ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

From individual perception to collective behavior in drones. A self-aware approach

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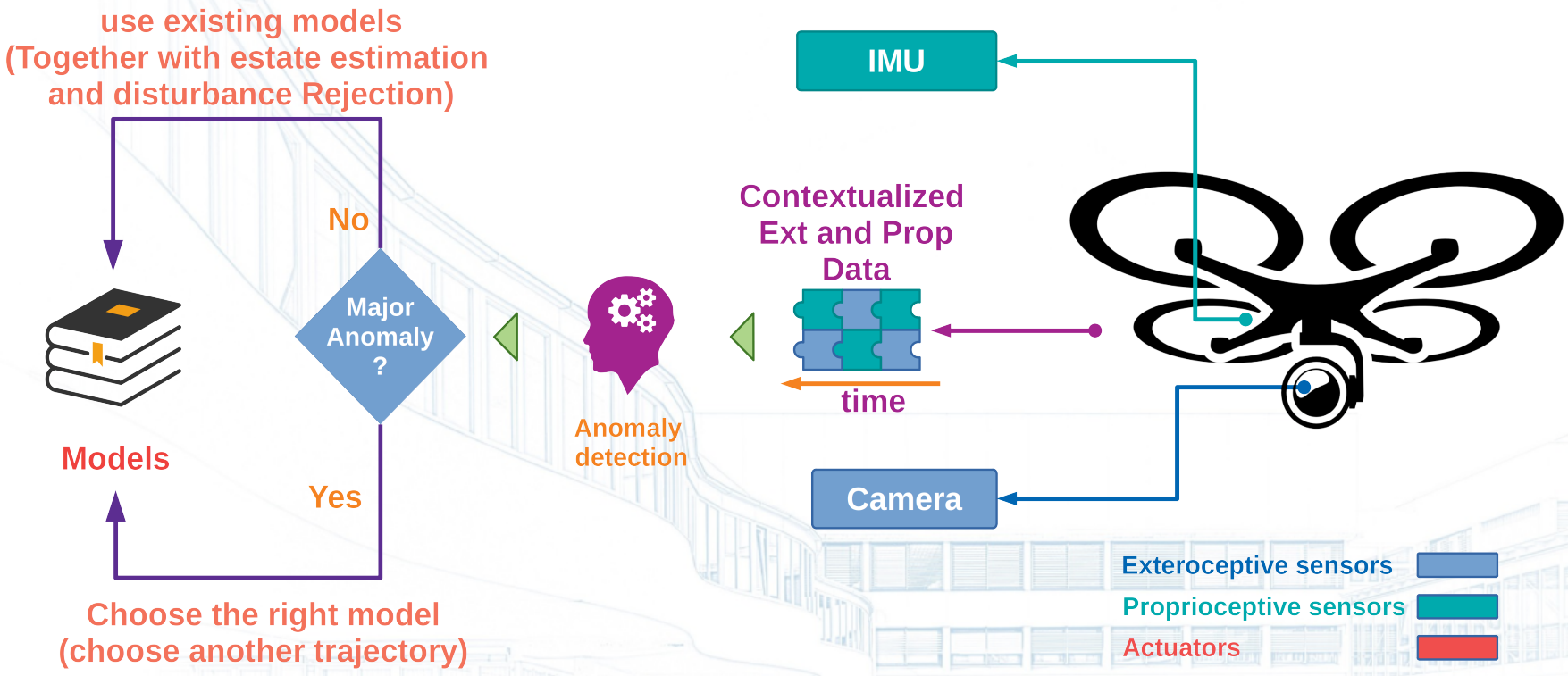
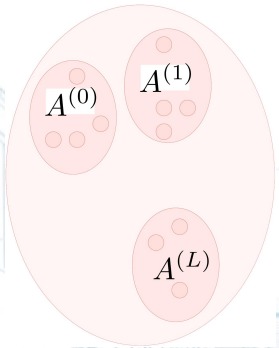


SA, sensors and actuators

Individual semantic emergence

Discretized[1] generalized state for different derivatives of time forms the alphabet of words by which each individual agent can describe the experiences it is practicing to other agents[2]



$$w = \{\alpha^{(0)}, ..., \alpha^{(L)}\} \tag{1}$$

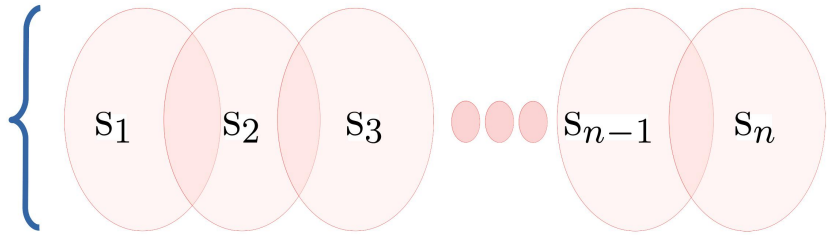
[1] Fiser, D., Faigl, J., & Kulich, M. (2013). Growing neural gas efficiently.

[2] Kanapram, D., Marin-Plaza, P., Marcenaro, L., Martin, D., & Arturo de la Escalera, C. R. (2019). Cognitive dynamic systems: Perception-action cycle, radar and radio.

