

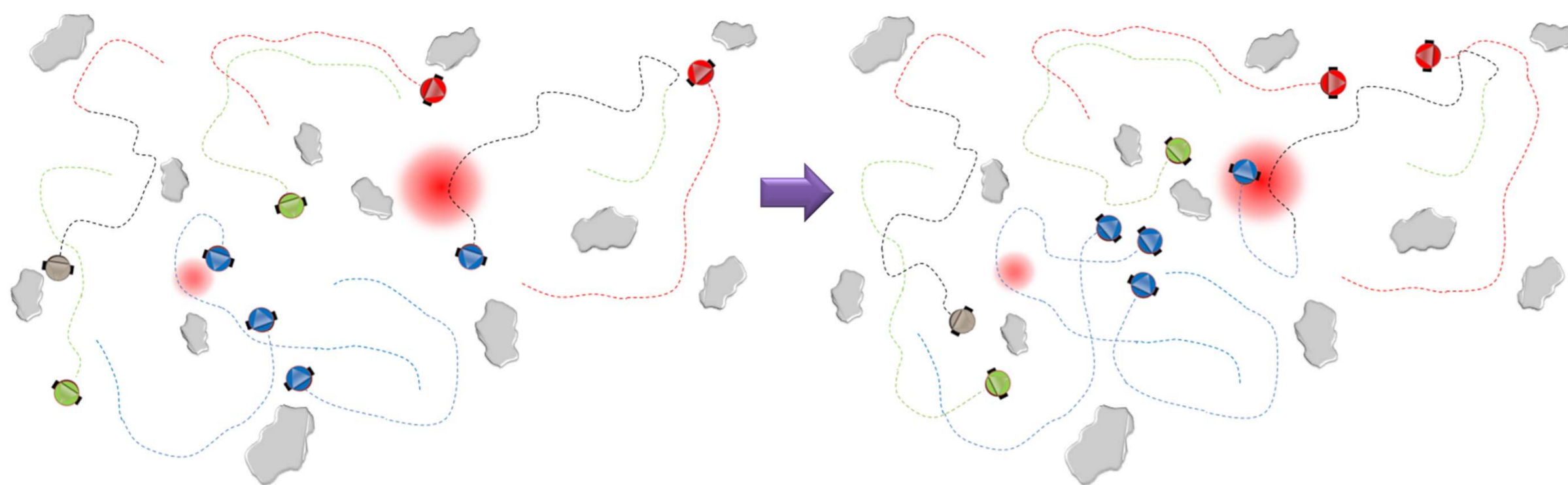
Multi-Agent Cooperation Over Unreliable MANETs

What?

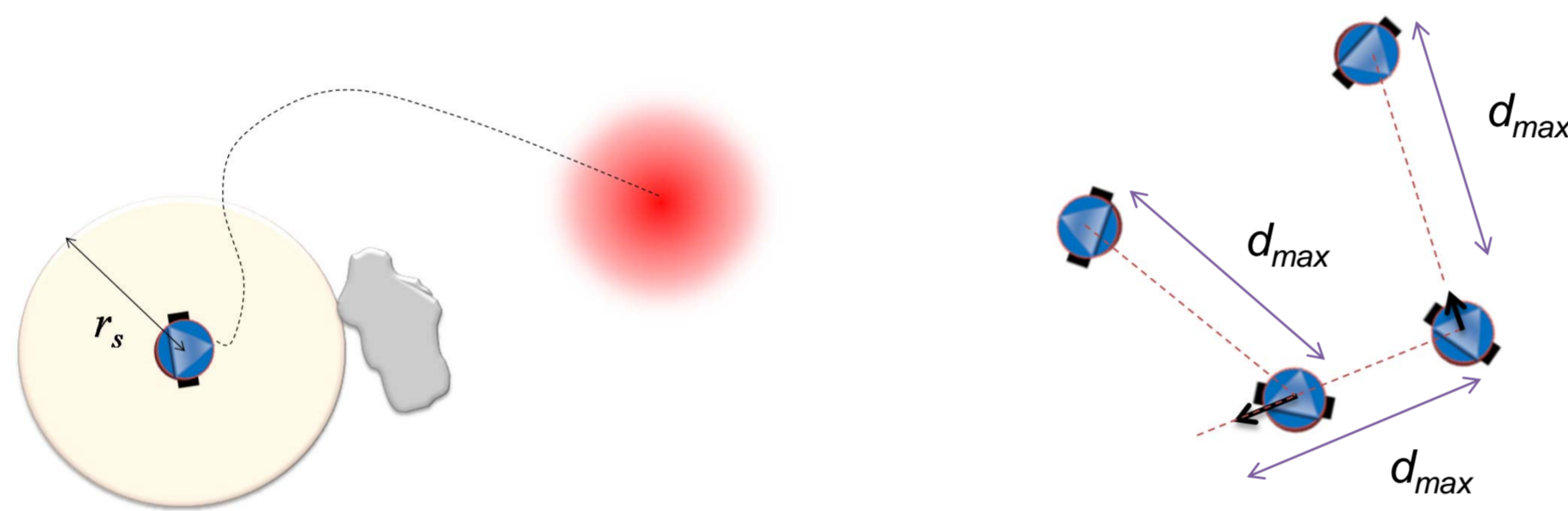
- Extension of the Darwinian Particle Swarm Optimization (*DPSO*), denoted as *RDPSO* (Robotic *DPSO*), to the multi-robot systems (*MRS*) domain

