



KAUPUNKI  
AKADEMIA

URBAN STUDIES & PLANNING

USP

USP-E0361

# Complex Adaptive Systems

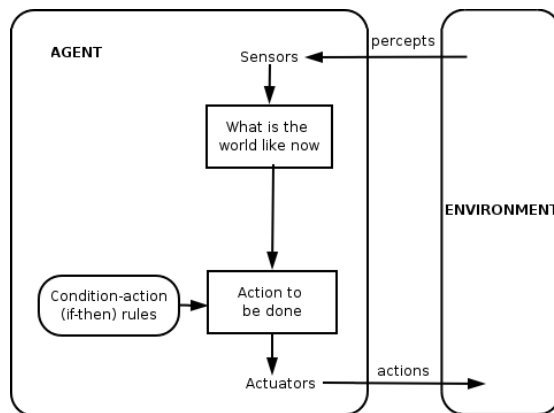
Lecture 3

11.5.2022 Anssi Joutsiniemi

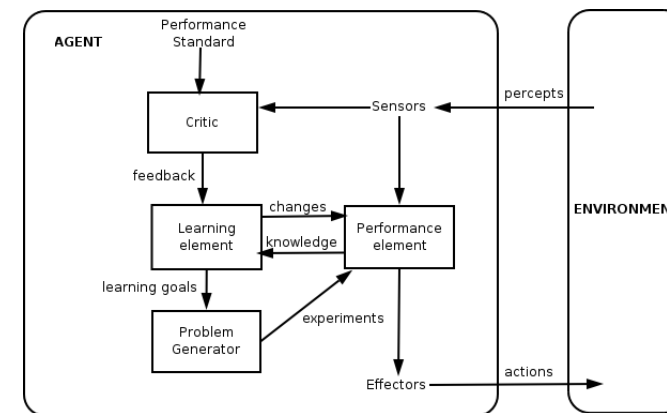
**A!**

# Multi-Agent System (MAS) Agent-base Modelling (ABM)

A multi-agent system (MAS) is a computerized system composed of multiple interacting intelligent agents. Despite considerable overlap, a multi-agent system is not always the same as an agent-based model (ABM). The goal of an ABM is to search for explanatory insight into the collective behavior of agents (which don't necessarily need to be "intelligent") obeying simple rules, typically in natural systems, rather than in solving specific practical or engineering problems. The terminology of ABM tends to be used more often in the science, and MAS in engineering and technology.

