



## POSTERIOR BELIEF CLUSTERING ALGORITHM FOR ENERGY-EFFICIENT TRACKING IN WIRELESS SENSOR NETWORKS

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*Abstract- In this paper, we propose a novel posterior belief clustering (PBC) algorithm to solve the tradeoff between target tracking performance and sensors energy consumption in wireless sensor networks. We model the target tracking under dynamic uncertain environment using partially observable Markov decision processes (POMDPs), and transform the optimization of the tradeoff between tracking performance and energy consumption into yielding the optimal value function of POMDPs. We analyze the error of a class of continuous posterior beliefs by Kullback–Leibler (KL) divergence, and cluster these posterior beliefs into one based on the error of KL divergence. So, we calculate the posterior reward value only once for each cluster to eliminate repeated computation. The numerical results show that the proposed algorithm has its effectiveness in optimizing the tradeoff between tracking performance and energy consumption.*

**Index terms:** Partially observable Markov decision processes, wireless sensor networks, target tracking, energy consumption, posterior belief, clustering algorithm.