

Virtual Pheromones for Real-Time Control of Autonomous Mobile Robots

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Abstract: This paper presents a novel implementation of the concept of “virtual pheromones” for controlling autonomous mobile robots. Instead of deploying chemicals, RFID tags, or other traceable marks in the environment, the virtual pheromones are stored in *a map of the environment* maintained and updated by a “pheromone server”. This map acts like a shared memory for all the agents, each of them communicating with the server via a radio link. No direct communication between agents is required. The pheromone server can be implemented on a regular computer, a portable device, or an embedded controller located on a robot. The technique described is applicable for guiding individual robots and robot swarms. This method can lead to significant simplification and cost reduction of the autonomous agents. Some possible applications are presented.

Keywords: Virtual pheromones, Autonomous Mobile Robots, Path following, Swarm Intelligence, Exo-synapses, Embedded systems.