

Dear Editor in Chief:

On behalf of the co-authors, I am submitting the enclosed material “Distributed Bayesian Filters for Multi-Robot Network Using Latest-In-And-Full-Out Exchange Protocol of Observations” for possible publication in the IEEE T-ASE.

Deploying teams of robots for collecting environment information is an important and promising area in both military and civilian applications, such as surveillance, reconnaissance, search and rescue. This work focuses on distributed localization of a hidden target in the environment. One main challenge for effective distributed estimation is the limited communication range and resource of robots. This paper presents a distributed Bayesian filtering (DBF) scheme that is based on local exchange of sensor measurements among neighboring robots. DBF can significantly reduce transmission burden and only rely on communication among neighboring robots, which is suitable for realistic applications. In addition, the proposed scheme ensures that all robots can correctly localize the true position of the target, when enough observations are obtained. Simulations using a team of robots for localizing static and moving target are conducted to demonstrate the effectiveness of the DBF.

We certify that we have participated sufficiently in the work to take public responsibility for the appropriateness of robot modeling, protocol design, consistency proof, simulations and analyses.

The primary Methodologies covered in this paper are 8 (Sensing and networks). The primary and secondary Applications are 4 (Safety, Security, Rescue) and 5 (Transportation), respectively.

Yours sincerely,
Chang Liu

Chang Liu
Ph.D. Candidate
Vehicle Dynamics & Control Lab
Department of Mechanical Engineering, University of California, Berkeley
Email: changliu@berkeley.edu