Activity 1 - Definition

Sergi Salido Cubero Giorgio Rossi Sarah Fadlallah
Francesco Leuce Chiheb Nasri

Escola Tècnica Superior d'Enginyeria
Universitat Rovira i Virgili
Tarragona, Catalunya

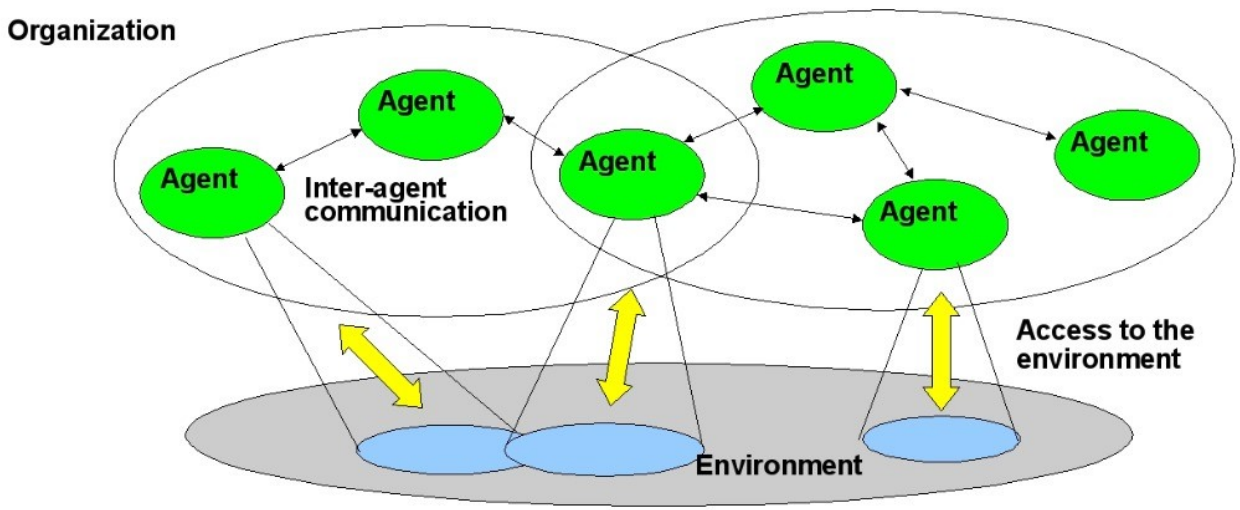
Multi-Agent Systems, 2020

Index

- Characteristics of the environment.
- Best kind of architecture to apply to each type of agents.
- Properties that should be exhibited by each type of agents.

Environment Analysis

- Accessible
- Deterministic
- Episodic
- Static
- Discrete



Accessible

- All agents should be able to **obtain complete, accurate, and up-to-date information** about the state of the environment, e.g. configuration, user input, system status, etc.

Deterministic

- The fuzzy agents are set to be deterministic.
- Since they work with a set of **deterministic fuzzy rules**, it's expected that the **action of an agent should have a certain outcome**, while manager agents aggregate input from different sources in a deterministic manner.

Episodic

- Sessions or episodes of action have no effect on one another as **there is not interaction** between the current episode and the previous one.
- Only the **current percept is relevant**, since all the decisions are based on the configuration and the fuzzy input variables.
- **Future improvements** can consider a **non-episodic** environment to allow the system to learn from past experiences.

Static

- The system is given a **bounded field of operation**.
- We assume that the environment remains **unchanged** while agents are deliberating, making it static.

