Abstract

Consider an urban scenario in which $N$ aerial UAVs, each with limited radius of observation $R$, must patrol $M > N$ targets moving on the surface. The movement of the UAVs is free while the movement of targets is restricted to certain paths, such as urban roads. Targets are friends who can, for example, be attacked by enemies. In this scenario, it can be assumed that the positions of the targets and the observers, obtained from GPS, are transmitted to a central command, and that the targets are collaborative, not avoiding the presence of the observers. This scenario is a new instance of the Cooperative Target Observation (CTO) problem. This work investigates a centralized algorithm, modified hill climbing, to command the UAVs with a view to maximize the average number of targets observed by at least one observer. The average performance of the proposed algorithm is superior to that of similar algorithms in this new problem setting.

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Index Terms

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Information Sciences

Keywords

Cooperative target observation, Centralized command of UAVs, Modified hill climbing, Moving over a planar graph