

Printed Soft Electronic Sensors for Humans and Robots

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Tactile sensors have taken increasing attention for the use in wearable healthcare devices and electronic skins for robots. In fabrication of the deformable tactile sensors, there have been two approaches; electronic sensor and iontronic sensor. Electronic tactile sensors monitor the electrical changes (resistance, capacitance, inductance, voltage, current) resulting from temperature change and mechanical deformation, either with/without selectors (diodes, transistors) and signal modulators (ring oscillator, analog-to-digital converter). Iontronic tactile sensors detect the electrical changes (voltage, capacitance, current) caused by charge distribution and ion transport in an electrolyte-containing medium, either with or without synaptic units used for signal modulation. In both approaches, several technological trends are emerging and competing; time-division multiple access (TDMA) versus event-driven parallel collection, passive sensing versus active sensing, and having multifunctions with clear decoupling between the functions. In this talk, I discuss some of the achievements in both the electronic and iontronic tactile sensors and compare the pros and cons of the approaches in the type of data collection, power supply, structural simplicity, and multifunctionality.