Discrete

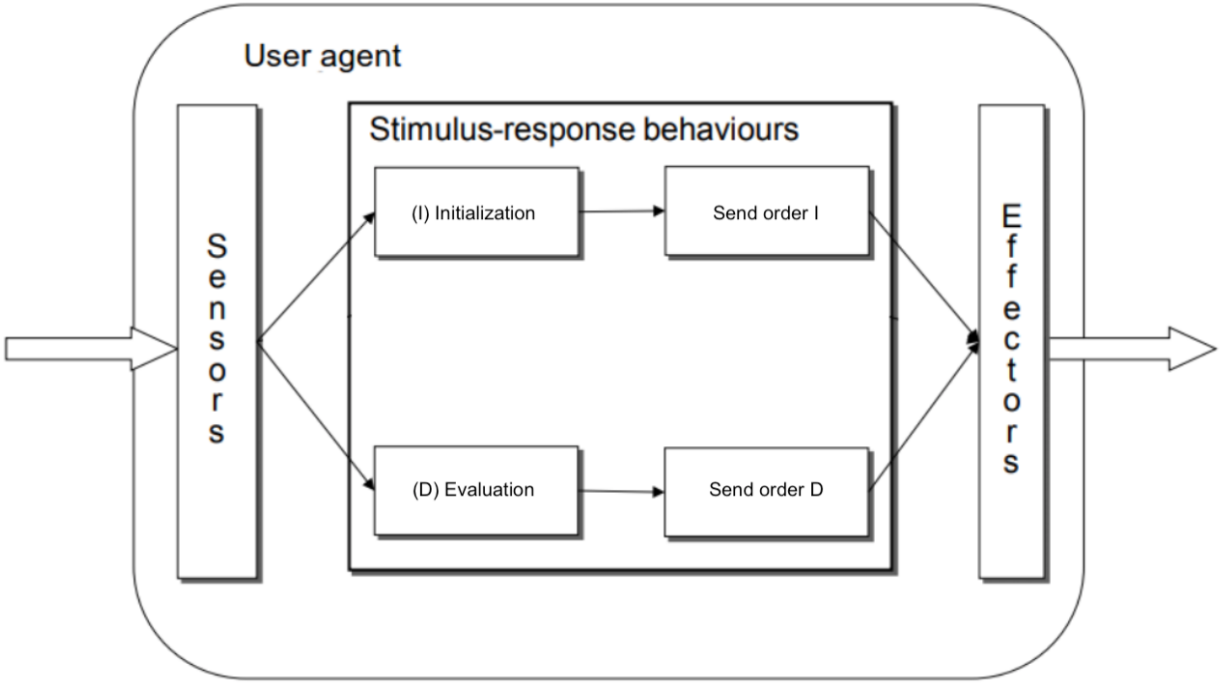
- The environment is perceived to be discrete, as there is a **fixed, finite number of actions** e.g. preparing the fuzzy agent-based system, and handling requests from users in order to percept the fuzzy set.

Architecture Analysis

Type of agent	*Architecture type*
User agent	**Reactive**
Manager agent	**Hybrid**
Fuzzy agent	**Deliberative**

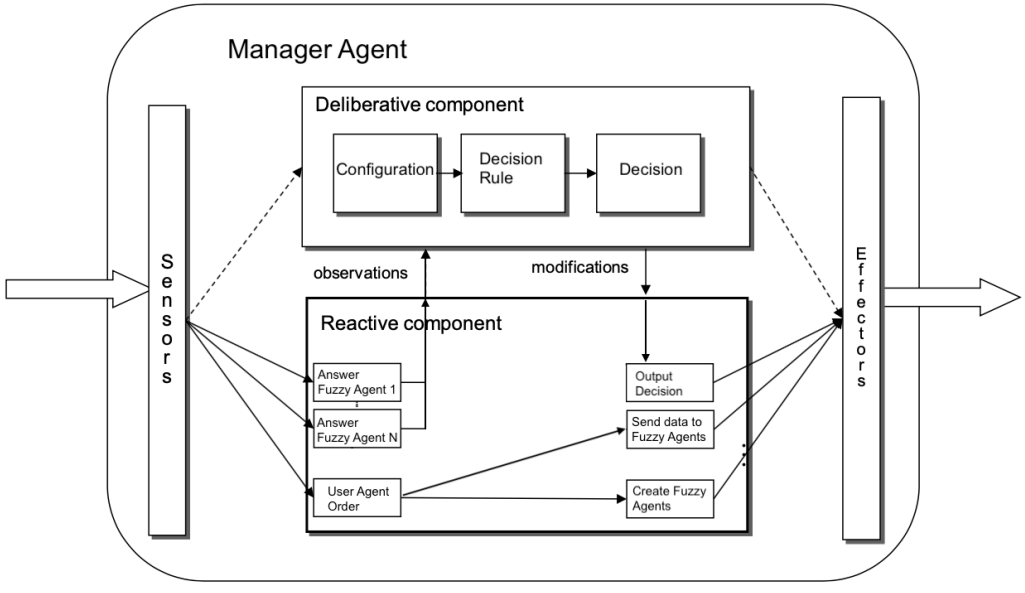
User Agent

- It is set to have a **reactive architecture**.
- This is due to its simple interaction (handle requests / configurations from the user).



