

Duration: 08:30 - 12:30

Room: Istanbul

WF-03

Highly Integrated mm-Wave Systems for Emerging Industrial and Consumer Radar-Based Applications

Organisers:

Vadim Issakov, Infineon Technologies AG, Germany

Uwe Rueddenklau, Infineon Technologies AG, Germany

Abstract

The amount of the radar-based consumer applications is dramatically increasing. Starting from a simple motion detector for lighting control and door openers, up to a sophisticated MIMO sensor technology for traffic monitoring or presence detection in railway stations, radar is used to enhance comfort and safety in our daily life. Advancement of novel radar algorithms and techniques in combination with ever increasing processing capabilities offer an opportunity for a vast amount of novel radar sensing applications that can be explored. Advanced silicon-based semiconductor technologies enable high level of integration with digital baseband, whilst providing excellent characteristics at mm-wave frequencies. Hence, this workshop discusses recent developments in the implementation and application of highly-integrated mm-wave radar systems for emerging industrial and consumer applications.

Seven speakers will present various aspects of mm-wave radar systems from highly integrated chipsets, novel algorithms, and advanced signal processing techniques to emerging radar-based applications. First, micro-Doppler effect in radar is discussed and its opportunities for emerging industrial and consumer applications are considered. Next, cutting edge application of radar-based material and object classification is presented. Further, advanced signal processing techniques are discussed for micro-Doppler signature recognition of radar-based thru-wall indoor human monitoring. Next, machine learning for micro-Doppler pattern recognition of perceptive cyber-physical IoT systems based on 140 GHz radar sensors is discussed. Thereafter, novel radar concept based on interferometry is discussed. The next talk addresses high volume low-cost 24GHz highly-integrated Doppler radar and a MIMO radar for traffic monitoring. Finally, highly-integrated 60GHz radar chipset and a demonstrator using micro-Doppler effect for gesture recognition is presented.

Programme

08:30 - 09:05 Highly Integrated Micro-Doppler Radar Sensors for Emerging Applications

Victor C. Chen, Ancortek Inc, USA

09:05 - 09:35 Radar Based Interaction for Ubiquitous User Interfaces

Hui-Shyong Yeo, Gergely Flamich, Patrick Schrempf, David Harris-Birtill, Aaron Quigley University of St. Andrews, UK

09:35 - 10:10 Signal Processing and Time-Frequency Analysis of Radar Data for Indoor Human Monitoring

Abdelhak M. Zoubir, Ann-Kathrin Seifert, TU Darmstadt, Germany

10:10 - 10:50 Break

10:50 - 11:15 Silicon Radars and Smart Algorithms: A Unique Combination for Disruptive Innovation in Perceptive IoT Systems

Wim van Thillo, IMEC, Belgium

11:15 - 11:40 Microwave Interferometry for Industrial Applications

Alexander Kölpin, University of Erlangen-Nuremberg, Germany

11:40 - 12:05 Low-Cost Advanced 24GHz Radar Systems for HighVolume Applications

Thilo Lenhard, InnoSenT GmbH, Germany

12:05 - 12:30 Next Generation mm-Wave Radar-Based Gesture Sensors

Jaime Lien, Google ATAP, USA, Saverio Trotta, Reinhard Jungmaier, Vadim Issakov, Infineon Technologies AG, Germany