

## Inferential Reasoning for Heterogeneous Multi-Agent Mission

**Authors :** Sagir M. Yusuf, Chris Baber

**Abstract :** We describe issues bedeviling the coordination of heterogeneous (different sensors carrying agents) multi-agent missions such as belief conflict, situation reasoning, etc. We applied Bayesian and agents' presumptions inferential reasoning to solve the outlined issues with the heterogeneous multi-agent belief variation and situational-base reasoning. Bayesian Belief Network (BBN) was used in modeling the agents' belief conflict due to sensor variations. Simulation experiments were designed, and cases from agents' missions were used in training the BBN using gradient descent and expectation-maximization algorithms. The output network is a well-trained BBN for making inferences for both agents and human experts. We claim that the Bayesian learning algorithm prediction capacity improves by the number of training data and argue that it enhances multi-agents robustness and solve agents' sensor conflicts.

**Keywords :** distributed constraint optimization problem, multi-agent system, multi-robot coordination, autonomous system, swarm intelligence

**Conference Title :** ICMASR 2020 : International Conference on Multi-Agent Systems and Robotics

**Conference Location :** London, United Kingdom

**Conference Dates :** June 29-30, 2020