

Theme : Sensor Technology

Subject : Non-Invasive Mobile Sensor and Platform

Introduction

The goal of this research subject is to explore novel mobile sensor and platform that allows smarter device design enabling advanced user specific services as well as enhanced user experience.

Triggered by various biometric sensor installations in mobile devices for user authentication and personal health monitoring, new services based on novel sensor technology in the industry is gaining more attentions. The foci of this subject include non-invasive mobile biometric sensors, chemical-specific sensors, ambient sensors, integrated sensory system and platform. Also, use of biomimetics technology and organic materials based device for mobile label-free sensing applications are fully covered within our scope of interest.

Scope

Challenges of designing novel mobile sensor, platform, and identifying new applications include:

- Concepts and methods of non-invasive biometric sensors for vital and physiological data monitoring
- Concepts and methods for chemical-specific gas (e.g., CO₂) sensors for potential hazard warning
- Exploration of new (organic) materials for flexible IR/Near IR sensors
- Sensor sensitivity enhancement based on biomimetics technology
- Complex sensory system(gas, particulated matter, etc.) for mobile devices and its application scenario
- User-friendly biometrics to measure and verify the bio-signals and/or bio-data according appropriately to a user interface and/or the position of a mobile and/or wearable device on body.
- Biometrics to measure and verify the vein pattern of a wrist and/or a finger.
- Biometrics to measure and verify the electrocardiogram of a user.
- Biometrics to measure and verify the fingerprint via screen of a smart phone
- Design and fabrication methods for sensor quantifying the blood glucose level non-invasively
- Verification of sensor performance based on ISO 15197
- Novel method to integrate all components into a simple platform
- Methods to synthesize the chemical composition that can convert its optical spectrum (color) change when it is exposed to target gas molecules.
- Methods to fabricate as one sensor sheet as a colorimetric sensor array form.
- Verification of the gas sensing result as CIS image sensor with H/W or S/W filter technology. But the investigating tool is not limited to CIS.
- Methods to provide a novel architecture to establish mobile electronic devices and wearable devices.

Expected Deliverables

The following is open to discussion:

- Suggestion of concepts and/or design of mobile sensor and/or platform with technical details
- Sensor design documents and/or S/W and algorithmic details
- Prototype samples based on scenario (if available)
- Journal publications and patents with Samsung (if agreed)
- Detailed quarterly progress reports summarizing accomplishments