On asynchronous training in sensor networks

Abstract

Due to their small form factor and modest energy budget it is infeasible to endow individual sensors with GPS capabilities. Yet, numerous applications require sensors to have a coarse-grain location awareness. The task of acquiring this coarse-grain location awareness is referred to as training. The main contribution of this work is to propose a fully asynchronous training protocol for massively-deployed sensor networks. The sensors wake up according to their internal clock and are not engaging in synchronization with the sink. Our protocol is lightweight and simple to implement. We show analytically that in spite of the lack of synchronization, individual sensors are trained energy-efficiently. The analytical results have been confirmed by simulation.