

Mirosław Dynia

Collective Graph Exploration

No one can deny the advantages that come from an application of multiple resources by solving some complex problems. However, there is always some additional coordination effort needed to be invested there.

We investigate cooperation of group of mobile robots by exploration of an unknown environment modeled by a graph. Even if each team member has a global view on the team (knows positions of all other robots), there is still some unknown part of the graph which might turn out to be the worst possible setting for the current distribution of robots. In this case some costly relocation will have to take place.

The situation gets even more challenging by considering various restrictions on the propagation of information. We investigate various communication models and try to observe their impact on the cooperation efficiency. The whole setting is considered under two different cost models and by different restrictions on the graph topology. Moreover, there are general lower bounds presented, proving that there are some graphs that cannot be explored optimally, if their topology not known in advance.