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Artificially Intelligent Robots Modelled After Ants

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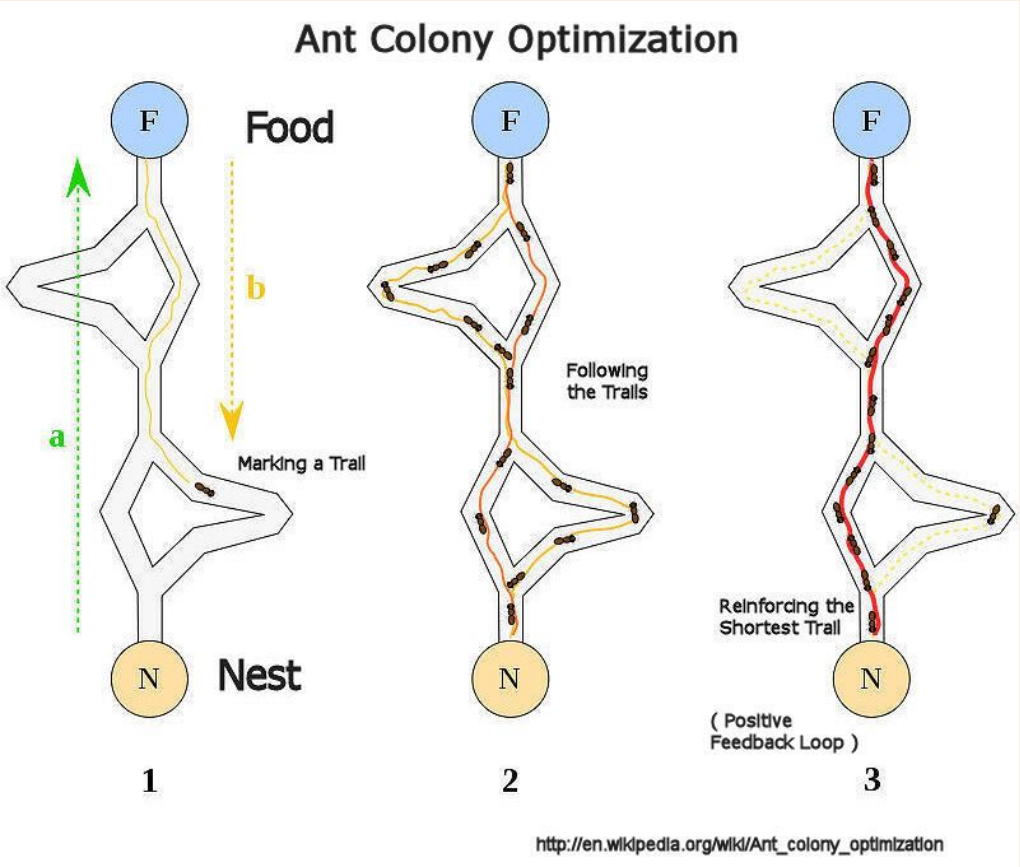
Introduction

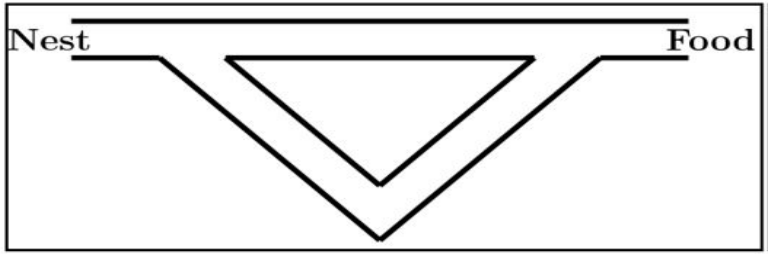
There are four main definitions of artificial intelligence. They are categorized as systems that: think like humans, act like humans, think rationally, and act rationally (Russel).

I will be focusing on the artificial intelligence that acts like ants behave, rather than focusing on their thinking, or their rationality.

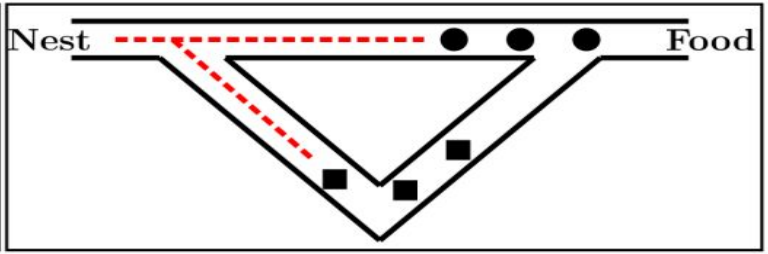
Ant Behavior

Ants are relatively simple creatures whose behavior has been widely studied

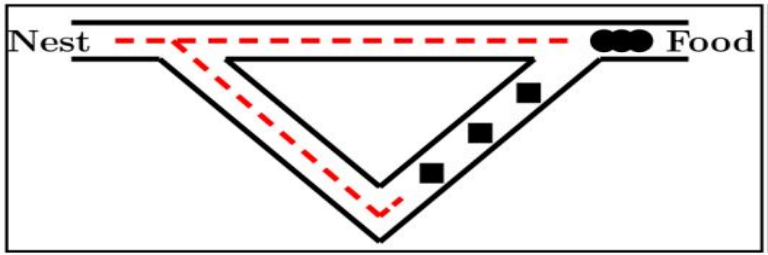




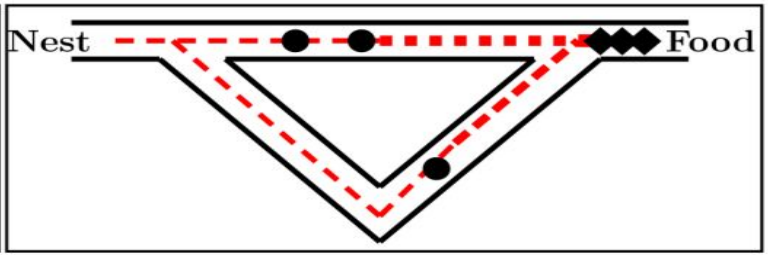
(a) All ants are in the nest. There is no pheromone in the environment.



(b) The foraging starts. In probability, 50% of the ants take the short path (symbolized by circles), and 50% take the long path to the food source (symbolized by rhombs).



(c) The ants that have taken the short path have arrived earlier at the food source. Therefore, when returning, the probability to take again the short path is higher.



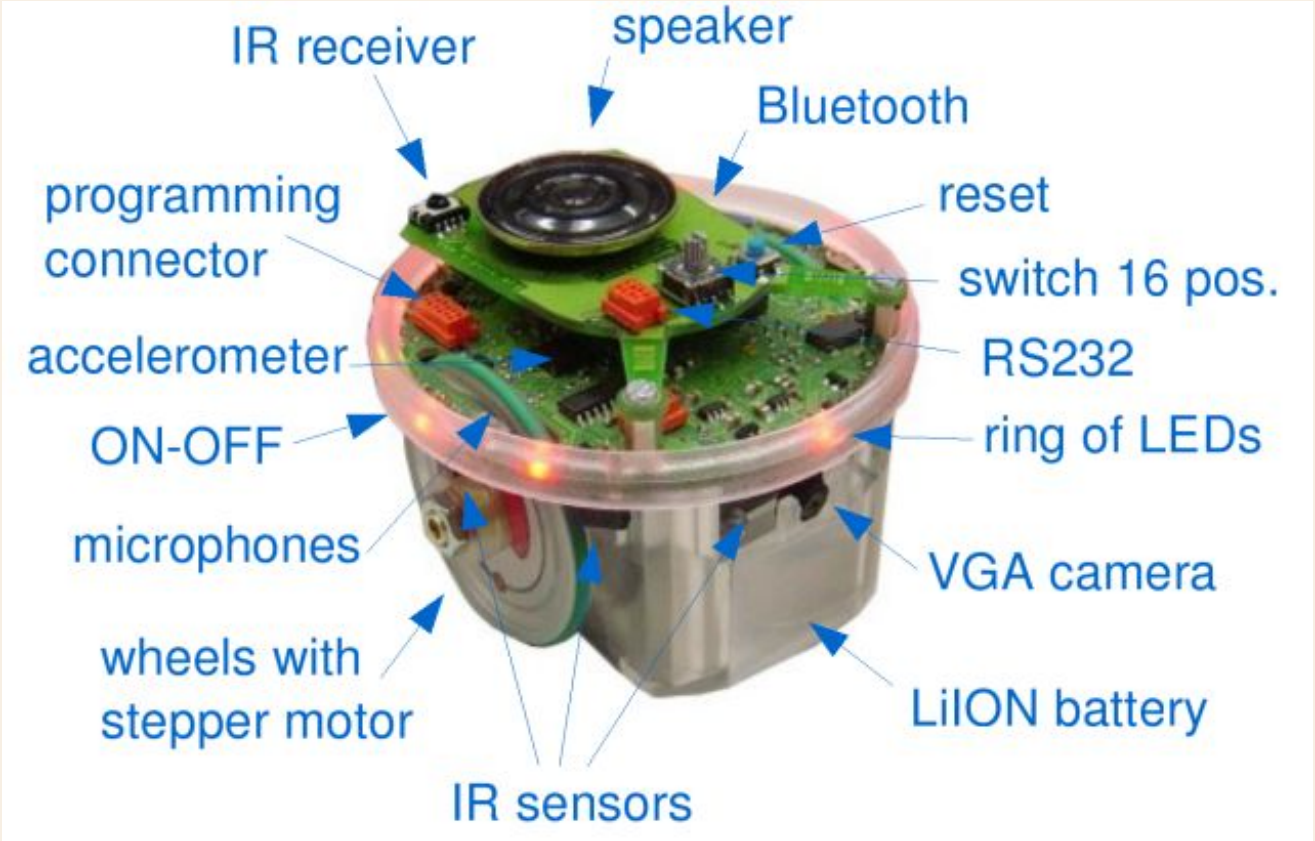
(d) The pheromone trail on the short path receives, in probability, a stronger reinforcement, and the probability to take this path grows. Finally, due to the evaporation of the pheromone on the long path, the whole colony will, in probability, use the short path.

(Blum).

Research Question:

Can an artificial intelligence project produce robots that effectively mimic the behavior of ants in the process of finding food?

E-Puck Robot



Generationrobots.com

Process

Read Instructional Material

Learn “ePic 2” in Matlab

Program single robots with navigational and movement skills

Program object recognition portion for finding “food”

Robot communication with each other using bluetooth

Information dissemination for novice programmers

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