

Intelligent User Interaction in the Internet of Things

PhD Candidate:

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1. Introduction

Nowadays, end users can personalize the joint behavior of their **connected entities**, i.e., smart devices and online services, by means of **IF-THEN rules**. The increasing complexity of the IoT ecosystem, however, raises new challenges, and makes trigger-action programming a **complex** task.

2. Goal

Exploring new approaches in the field of **Human Computer Interaction** able to assist end users in **personalizing** their own connected entities. The aim is to simplify:

- the **definition** of IF-THEN rules
- the **discoverability** of new functionality
- the **debugging** of IF-THEN rules

3. Definition

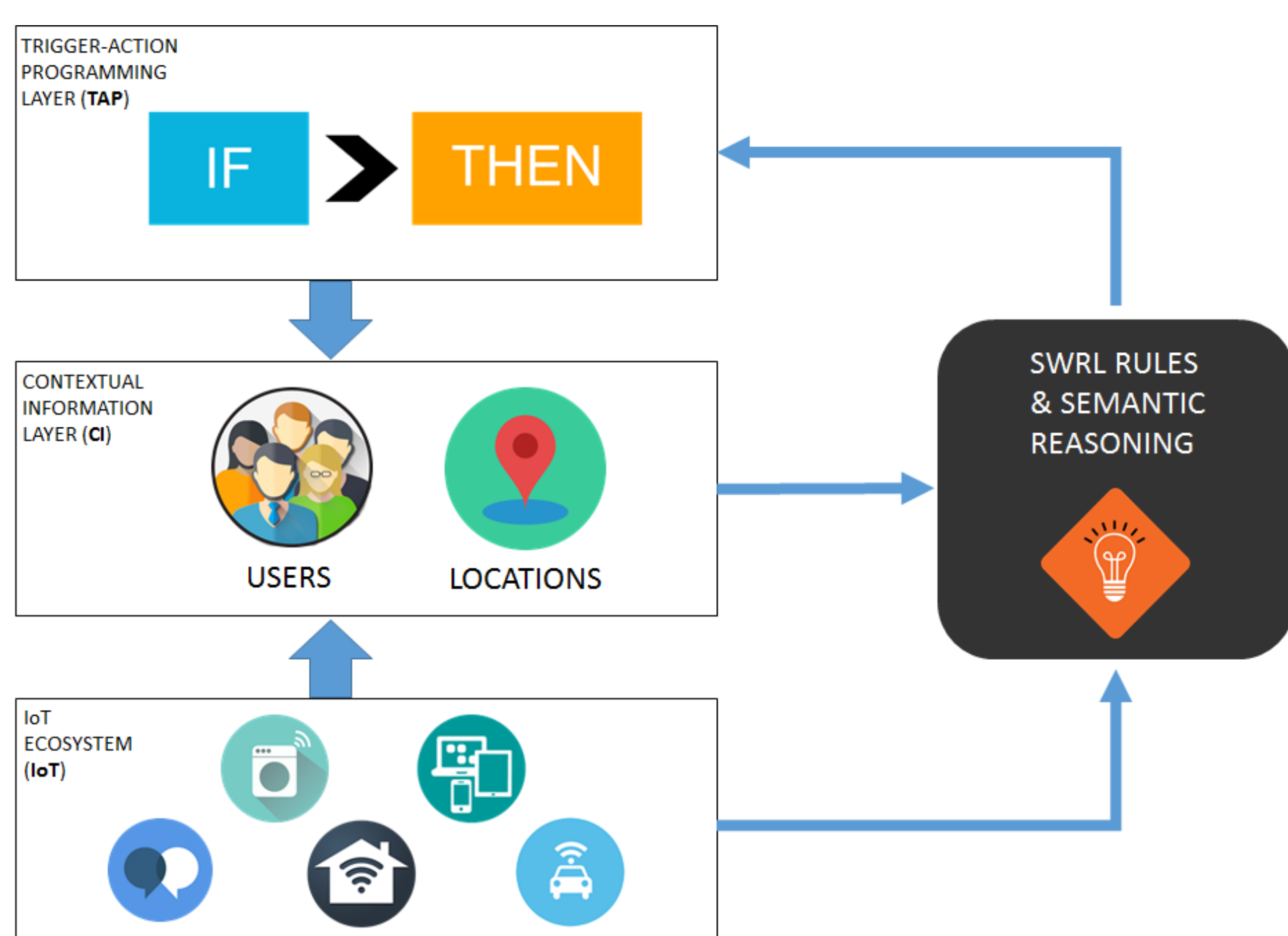


Fig. 1: The EUPont Architecture

EUPont [1] is an ontology that models abstract and technology independent IF-THEN rules that can be adapted to different contextual situations. **Results** show that EUPont improve the rule composition process by reducing time and errors.

4. Discoverability

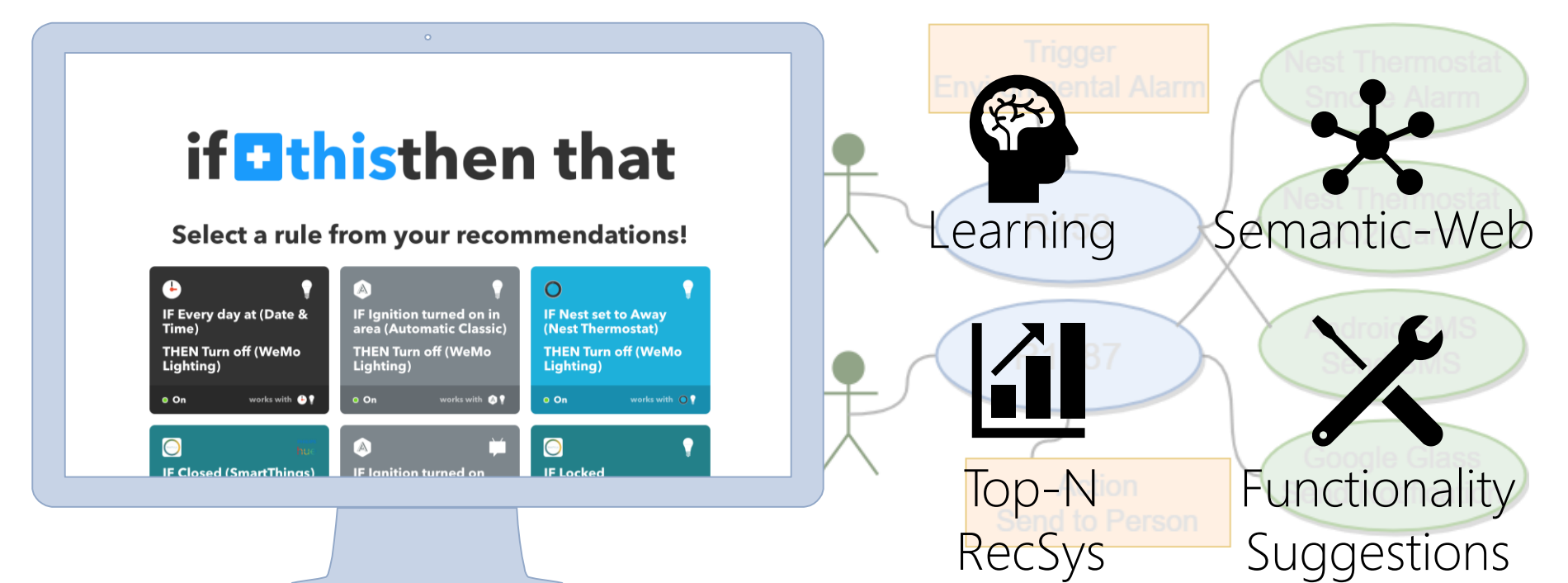


Fig. 2: An overview of RecRules

RecRules [2] is a hybrid and semantic recommender system that suggests IF-THEN rules on the basis of their final functionality, thus abstracting details like brands and manufacturers. **Results** show that RecRules outperforms state-of-the art algorithms.