Collective semantic emergence

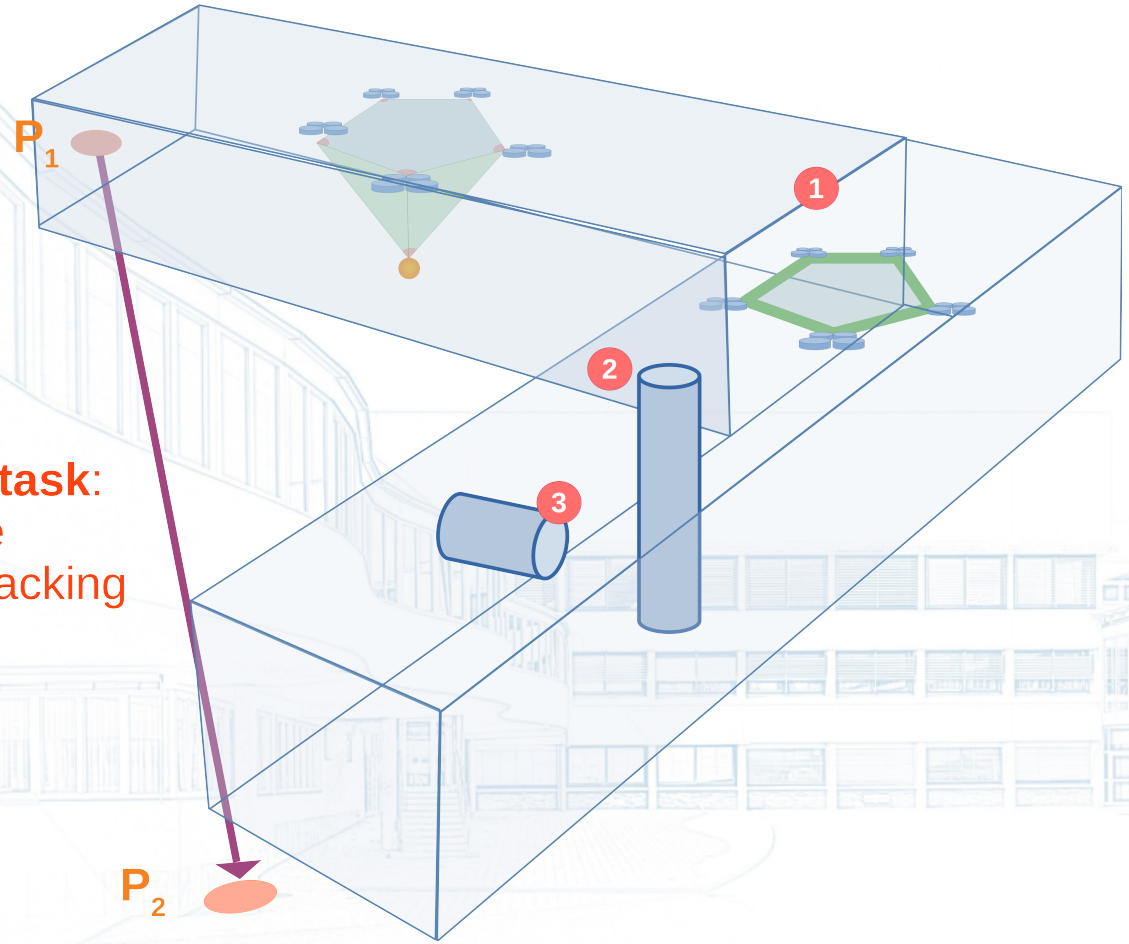
Mutually activated discretized generalized state space for the collective language[3]

Words are synchronously activated Zones in the absence of repulsive forces



[3] Baydoun, M., Campo, D., Kanapram, D., Marcenaro, L., & Regazzoni, C. S. (2019). Prediction of multi-target dynamics using discrete descriptors: An interactive approach.

Previous: Experimental setup - Formations for Rigid payload



Reference task:
Straight line
trajectory tracking

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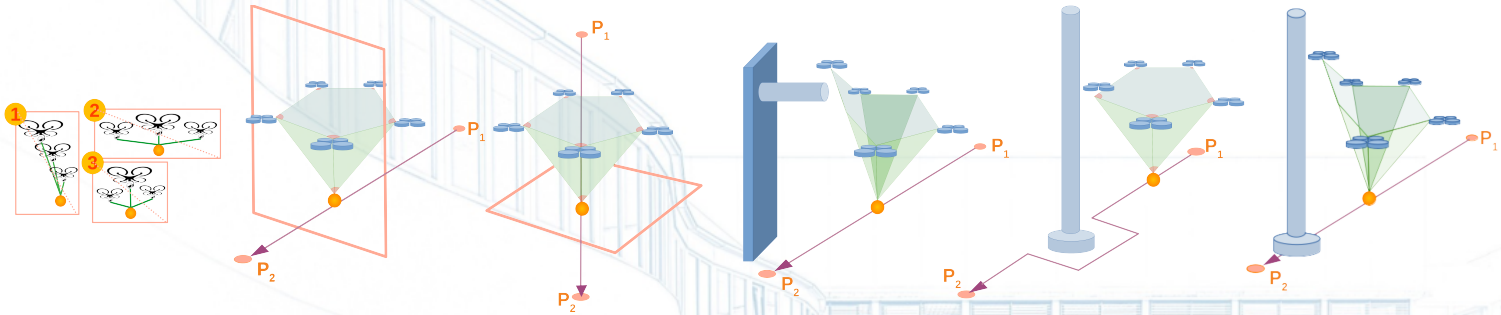
Previous: Experimental setup - Formations for Suspended payload



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Previous: Literature review of existing collaborative payload trans

Categorized by

- Payloadshap
- Suspention
- Formation
- Attachment type
- ...

Future

- A literature review of existing multi-rotor formations
- Discrete estate estimation by particle filtering for discretized state space (DSS)
- Motion and path planning for DSS according to MJPF (**T** The result should be describable by type A and B)
- Trajectory tracking according to MJPF
- Disturbance rejection according to (DSS)
- Dynamic generalized model discrimination in face of the scenarios
- **Ultimately** Training a model to map Type A (regional individual behavior) to Type B (collective behavior)