IEEE RAS/SA 7007 - Ontological Standard for Ethically Driven Robotics and Automation Systems

Sandro Rama Fiorini
Vice-Chair
srfiorini@ieee.org

Some slides by **Prof. Edson Prestes (Chair)**

IEEE SA / RAS P7007- Ontological Standard for Ethically Driven Robotics and Automation Systems

http://standards.ieee.org/develop/project/7007.html

Scope: The standard establishes a set of ontologies with different abstraction levels that contain concepts, definitions and axioms which are necessary to establish ethically driven methodologies for the design of Robots and Automation Systems.

Purpose : The standard establishes **a set of definitions and their relationships** that will enable the development of Robotics and Automation Systems in accordance with worldwide Ethics and Moral theories, with a particular emphasis on aligning the ethics and engineering communities to understand how to pragmatically design and implement these systems in unison. These definitions allow for a precise communication among global experts of different domains that includes Robotics, Automation and Ethics

Ontological Standards

- Ontologies are information artifacts that represent consensual knowledge in an explicit and formal way.
- Very good tool standardization initiatives: formalize the consensus around a specific domain.
- Main uses:
  - Vocabulary disambiguation among groups of humans, robots, and other groups of agents that share the same conceptualization.
  - Conceptual model (e.g. in databases).
  - Symbolic model to support different forms of reasoning

What an ontology for Robot Ethics should define?

✗ What *is* ethical or not ethical.

✓ What we mean when we say
that something is ethical or not ethical.

It should provide answers to:

- What does it mean to say that a robot is unethical?
- What is an ethical issue?
- What is an ethical theory?
- What is a norm? What are its elements?
- What it means to say that a robot violates a norm?
- How robot action and design conforms to norms?
- What are the contextual elements of a ethical action?
- ...

IEEE SA / RAS P7007- Ontological Standard for Ethically Driven Robotics and Automation Systems

http://standards.ieee.org/develop/project/7007.html

Group Expectation

"Our standard should be used as guide to the design, development and operation of products and services related robots and robotic systems with respect to ethics. It should help decision makers and robot designers to address ethical issues regarding user experience, safety, data protection, data privacy and transparency"

Possible use

- a guide for teaching ethical design;
- a reference by policy makers and governments to draft AI related policies;
- a common vocabulary to enable the communication among government agencies and other professional bodies around the world;
- part of decision making during investment in companies and technologies;
- a framework to create systems that can act ethically;

Stakeholders: Manufacturers, service and solution providers, equipment suppliers in the robotics and users.

IEEE SA / RAS P7007- Ontological Standard for Ethically Driven Robotics and Automation Systems

http://standards.ieee.org/develop/project/7007.html

Currently, our group more than **120 members** from

Brazil, Portugal, USA, United Kingdom, Hungary, Italy, Norway, Canada, Spain, France, Greece, Switzerland, Germany, Spain, Sweden, Nederland, Malaysia, China, Egypt, Bangladesh, Israel

Main sub-groups

- **Robot Ethics KR SG**: This subgroup will review the theoretical aspects that characterize ethics in R&A and propose models to represent them. It is the main ontology group;

- **Ethical Robot Design SG**: This subgroup will produce guidelines and models to take into account ethical concerns in general robot design, from simple automatons to highly autonomous systems;

- **Ethical Violation Management SG**: This subgroup will produce a set of guidelines and models to assess and correct ethical violations in robot behavior. This might also include aspects regarding transparency, accountability and responsibility.

IEEE SA / RAS P7007- Ontological Standard for Ethically Driven Robotics and Automation Systems

http://standards.ieee.org/develop/project/7007.html

Transversal Subgroups

Transparency : guidelines and models to regulate transparency in robots.

