Autonomic Networks

Arthur Escriou

Lecture 8

Swarm algorithms

Swarm algorithms

- Separation

  All agents are isolated

- Alignment

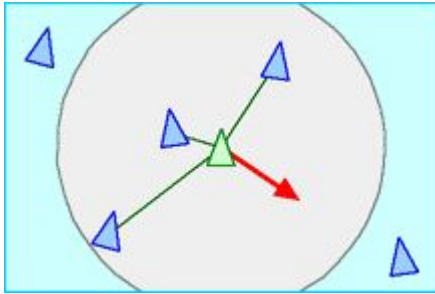 All agents share the same goal

- Cohesion

  All agents move towards the goal together

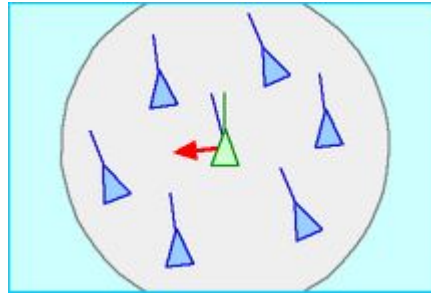# Swarm algorithms example

- ant colony optimization

- evolutionary algorithm

- particle swarm optimization
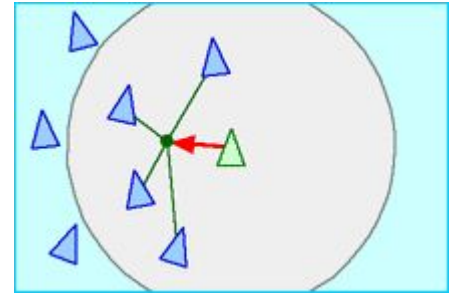
Birds flock simulation

Separation
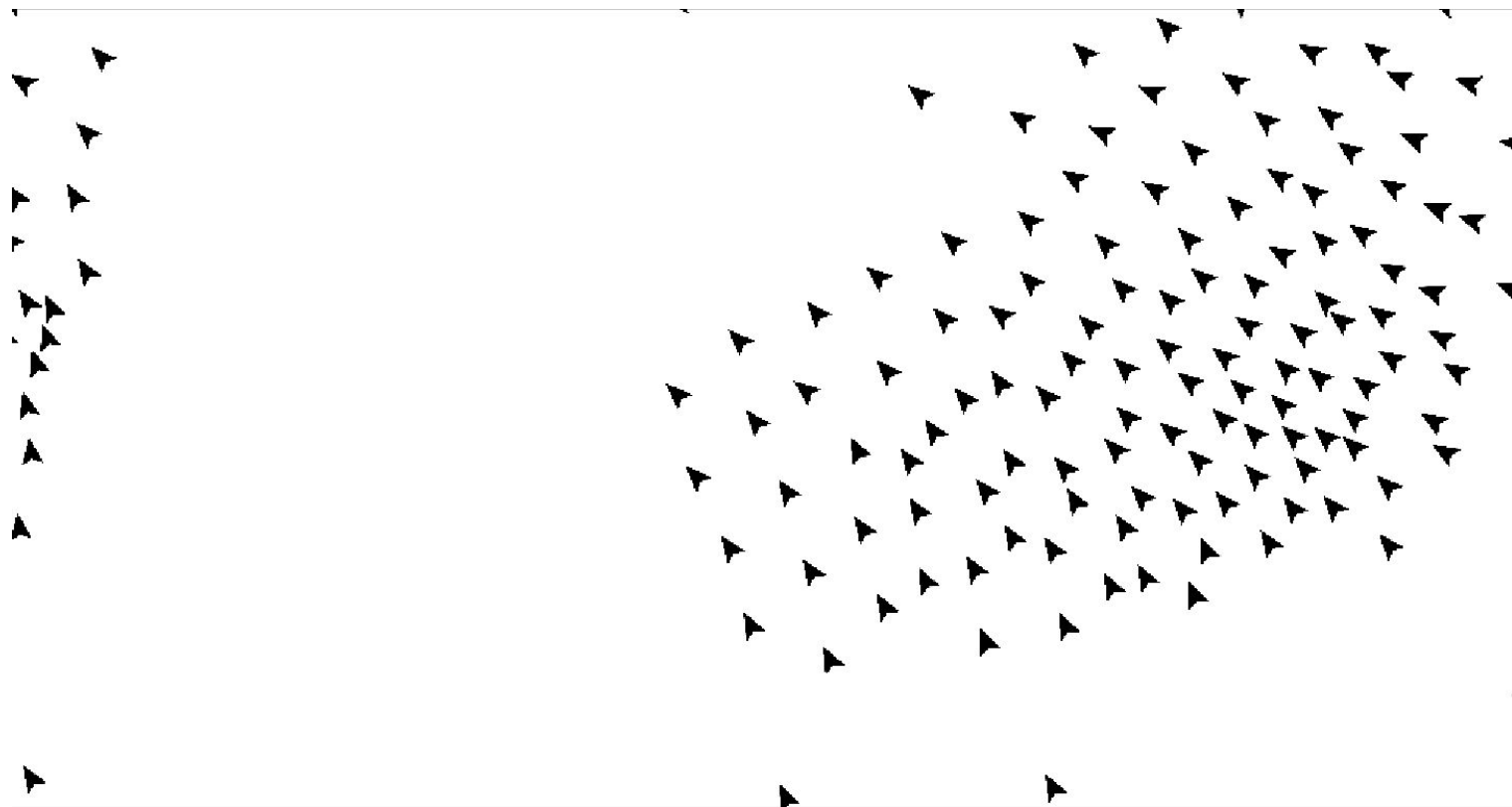
Alignment

Cohesion

Birds flock simulation

Agent behavior :

- get the 3 nearest birds

- compute the mean angle of those birds

- change your own angle to look like the other birds

Birds flock simulation

SVB Simulation

- Separation

  All ship have their own code and don't share memory

- Alignment

  In a team all ship goal are the same (destroy enemy ships)

- Cohesion

  To work together ships can communicate through radio

SVB Simulation - algorithm idea

With all the same ships :

- thrust to a speed of 10%

- when a enemy ship is detected in radar range turn to aim it and communicate its position in the radio

- when another ship send an enemy position turn to aim it

SVB Simulation - algorithm idea

pro :

- our ships out number other ships in fight

con :

- you have to verify to be in range
- what happened when our swarm detect more than one ship?

SVB Simulation - some ideas

- split your swarm in different area to be sure to cover all the space

- give different role to ships (some can for example go forward to scout)

- communicate only to the N nearest ships when you detect enemies

Some additional resources

- https://www.youtube.com/watch?v=GOFws_hhZs8
- https://en.wikipedia.org/wiki/Ant_colony_optimization_algorithms
- https://en.wikipedia.org/wiki/Boids
- https://www.youtube.com/watch?v=5CaVhGTG8eA (fr)