Intelligent Systems

Exercise 2- Design

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Christian-Albrechts-Universität zu Kiel, Winter Semester 2019

Content

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2. Observer/Controller - Pattern
3. Distribution variants
4. Python Visualization: WSA Lübeck

Organisatorial issues

Organisatorial issues

- Inquiry → https://terminplaner4.dfn.de/uTaUnai9DBgI2lI7liza3seg/admin

- Team forming

Organisatorial issues

- Inquiry → https://terminplaner4.dfn.de/uTaUnai9DBgI2lI7liza3seg/admin
- New exercise date:
  Time and place: Monday 18:00 - 19:30, LMS2 - R.Ü1 from 11.11.2019 to 27.1.2020
- Team forming

Roadmap

Exercise 1	Organisation & Python Intro	✓	29.10.2019
Exercise 2	Design / Signature Task I	✓	05.11.2019
Exercise 3	Design II / Signature Task II		12.11.2019
Exercise 4	Preprocessing / Signature Task III		19.11.2019
Exercise 5	Representation		26.11.2019
Exercise 6	Similarities		03.12.2019
Exercise 7	Segmentation / Clustering		10.12.2019
Exercise 8	Classification / Anomaly Detection		17.12.2019
Exercise 9	Evaluation / Order		07.01.2020
Exercise 10	Quantification		14.01.2020
Exercise 11	Modelling		21.01.2020
Exercise 12	Learning/ Mutual Influences / Opt.		28.01.2020

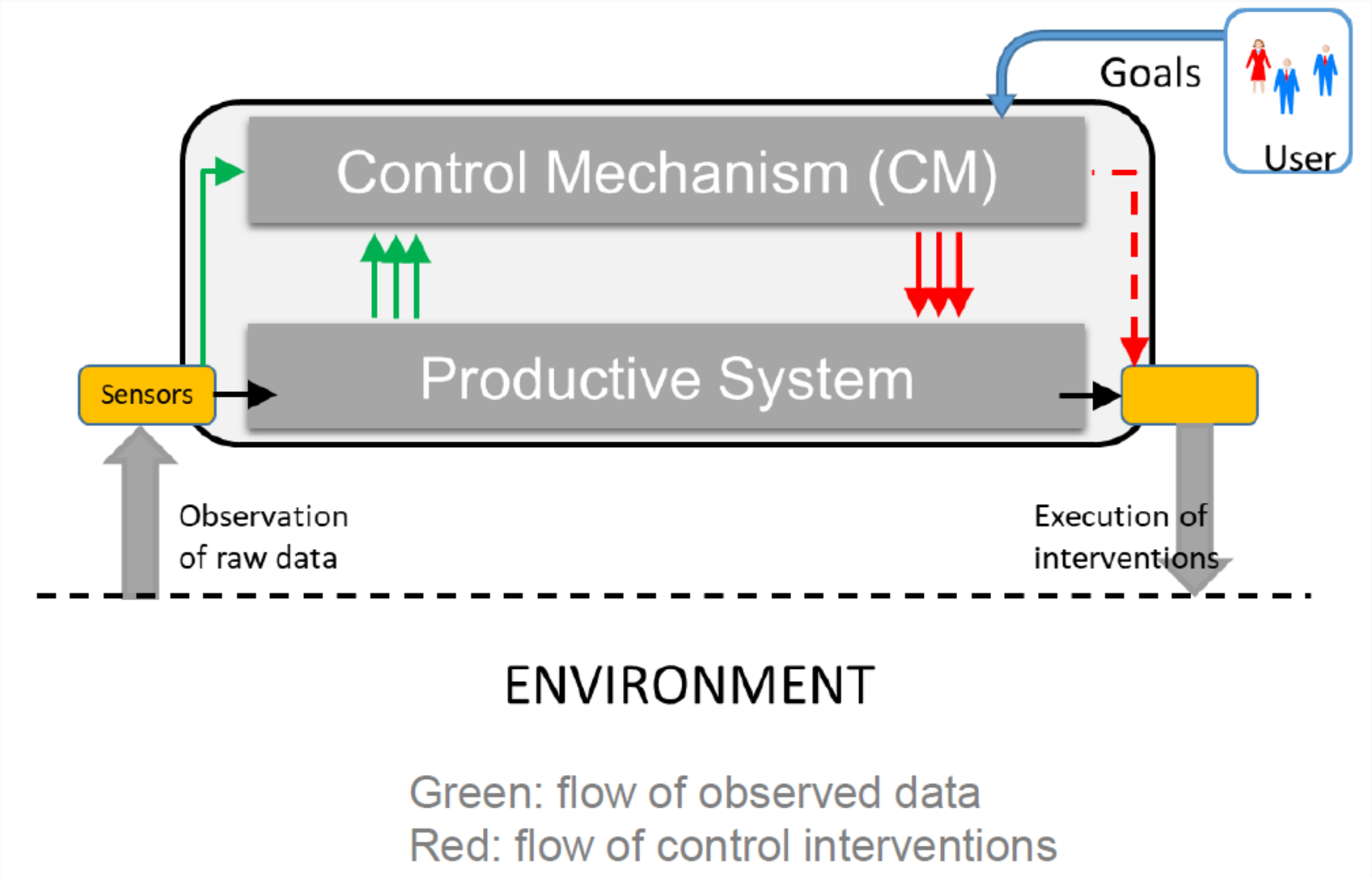
Tabelle 1: Exercise schedule

Observer/Controller - Pattern

Exercise 1 - Observer/Controller Pattern

Explain the Observer/Controller pattern by choosing your own example. In detail, start with a real-world application and explain how the system can be optimised with the O/C Pattern by Observation and Control.

Observer/Controller Pattern



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Be sure to define the following things:

- System boundaries
- Goal
- Sensors (internal/external)
- Actions

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Example from the lecture Traffic light.
Other candidates:

- Self-controlled heating system
- Elevator
- Cam Stabilizer
- ...

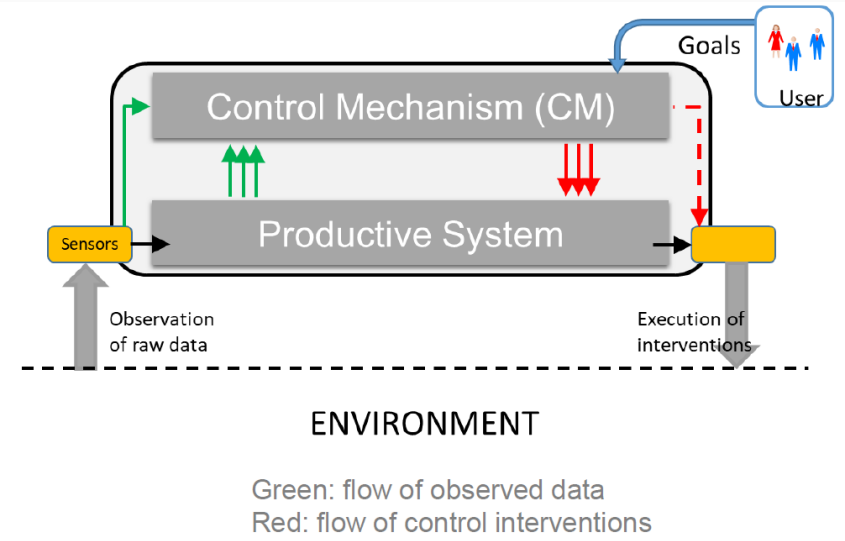
Distribution variants

Exercise 2 - Distribution variants

A. **Classify the following distriuted systems into one of the categories: fully centralised, fully decentralised, and hybrid.**
B. Explain your decision by describing communication channels, process flows, and the level of autonomy.

