

Adaptive data-driven error detection in swarm robotics with statistical classifiers

Abstract

Swarm robotics is an example of a complex system with interactions among distributed autonomous robots as well with the environment. Within the swarm there is no centralised control, behaviour emerges from interactions between agents within the swarm. Agents within the swarm exhibit time varying behaviour in dynamic environments, and are subject to a variety of possible anomalies. The focus within our work is on specific faults in individual robots that can affect the global performance of the robotic swarm. We argue that classical approaches for achieving tolerance through implicit redundancy is insufficient in some cases and additional measures should be explored. Our contribution is to demonstrate that tolerance through explicit detection with statistical techniques works well and is suitable due to its lightweight computation.