

Title

Distributed fault detection and recovery for networked multi-robot systems

Abstract

The talk deals with the problem of decentralized fault detection, isolation and recovery for teams of networked robots. The proposed approach builds on a distributed controller-observer schema that makes each robot of the team able to detect and isolate faults occurring on other robots, even if they are not direct neighbors. By means of a local observer, each robot can estimate the overall state of the team and it can use such an estimate to compute its local control input to achieve global tasks. The same information used by the local observers is also used to compute residual vectors, whose aim is to allow the detection and the isolation of actuator faults occurring on any robot of the team. Adaptive thresholds are derived based on the dynamics of the residual vectors, and once the faulty robots have been isolated, they are removed from the team and the mission is rearranged. The approach has been validated via both numerical simulations and experiments involving a team of Khepera III mobile robots.