How?

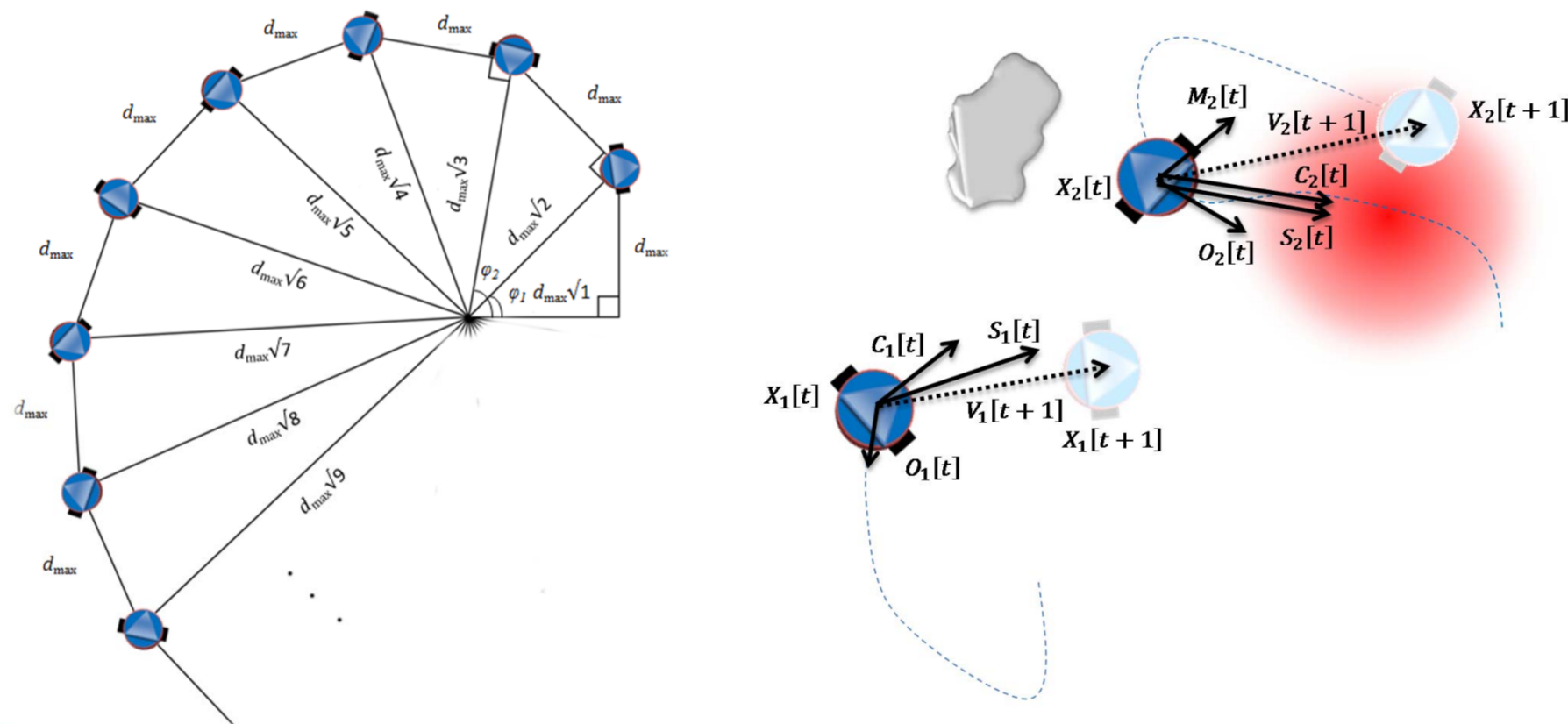
- The concepts of social exclusion and inclusion are used to enhance the ability to escape from local optima