5. Debugging

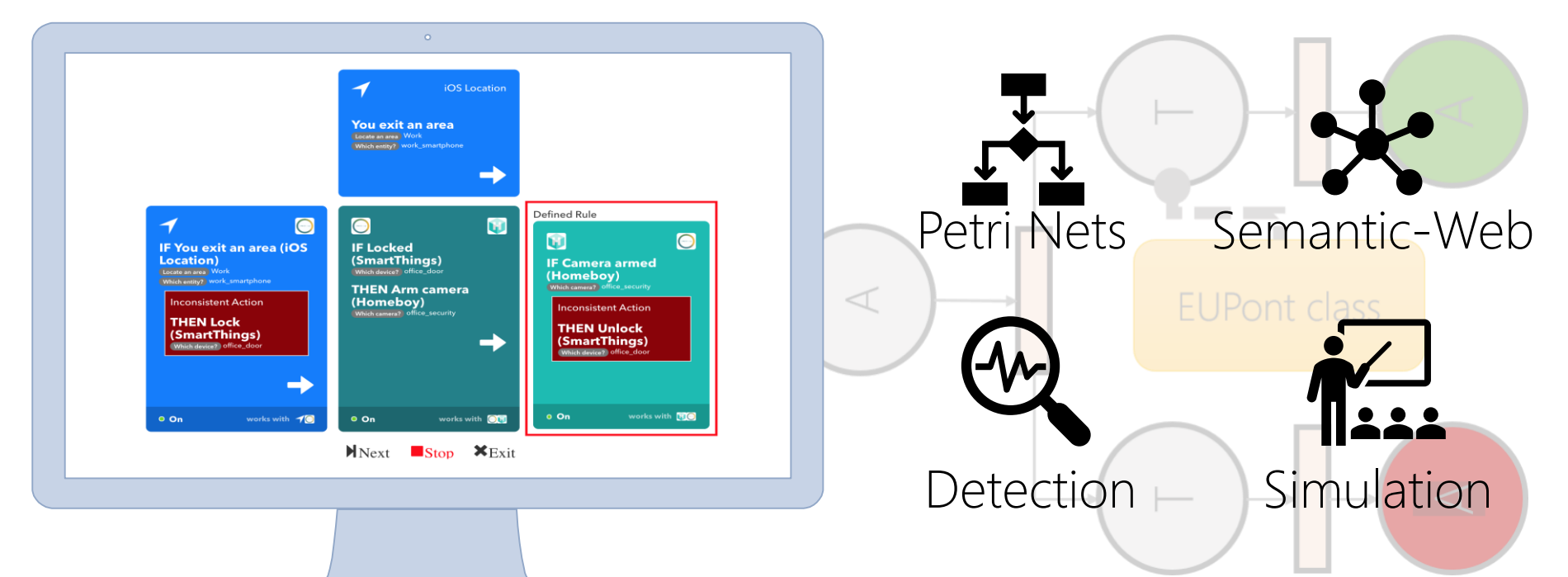


Fig. 2: An overview of EUPont

EUPont [3] is a tool to detect and simulate conflicts between IF-THEN rules at composition time. It uses a novel formalism based on Petri Nets and Semantic Web. **Results** show that EUPont helps users identify and understand rules conflicts.

6. References

1. F. Corno, L. De Russis, A. Monge Roffarello, "A High-Level Semantic Approach to End-User Development in the Internet of Things", 2019, International Journal of Human-Computer Studies.
2. F. Corno, L. De Russis, A. Monge Roffarello, "RecRules: Recommending IF-THEN Rules for End-User Development", 2019, ACM Transaction on Intelligent Systems and Technology.
3. F. Corno, L. De Russis, Alberto Monge Roffarello, "Empowering End Users in Debugging Trigger-Action Rules", 2019, Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems.