Intelligent Systems

Exercise 2- Design

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Content

1. Organisatorial issues
2. Observer/Controller - Pattern
3. Distribution variants
4. Python Visualisation: WSA Lübeck

Organisatorial issues

Teams

Finalise the composition of the student groups.

Organisatorial issues

Exercise 1	Organisation & Python Intro	✓	We, 11.11.2020, 10:15
Exercise 2	Design / Intro to **FT**	✓	We, 18.11.2020, 10:15
FT I	**FT I** Preprocessing		Mo, 23.11.2020, 14:15
FT I	**FT I** Preprocessing Presentation		We, 25.11.2020, 10:15
Exercise 3	Preprocessing		We, 02.12.2020, 10:15
Exercise 4	Representation		We, 09.12.2020, 10:15
FT II	**FT II** Feature Selection		Mo, 14.12.2020, 14:15
FT II	**FT II** Feature Selection Presentation.		We, 16.12.2020, 10:15
Exercise 5	Similarities / Segmentation		We, 06.01.2021, 10:15
Exercise 6	Clustering		We, 13.01.2021, 10:15
Exercise 8	Classification		We, 20.01.2021, 10:15
FT III	**FT III** Model Selection		We, 27.01.2021, 10:15
FT III	**FT III** Model Selection Presentation		We, 27.01.2021, 12:15
Exercise 9	Quantification/Eval.		We, 03.02.2021, 10:15
Exercise 10	RL / Quantification		We, 10.02.2021, 10:15

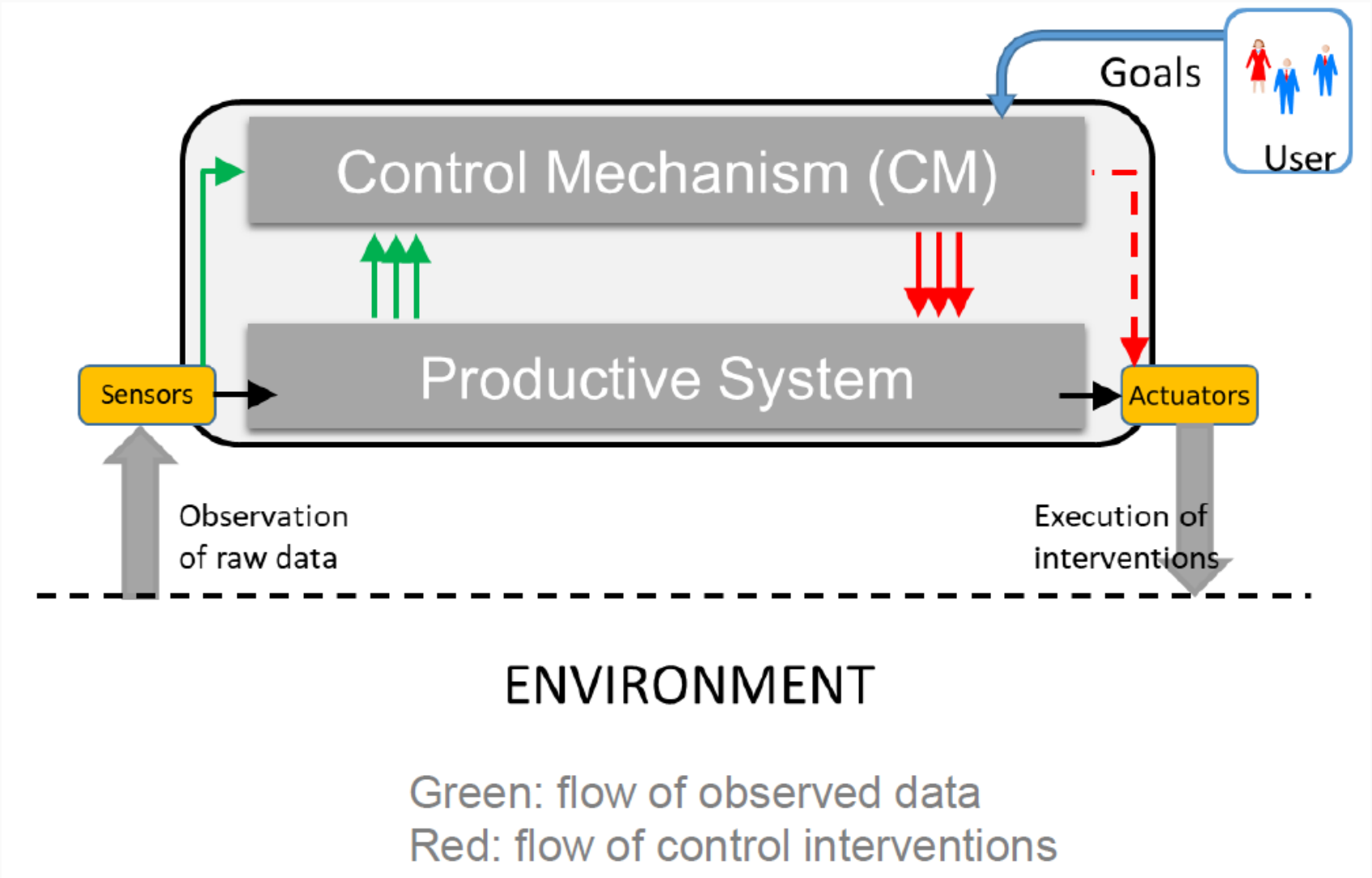
Tabelle 1: Roadmap – no changes (yet)

Observer/Controller - Pattern

Exercise 1 - Observer/Controller Pattern

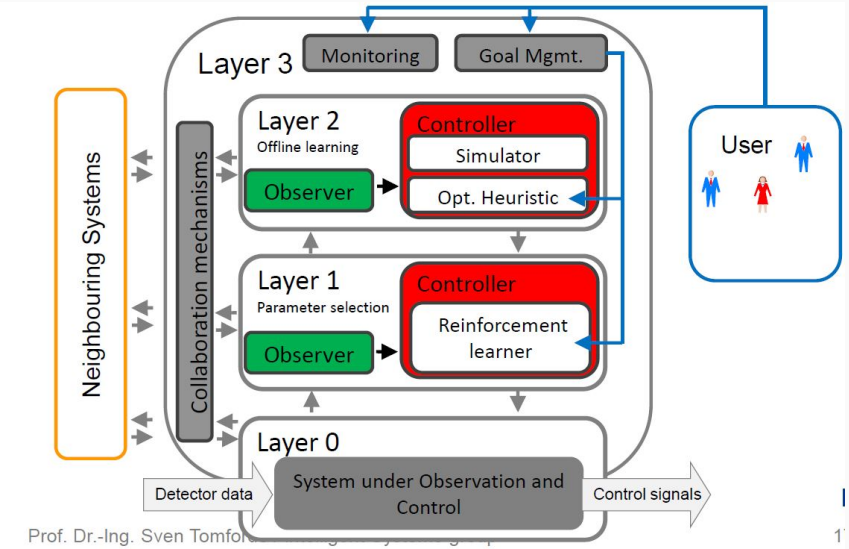
Explain the Observer/Controller pattern by choosing your own example. In detail, start with a real-world application and explain how the system can be optimised with the O/C Pattern by Observation and Control.

Observer/Controller Pattern



Multi level

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



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Be sure to define the following points:

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

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The example from the lecture for controlling traffic lights (OTC).

Other candidates:

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

Distribution variants

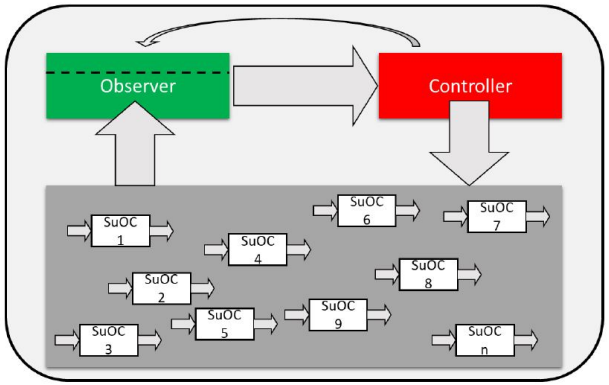
Exercise 2 - Distribution variants

A. **Classify the given distributed 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.

Distribution variants - fully centralised

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

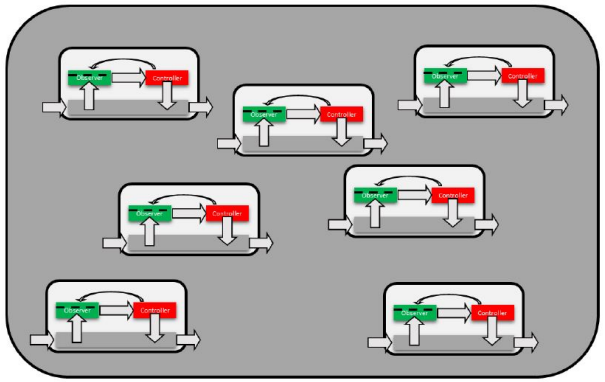
Variant A: Fully centralised



Distribution variants - fully decentralised

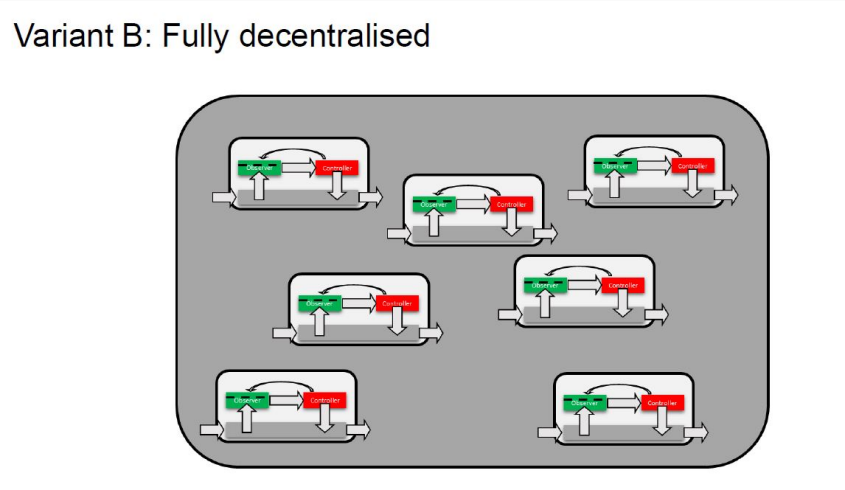
- No global state accessible; but agent-specific local view and neighbourhoods
- Homogeneous agents possible

Variant B: Fully decentralised



Distribution variants - hybrid

- Global state accessible and agent-specific local view and neighbourhoods
- Heterogeneous structure of agents



Exercise 2 - Distribution variants

A. Classify the given distributed systems into one of the categories: fully centralised, fully decentralised and hybrid.

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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 Visualisation: WSA Lübeck

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Python Visualisation: WSA Lübeck

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