- A new objective function is created to guide the robot to perform the main mission while avoiding obstacles
- The link matrix is used to “force” each robot to communicate with its nearest neighbor that has not chosen it as its nearest neighbor using attractive or repulsive tensions



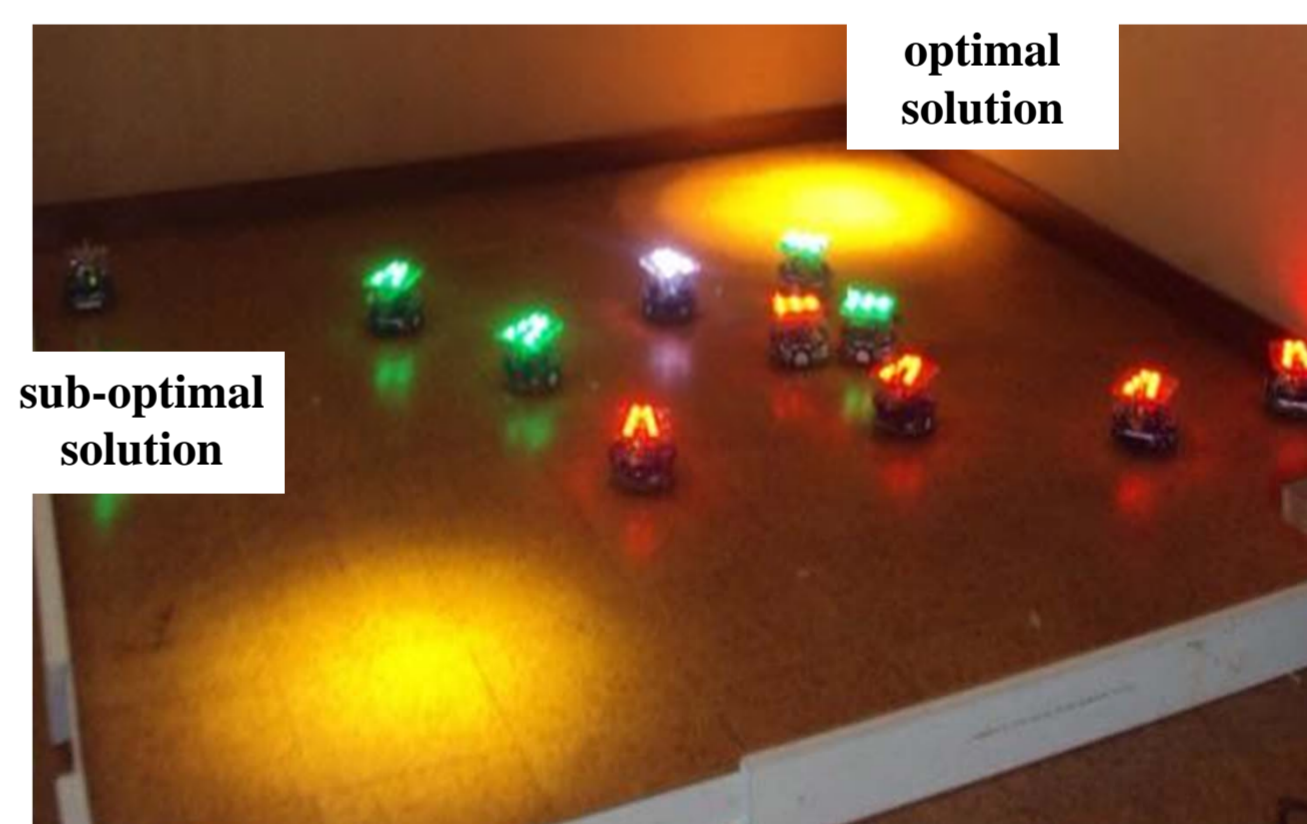
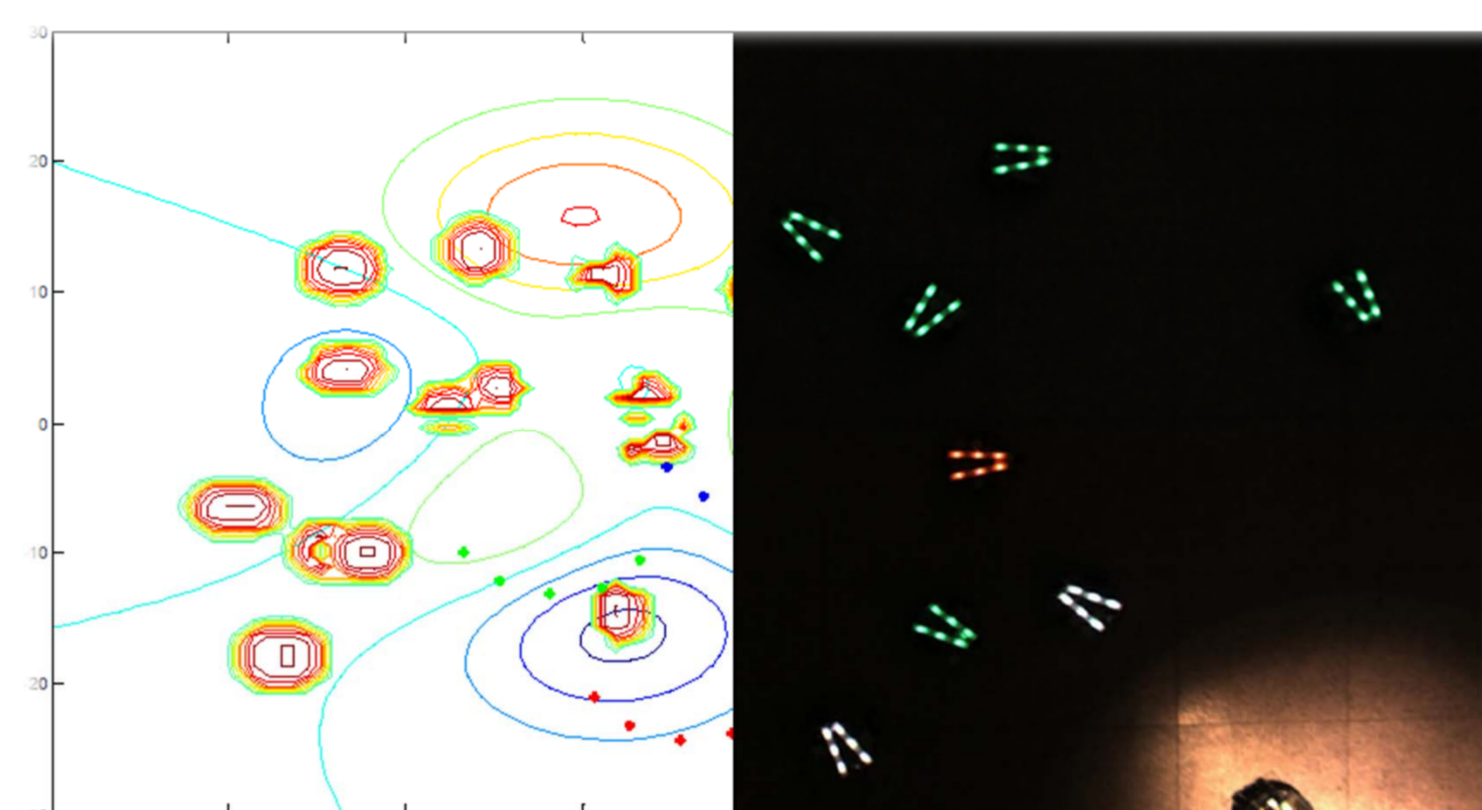
- Deployment strategy based on the *Spiral of Theodorus*



