Pervasive and Energy-Efficient Positioning and Trajectory Tracking for Mobile Devices (Henrik Blunck) -May 5th 2011, 16:00 c.t., E18, OH 16-

Emerging and envisioned applications within domains such as indoor navigation, fire-fighting, and precision agriculture still pose challenges for existing positioning solutions to operate accurately, reliably, and robustly in a variety of environments and conditions and under various application-specific constraints. This talk will first give a brief overview of efforts made in a Danish project to address challenges as mentioned above, and will subsequently focus on addressing the energy constraints imposed by Location-based Services (LBS), running on mobile user devices such as smartphones.

A variety of LBS, including services for navigation, location-based search, social networking, games, and health and sports trackers, demand the positioning and trajectory tracking of smartphones. To be useful, such tracking has to be energy-efficient to avoid having a major impact on the battery life of the mobile device, since the battery capacity in modern smartphones is a scarce resource, and is not increasing at the same pace as new power-demanding features, including various positioning sensors, are added to such devices. We present novel on-device sensor management and trajectory updating strategies which intelligently determine when to sample different on-device positioning sensors (accelerometer, compass and GPS) and when data should be sent to a remote server and to which extent to simplify it beforehand in order to save communication costs. The resulting system is provided as uniform framework for both position and trajectory tracking and is configurable with regards to accuracy requirements. The effectiveness of our approach and the energy savings achievable are demonstrated both by emulation experiments using real-world data and by real-world deployments.

Henrik Blunck works at the Department of Computer Science at the University of Aarhus, Denmark.

His scientific Interests are:

- Pervasive Positioning
- Spatial and Spatio-Temporal Databases
- Algorithm Engineering
- Time-, Space- and Energy-efficient Algorithms for Large Data Sets
- Computational Geometry

For further information about Henrik Blunck you can visit his homepage: http://www.daimi.au.dk/~blunck/