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MULTI-ROBOT HUNTING IN DYNAMIC ENVIRONMENTS

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ABSTRACT—This paper is concerned with multi-robot hunting in dynamic environments. A BCSLA approach is proposed to allow mobile robots to capture an intelligent evader. During the process of hunting, four states including *dispersion-random-search*, *surrounding*, *catch* and *prediction* are employed. In order to ensure each robot appropriate movement in each state, a series of strategies are developed in this paper. The *dispersion-search* strategy enables the robots to find the evader effectively. The *leader-adjusting* strategy aims to improve the hunting robots' response to environmental changes and the *outflank* strategy is proposed for the hunting robots to force the evader to enter a besieging circle. The *catch* strategy is designed for shrinking the besieging circle to catch the evader. The *predict* strategy allows the robots to predict the evader's position when they lose the tracking information about the evader. A novel collision-free motion strategy is also presented in this paper, which is called the *direction-optimization* strategy. To test the effect of cooperative hunting, the target to be captured owns a *safety-motion* strategy, which helps it to escape being captured. The computer simulations support the rationality of the approach.

Key Words: Multi-robot, hunting, besieging circle, dynamic environment