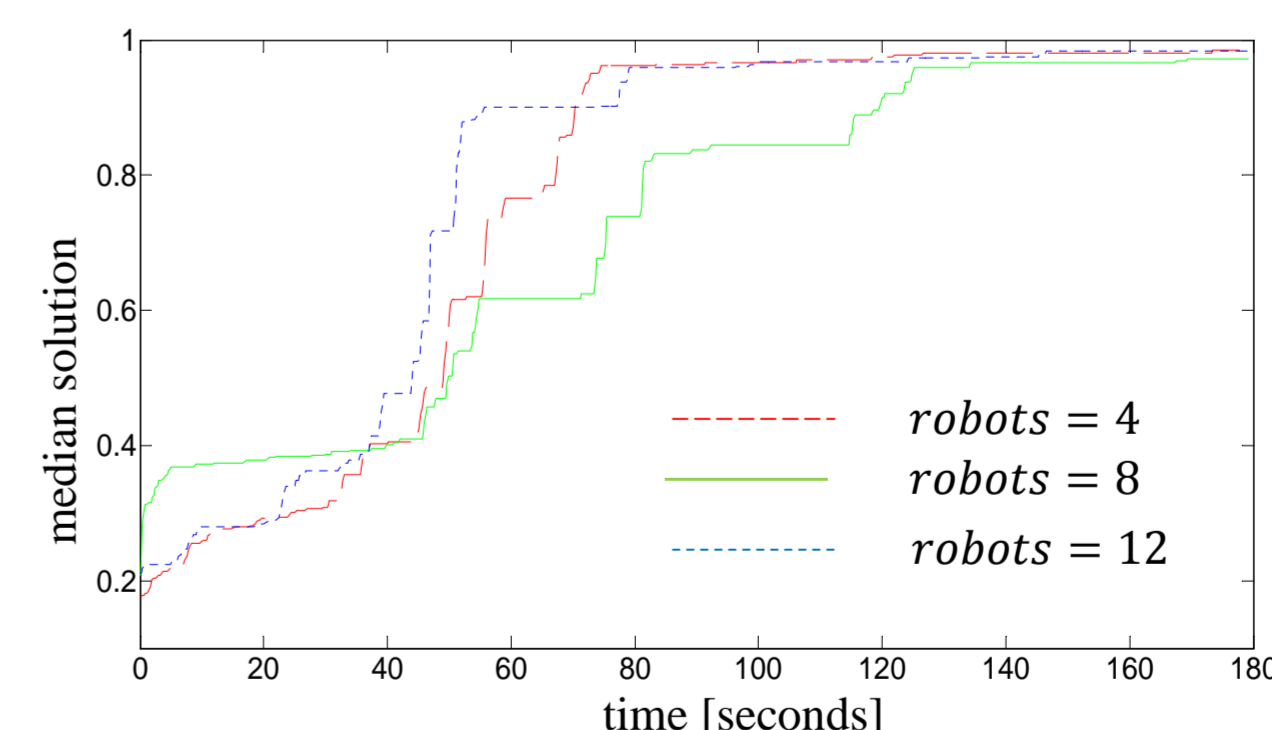
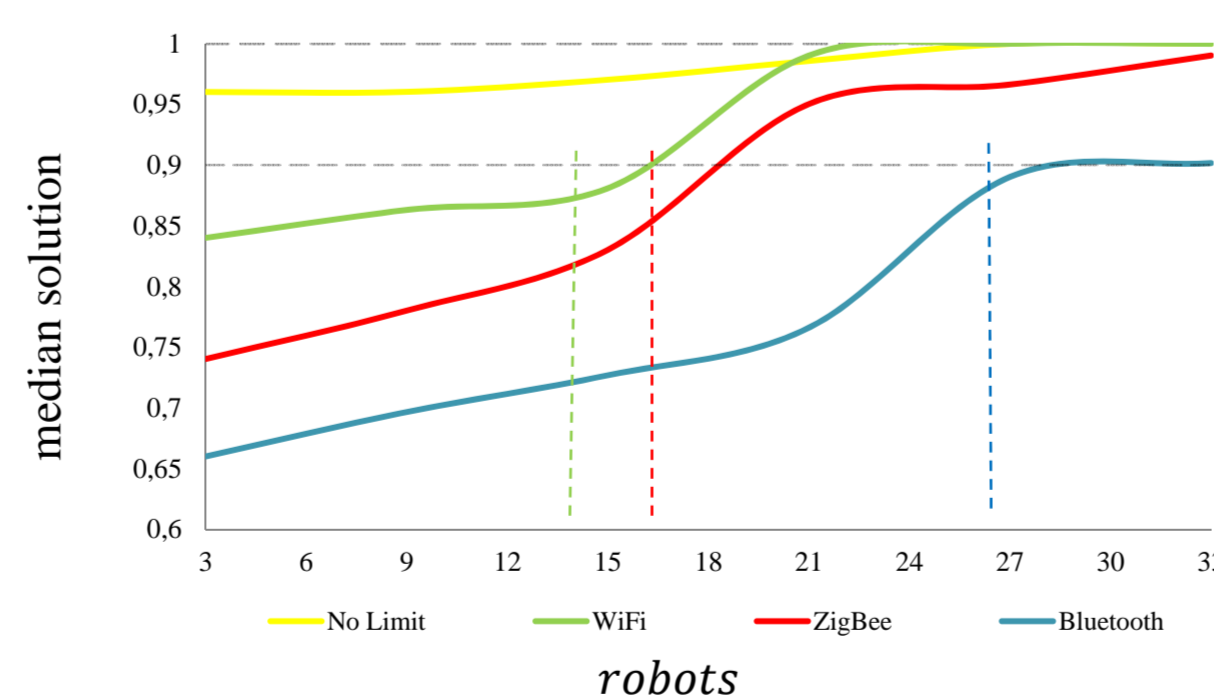
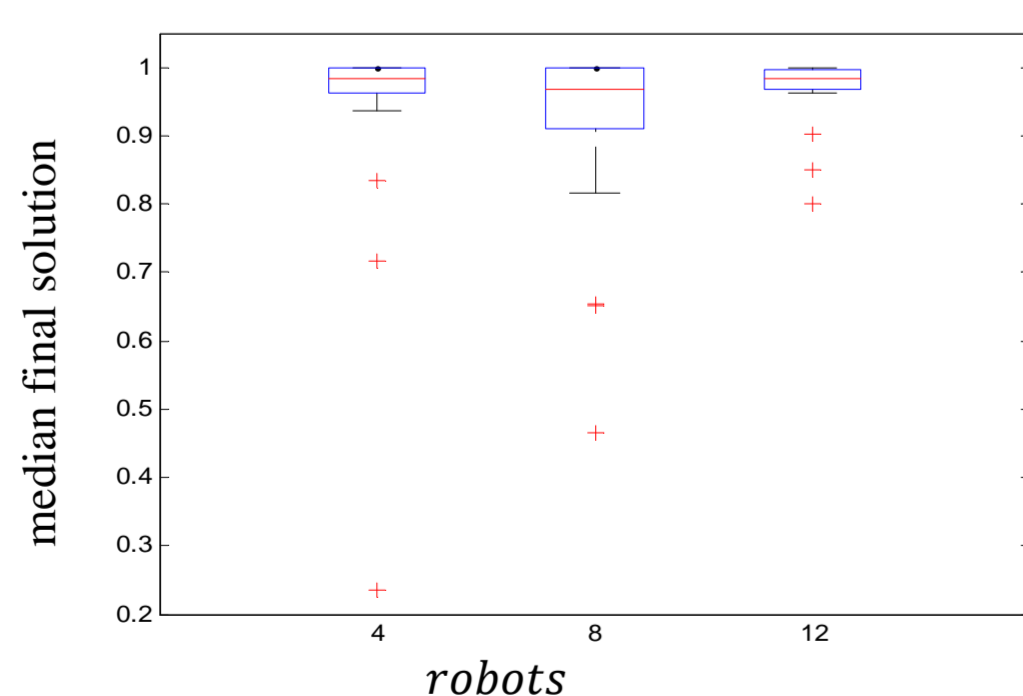
Why?

- The *DPSO* is an evolutionary algorithm that extends the *PSO* using natural selection
- Contrarily to virtual agents, robots are designed to act in the real world where obstacles and communication constraints need to be taken into account

Validated by simulations in *MatLab* and experiments with teams of *eSwarBots* and *TraxBots*



Preliminary results show that, with both simulated and physical robots, the global optimum is achieved in approximately 90% of the experiments



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