

# A Simple Approach to the Multi-Predator Multi-Prey Pursuit Domain

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## 1. Abstract

We present a different approach to a class of pursuit games: the Multi-Predator Multi-Prey domain. In the typical game, a group of predators tries to capture a group of preys, and all the agents have perfect knowledge of the prey and predator positions. In our problem definition the prey-agent and the predator-agent have only local information provided by its vision range, each predator independently tries to capture a prey in a one-predator-one-prey-pair way. The predator-prey-pair capture is not known in advance and both the predators and the preys are moving in the environment. We show that a simple greedy local predator rules are enough to capture all the preys.

## 2. Introduction and Previous Work

This class of pursuit game has become a popular domain for the study of cooperative behavior in Distributed Artificial Intelligence (DAI). The pursuit domain was introduced by Brenda et. al. [Brenda 1986]. In his formulation, the prey moves randomly, and the predators can occupy the same position. In his work he made use of the center of gravity of the agents. Stephens and Merx [Stephens 1989], [Stephens 1990] experimented in a domain that did not allow two agents to occupy the same position, the predators alternated moves and the prey moved randomly. Their successful way to capture the prey made use of a centralized control mechanism. Korf [Korf 1992] introduced a simple solution to the pursuit domain. His simple algorithm made use of “attractive forces” between the predators and the prey, and “repulsive forces” between the predators. In his approach the predators had knowledge of the existence of all the other predators and the prey, then every single