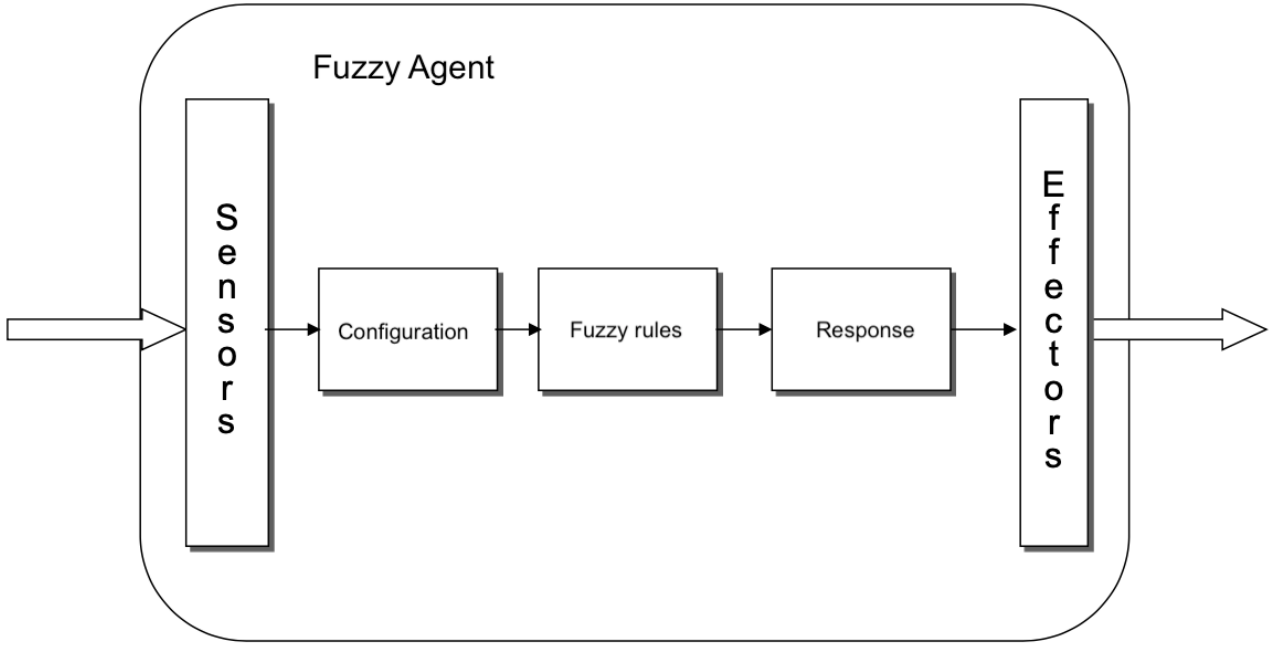
Manager Agent

- It acts as a coordinator. It functions by aggregating all the fuzzy agent's responses, using a proper decision rule to infer a decision.
- It also has the role of creating other fuzzy agents.
- This lead to it being a **hybrid agent** by definition.



Fuzzy Agent

- The agent is set to have a **deliberative architecture** as it computes answer via (fuzzy) logical reasoning.



Agents Properties

- It cannot be predicted with certainty that they will behave in a **benevolent** manner.
- **Character** and **veracity** depend on the rules of the configuration.

User Agent

- Reactivity
- Communication and Social Abilities
- Temporal continuity

Manager Agent

- Reactivity
- Proactiveness and Autonomy
- Rationality and Reasoning
- Flexibility
- Temporal continuity

Fuzzy Agent

- Reactivity
- Rationality and Reasoning

Agent Types

- User Agent: **Interface agent** (secretary, personal assistant, reactive).
- Manager Agent: **Collaborative agent** (communication, autonomy, reasoning).
- Fuzzy Agent: **Agentification of a logic module** (adaptive rule-base, provides information).