A SCALABLE SYNCHRONIZATION PROTOCOL FOR LARGE SCALE WIRELESS SENSOR NETWORKS

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Abstract

Research in wireless sensor networks has become a hot issue during the last decade. Interest in Wireless Sensor Network (WSN) has been increased due to advances in MEMS (micro-electro-mechanical systems), processor, radio, and memory technologies. Time synchronization is an important task in wireless sensor network. Existing time synchronization methods were not designed with wireless sensor networks in mind, and need to be extended or redesigned.

In "A scalable Synchronization Protocol for Large Scale Sensor Networks and Its Applications" paper published by Yao-Win and Anna Scaglione, an adaptive and distributed time synchronization method using pulse coupled oscillators was proposed. The main advantages of the proposed method are its scalability and low complexity.

During the course of this research for EE-598 (Research Project 1), a model was developed under Matlab environment to simulate the Synchronization problem. Results were compared to the published paper "A scalable Synchronization Protocol for Large Scale Sensor Networks and Its Applications" results and were identical. These results include:

- Number of Nodes versus Period to Synchronize.
- Radius of Transmission versus Period to Synchronize.
- Radius of Transmission versus Energy to Synchronize.
- Period to Synchronize versus Energy to Synchronize.

The code was further developed to include features not addressed by Yao-Win and Anna Scaglione published paper. This includes: Power Transmission versus Period to Synchronize (with different path losses and different number of nodes).