

Cyber Valley Evening Colloquium on Autonomous Systems

Creating an Efficient Whole-body Tactile Skin using a Piezoresistive Structure and Contact Inference

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Online on Webex. For the event link please click [here](#)

Abstract

Autonomous robots operating in complex and contact-rich environments are becoming essential for industry. These robots would benefit from a soft tactile skin that detects the location and strength of contacts over the entire robot's body surface. Implementing such tactile skin is challenging as the skin should seamlessly cover large and curved surfaces to monitor unexpected physical contacts. Human tactile skin efficiently resolves this challenge using an overlapped receptive field structure and cognitive processing. My research mimics this efficient feature by designing a piezoresistive structure with sparsely distributed electrodes and indirectly inferring contact locations and magnitudes from the electrodes. This approach considerably simplifies whole-body tactile sensor design and fabrication while achieving its contact sensing performance comparable to that of human skin. This talk will introduce key design components of a fabric-based tactile sensor and evaluation results, showing its potential toward efficient whole-body tactile skin applications.

Biographical Information

Dr. Hyosang Lee is currently a research scientist at the Max Planck Institute for Intelligent Systems, Stuttgart, Germany. He received a B.S. in Mechanical Engineering from Korea University in 2010. His passion for robotics led him to obtain an M.S. in Robotics from Korea Advanced Institute of Science and Technologies (KAIST), Daejeon, South Korea, in 2012, and a Ph. D. in Mechanical Engineering from KAIST in 2017 where he developed soft tactile skin using piezoresistive nanocomposites. Moved by his interest in haptics, he joined Max Planck Institute for Intelligent Systems as a postdoctoral research fellow in 2017. Since then, he works on the development of a feasible whole-body tactile skin and its possible applications.