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Editorial

Localization, Verification, Privacy, Monitoring and Interaction in Intelligent Devices

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Signal processing power intelligent devices and systems enabling sophisticated interactions with our environment, allowing us to be located, monitored and identified in ways which are as efficient as possible. Of course, the opposite is also true regarding our understanding of our environment. This issue highlights a range of technologies designed for this purpose.

Finding, identifying and communicating with devices is a crucial capability. In recent years, localization efforts, both indoors and outdoors, have been improving. ***Online Dynamic Window (ODW) Assisted Two-stage LSTM Frameworks for Indoor Localization*** describes a further advancement of this field, using machine learning for efficient location indoors. Once found, verifying users is the next step in many sensitive applications. Increasingly biophysical signals, eminating from the human body, are proving important for this requirement. In ***A New Score Level Fusion Approach for Stable User Verification System using the PPG Signal*** the authors describe a system for doing precisely that using measurements of human pulse. Complementary to this need to authenticate devices is the need for privacy in communication. Securing these interactions is frequently of the utmost importance, and efficient arithmetic and other components for cryptography are key in modern devices. ***Polynomial Multiplication Architecture with Integrated Modular Reduction for R-LWE Cryptosystems*** describes an example of this need - an efficient circuit architecture for modern cryptographic applications.

Of course, once a user is verified, modern devices provide a rich array of immersive interaction and passive monitoring capabilities. Two examples are provided in the last two papers in this issue. In ***A multi-channel wireless active noise control headphone with coherence-based weight determination algorithm*** the authors describe an approach to maximising the quality of audio signals on wireless headphones; the paper ***Automatic non-invasive Cough Detection based on Accelerometer and Audio Signals*** an approach which can use sensors embedded in smartphones for a very timely purpose - the identification of coughing patterns, with all the potential to diagnose conditions causing the coughing that work brings.

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