Elektrotechnisches Kolloquium

der Bergischen Universität Wuppertal

Die Fakultät für Elektrotechnik, Informationstechnik und Medientechnik lädt zur Teilnahme an folgender Vortragsveranstaltung mit anschließender Diskussion ein:

Es spricht

Dr. Miguel Heredia Conde

Lehrstuhl für Hochfrequenzsysteme in der Kommunikationstechnik
Prof. Dr. Ullrich Pfeiffer

über das Thema

Recent Advances in Computational Time-of-Flight Imaging

Inhalt:
Photons travel at the speed of light. However, conventional cameras are blind to their individual arrival times. In order to capture 3D geometry, Time-of-Flight (ToF) cameras exploit the fact that the travel time of photons relates linearly to the traveled distance. In this talk, I will review the tradeoffs of this novel 3D imaging modality and analyze some of the shortcomings that compromise its deployment. Specifically, our focus will be on the relatively high power consumption, limited depth range, and measurement distortions due to harmonics and multi-path interference.

Furthermore, I will present recent advances in computational ToF imaging within my group aiming to surpass these limitations, enabling passive operation indoors, long-range operation outdoors, and the realization of single-shot multi-frequency continuous-wave operation with minimal harmonic distortion. Passive operation is attained by exploiting opportunity sources of modulated light, such as LiFi or Visible Light Communications (VLC) modules. Independently, gains in operative range can be obtained by means of ultrashort pulse shaping combined with low-density coded demodulation. Accurate Fourier sampling with minimal harmonic distortion is attained by inducing custom resonant effects in the ToF pixels. To conclude, evaluation results from both simulated and real ToF correlation functions will be shown that prove the potential of these computational 3D imaging approaches to bypass the aforementioned limitations.

T e r m i n: **13.12.2023, 14:00 Uhr**

O r t: Bergische Universität Wuppertal
Campus Freudenberg, Seminarraum FG 1.01