Multi level

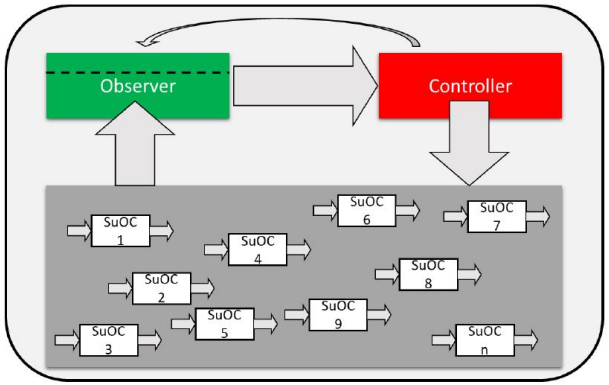
- Additional layer 2 for offline learning
- Complex optimisation techniques on layer 2 (EA, Simulations, etc.)
- Different time scales (online/offline) for learning on layer 1 and layer 2



Distribution variants - fully centralised

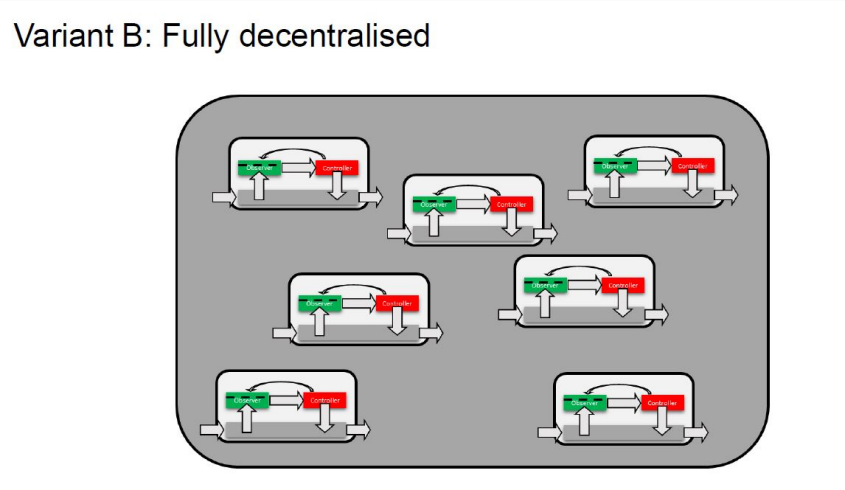
- System parameters globally accessible/adaptable
- No homogeneous agents
- Superagent

Variant A: Fully centralised



Distribution variants - fully decentralised

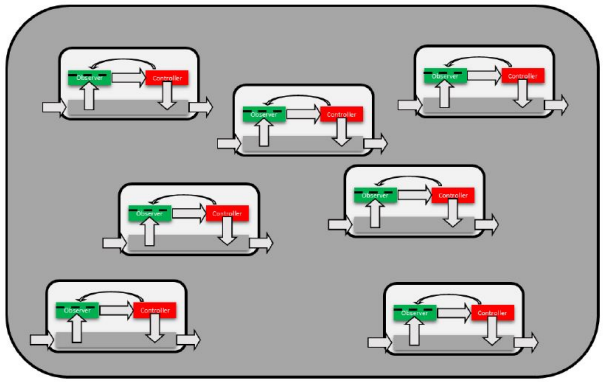
- No global state accessible; but agent-specific local view and neighborhoods
- Homogeneous agents possible



Distribution variants - hybrid

- Global state accessible and agent-specific local view and neighborhoods
- Heterogenous structure of agents

Variant B: Fully decentralised



Exercise 2 - Distribution variants

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Exercise 2 - Distribution variants
Distriubtion and Communication

Name	Dist.	Communication Channel
P2P-Network	originally: fully-decentralised	Network packages
VCS GIT	fully-centralised	ssh
Ant colony	fully-decentralised	pheromones
Internet	hybrid	Internet protocol

Tabelle 2: Distribution variant examples

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Name	Process flow	Autonomy
P2P-Network	Ask / Provide	no autonomy
VCS GIT	pull/change/add/commit/push	deep copy of root
Ant colony	exploration / exploitation	no autonomy
Internet	REST-Queries	“no” client state

Tabelle 3: Distribution variant examples

Python Visualization: WSA Lübeck

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Python Visualization: WSA Lübeck

→ https://www.pegelonline.wsv.de/webservices/files/Wasserstand+Rohdaten/OSTSEE/LT+KIEL