definitions of Multi-Agent systems and Digital Twins does not have a consensus on their definition. I will have to choose one that could limit the set of possible interpretations of these two concepts.

2.7   Risks

Falling behind schedule on the state of the art.

3   Evaluation & news value

Peer-review? Feedback meetings?
  Personne.

4   Pre-study

DT, SMA, most important security issues of cyber-physical systems
  Lab preliminary ressources, gscholar.
  cf zotero ?

5   Condition & schedule

Computers, internet, zotero, MESA

- Setting up the project: 2 weeks

- State of the art: 1 month

- Personal contribution: 3 months

- Personal contribution writing refining: 3 weeks

A regular supervision will be done on the basis of weekly meetings and additional meetings if needed in which I will present the work in progress which will be analysed by the supervising team.

6   References

List references, including information Authors, Title, Journal/Book/Conference/Website, Publication date