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Semester/Master Thesis

Precise Time Synchronization for Sensor Networks using the Global Positioning System (GPS)

Wireless sensor networks are a valuable tool to gain a digital representation of physical phenomena, e.g., the scientific study of earthquakes. Measurement data acquired at different sensor nodes have to be tagged with the correct timestamps to facilitate data fusion in the processing phase. Research in sensor networks brought up different clock synchronization protocols especially tailored to sensor network. State-of-the-art time synchronization protocols provide a synchronization accuracy in the order of a few microseconds between nodes in the sensor network. The conversion between network time (hardware clock) and real time (UTC) is usually done at the network boundary, e.g., when messages are transferred to the PC attached to the base station. However, this approach introduces large errors due to the non-deterministic delays on the message path.



The goal of this thesis is to use a GPS receiver module from u-blox to timestamp incoming messages immediately after reception at the base station with the current UTC time provided by the GPS satellites. This work can build on existing time synchronization protocol implementations already available today for TinyOS and should extend them where necessary. As part of this thesis, software components should be written in TinyOS/nesc to communicate with the GPS module.

Required Skills

You should already have some skills in software development and you should be familiar with the C and JAVA programming language.

Are you interested? Please contact us by email or phone.

Contact

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