

Duration: 13:50 - 17:50

Room: Shanghai

WTh-01

Resource-Efficient Localization in Wireless Sensor Networks

Organisers:

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Thorsten Nowak, University of Erlangen-Nuremberg, Germany

Abstract

Nowadays, wireless sensor networks (WSNs) have become omnipresent. Process automation, asset tracking and wildlife monitoring are just a few examples to name. In many applications among energy-awareness, also location information is a core feature, today. Position information along with sensor data offers new opportunities in data analysis. Contrary requirements of localisation and low-power nodes bring up new challenges as accuracy is linked to the energy budget. This workshop will deliver an insight into modern WSN positioning techniques. Besides a general overview on localisation in WSNs, classical fingerprinting and received signal strength indicator (RSSI) as well as high resolution techniques are addressed. This includes theoretical basics localisation algorithms, sensor node and network design. In addition, practical challenges in applications are addressed. Fingerprinting and RSSI-based direction of arrival (DOA) are a promising approach in low-power networks and discussed in detail including propagation effects. Furthermore, high-resolution positioning is covered including phase-based DOA estimation and ranging based on UWB as well as frequency hopping signals. All named localisation techniques will be discussed for real world examples illustrating the practical relevance of the workshop content.

Programme

13:50 - 14:10 Wildlife Tracking: Localization in Resources Limited Heterogeneous Wireless Sensor Networks

Markus Hartmann, Thorsten Nowak, University of Erlangen-Nuremberg, Germany

14:10 - 14:30 Sensor Node Design for Animal Tracking in Resources Limited Wireless Sensor Networks

Niklas Duda, Alexander Koelpin, University of Erlangen-Nuremberg, Germany

14:30 - 15:00 Everlasting Sensor Nodes: Energy Efficiency and Hybridization for Wireless Localization Networks

Christoph Götze, Erik Mademann, Zigpos, Germany

15:00 - 15:30 Indoor Radio Localization Using Interpolated Fingerprint Maps

Reinhard Müllner, indoo.rs, Austria

15:30 - 16:10 Break

16:10 - 16:40 SmartHome Low Power Wireless Sensor Network with Localization Functionality

Felix Pflaum, Alexander Koelpin, University of Erlangen-Nuremberg, Germany

16:40 - 17:10 Indoor Localization Methods Using Sub-5- μ W UHF Wake-Up Receivers

Heinrich Milosiu, Fraunhofer Institute for Integrated Circuits IIS, Germany

17:10 - 17:40 Energy Harvesting and UWB Techniques for Centimeter Level Accuracy Localization of Passive Tags in Space Applications

Davide Dardari, University of Bologna, Italy