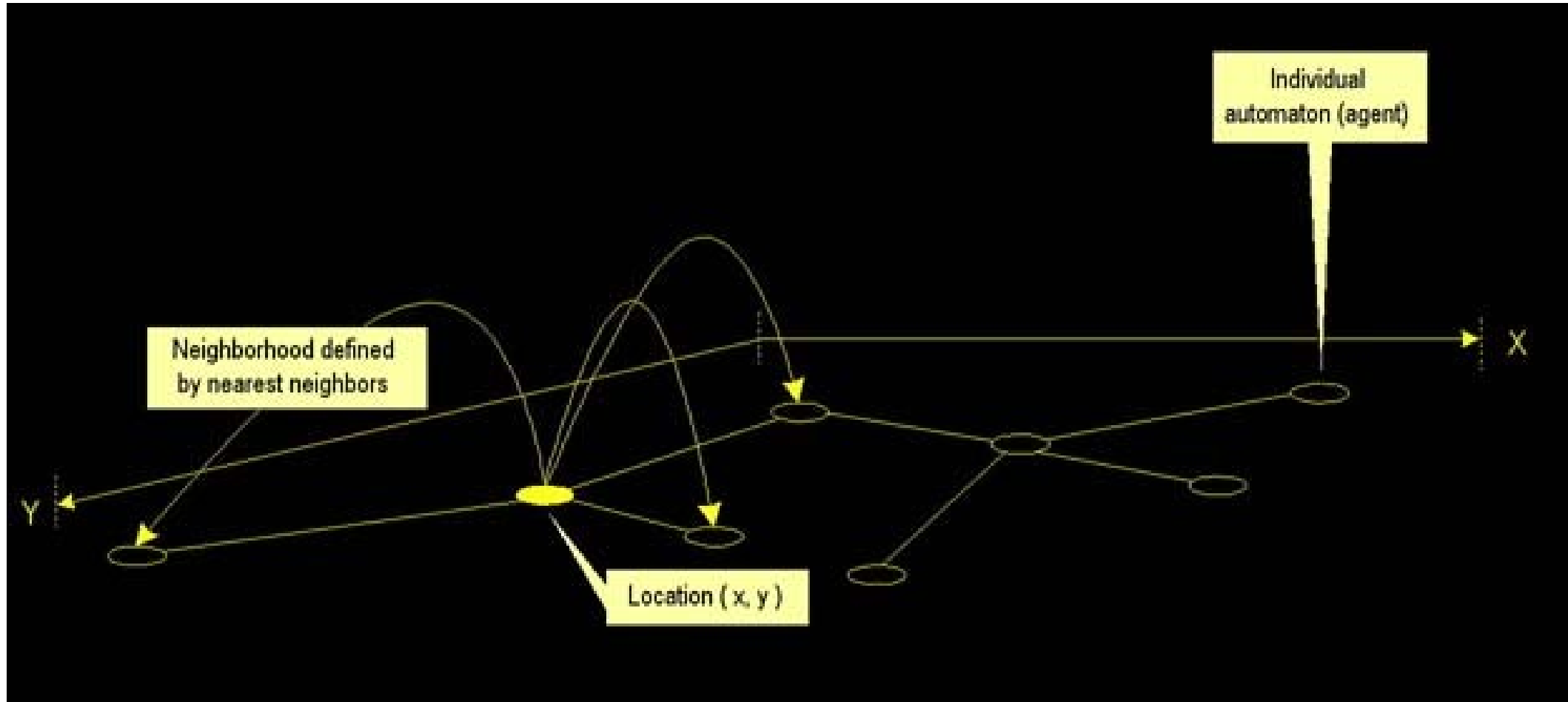


**Reflecting agent**



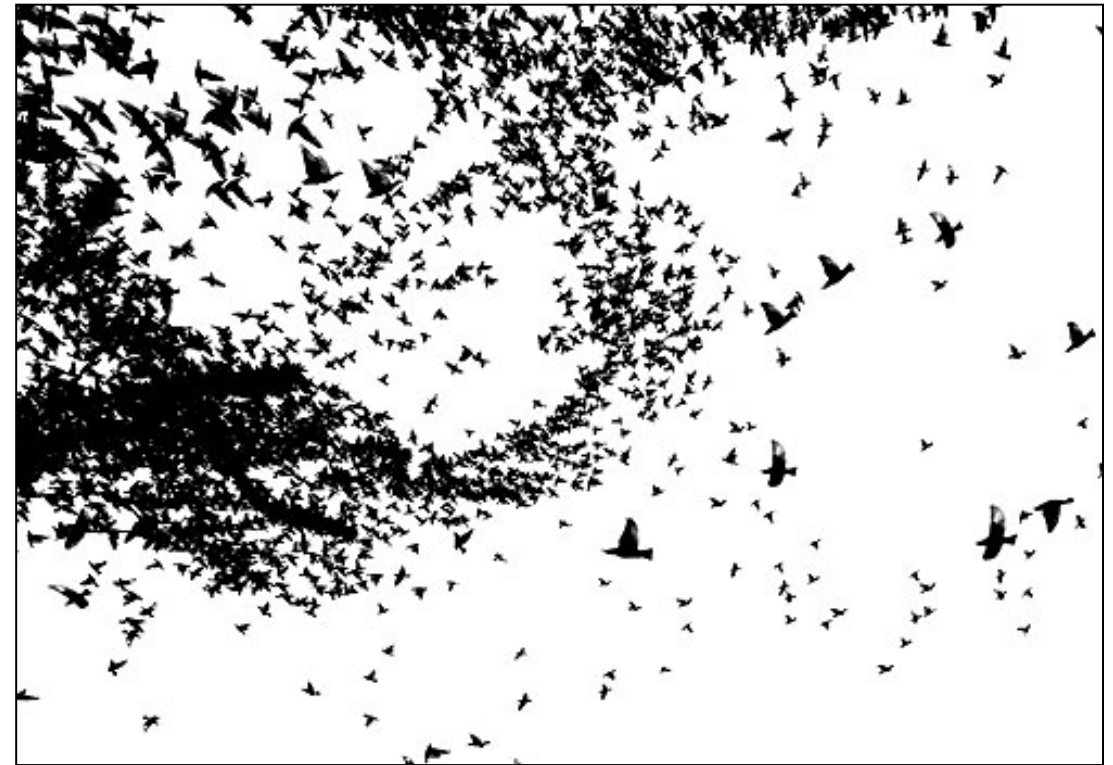
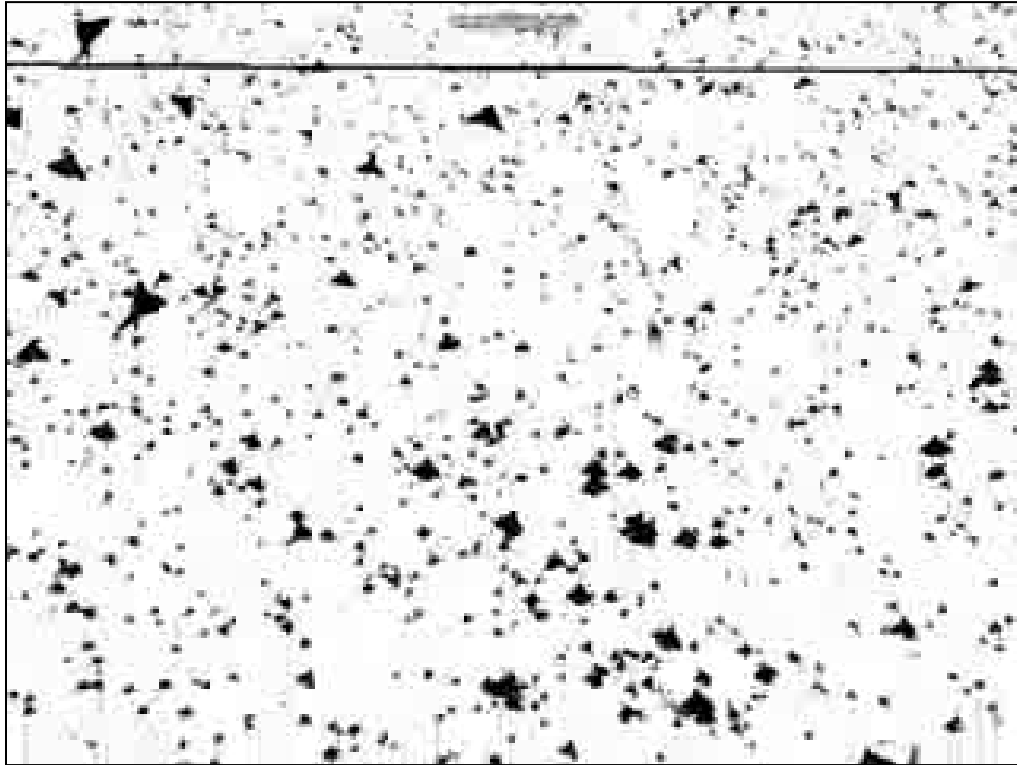
**Learning agent**

# Multi-Agent System (MAS)



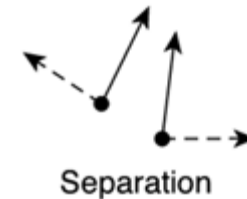
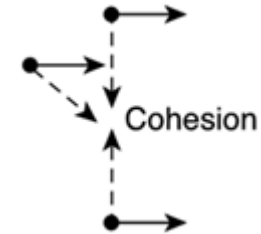
# MAS rule set...

...is also the base for Craig Reynolds Boids "game"



# Boids Rules

- **Cohesion** (*Centrality*)  
("head toward the centre")
- **Separation** (*Distance*)  
("keep personal distance")
- **Alignment** (*Direction*)  
("delineate with others")



# Boids links

- <https://www.youtube.com/watch?v=bqtq1tqcQhw>
- <https://www.youtube.com/watch?v=QbUPfMXXQIY>