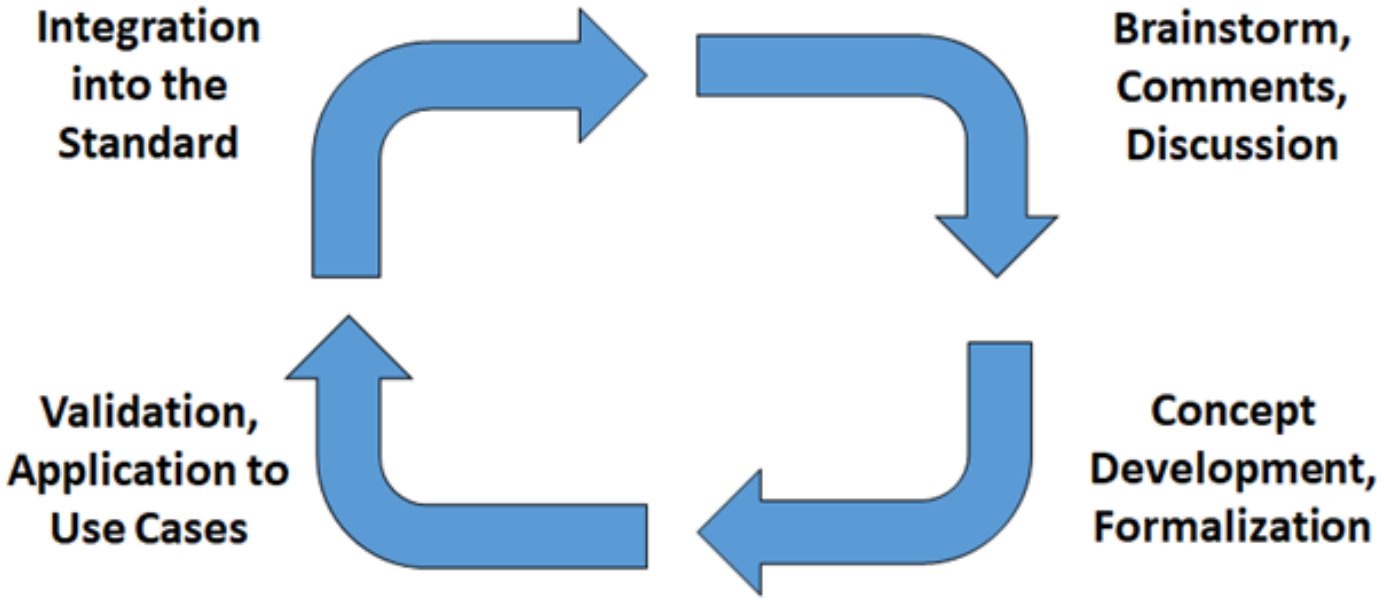
Data privacy and protection: guidelines and models to regulate data privacy and protection in robots.

Full Moral Robots: guidelines and models to design and operate robots which actively adapt their behavior according ethical notions.

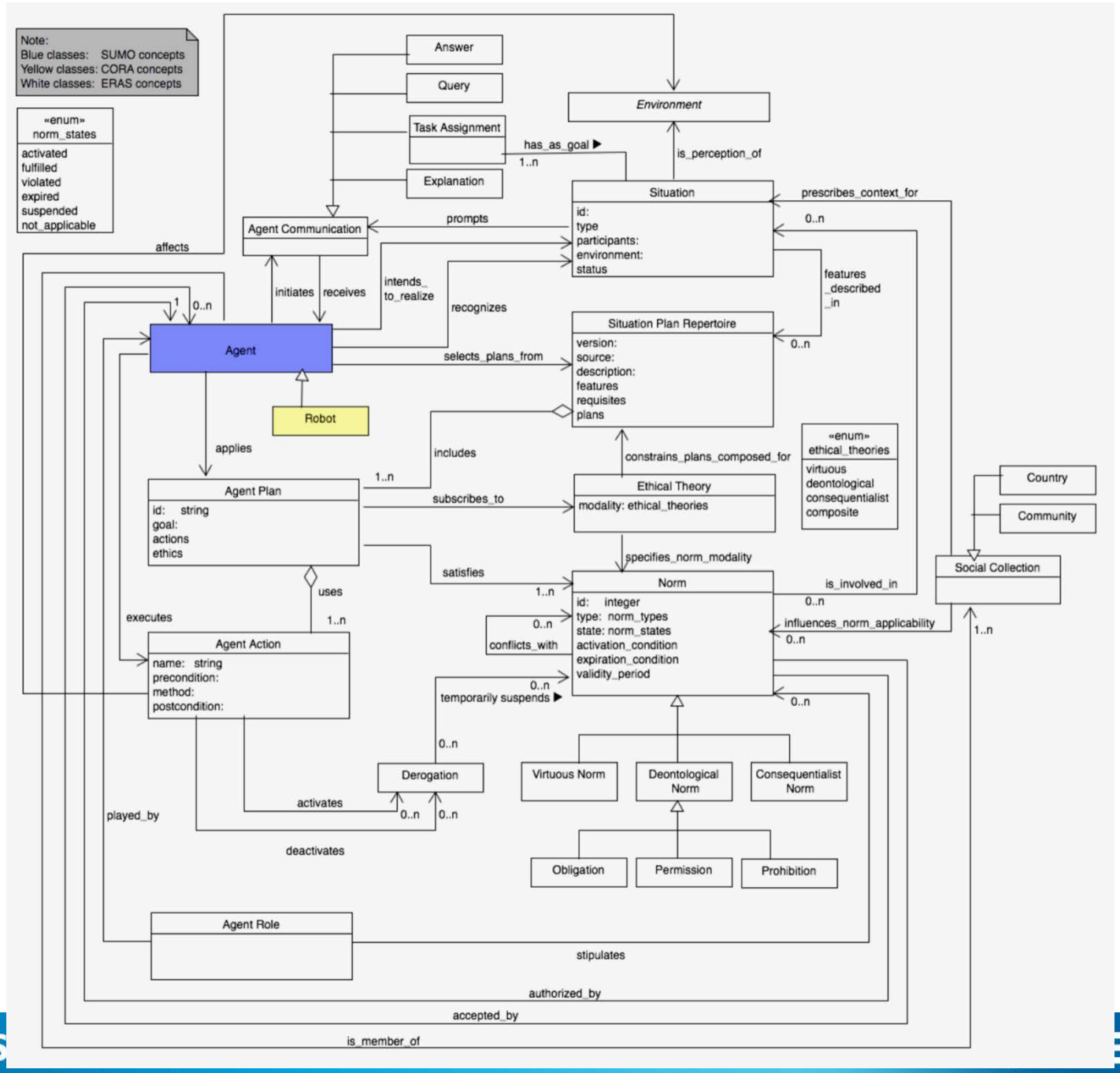
Law: guidelines and models to assess accountability and responsibility, taking into account law and regulations.

Ethical use of robots: guidelines and models for the ethical use of robots (i.e. taking into account the impact in economics, tax and politics).

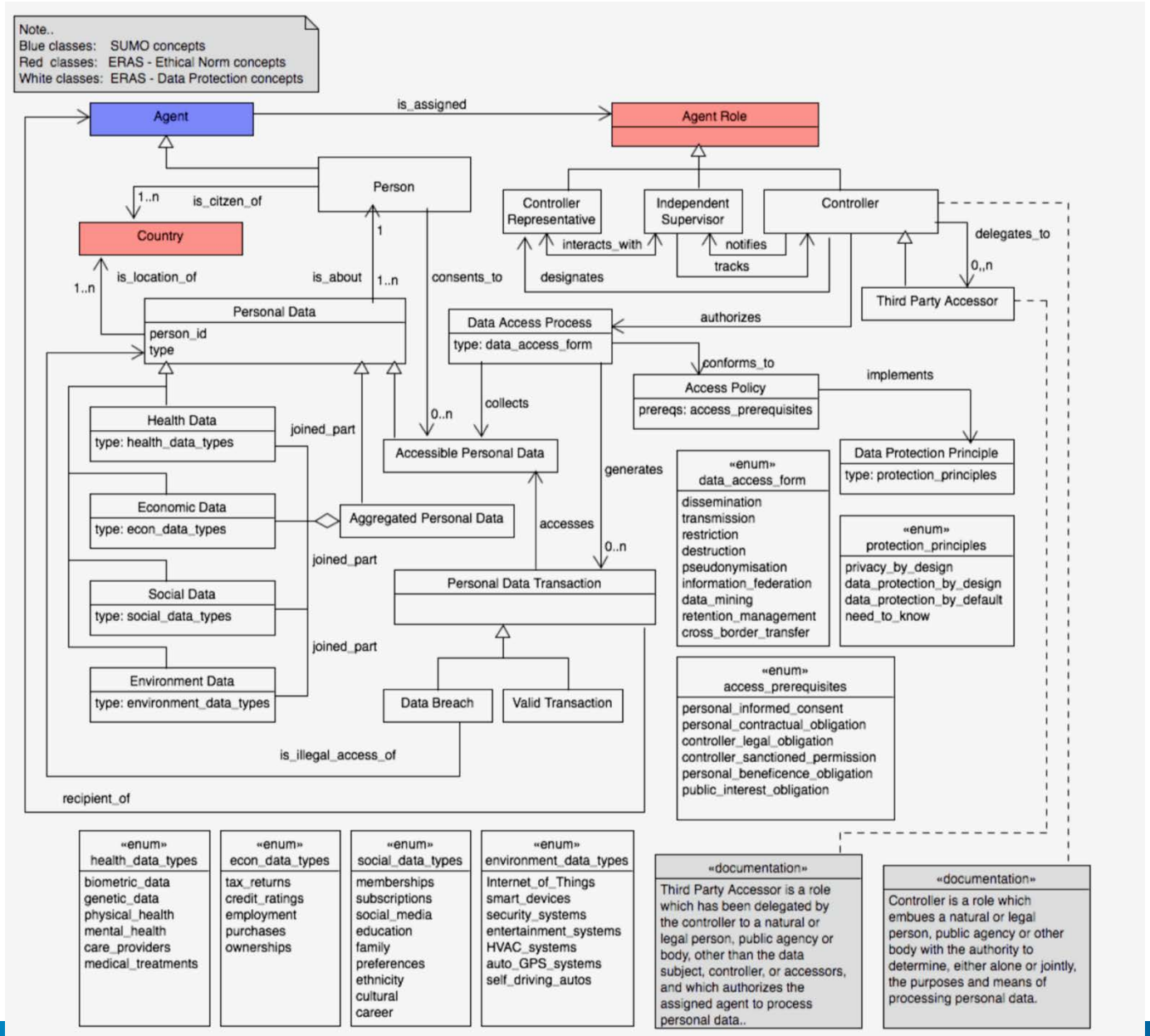
Work so far: methodology



Work so far: initial model for actions and norms



Work so far:
initial model
privacy
(based on GDPR)



How to get in touch

https://standards.ieee.org/project/7007.html

Email: srfiorini@ieee.org, edson.prestes@ieee.org