

3D Depth and Tactile Imaging Sensors

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The lecture starts with an overview of robotic sensors that are currently in use for 3D navigation and manipulation. Followed is an in-depth survey of 3D depth imaging sensors for applications to, e.g., advanced vehicles, intelligent transportation systems, security systems, smart homes, interactive game environments, and service robots. The many approaches to 3D depth imaging based on such physics principles as time of flight, structured light, stereo-vision, signal interference, integrated photography or compound vision will be covered. Emphasis will be given to the compactness in sensor size with micro-fabrication, the performance robustness against environment variation and noise, as well as the cost-effectiveness. Then, the lecture shifts its focus to the recent progress on tactile imaging sensors or artificial skins. It will focus on how the advancement of MEMS and flexible electronics technologies could lead to more compact, functional, and flexible tactile imaging sensors. Finally, the impact that 3D depth and tactile imaging sensors bring about on various applications ranging from consumer electronics to human-machine interfaces will be addressed. The lecture aims at providing the sensor community with the recent progress and future perspective of 3D depth and tactile imaging sensors as well as the opportunity of these sensors for various real-world applications.

Dr. Lee is a Distinguished Professor of Information and Communication Engineering and the Director of the Intelligent Systems Research Center at the SungKyunKwan University (SKKU). Prior to his affiliation with SKKU, he has been an Executive Vice President and Chief

Research Officer (CRO) of the Samsung Advanced Institute of Technology (SAIT), managing Micro & Nano as well as Intelligent Systems Sectors. Dr. Lee has been a Professor of Electrical Engineering and Computer Science at the University of Southern California and held a Senior Research Staff Position at the Jet Propulsion Laboratory (JPL), California Institute of Technology. Dr. Lee received his Ph.D from Purdue University, West Lafayette, and MS/BS from Seoul National University.

Dr. Lee has published over 250 papers in scientific journals and major conference proceedings. He is a Fellow of IEEE and a Life Fellow of the Korean Academy of Science and Technology. Dr. Lee is currently serving as a Vice President of IEEE Robotics and Automation Society, directing the Industrial Activities Board. He is also the founding Editor-in-Chief for the Springer-Verlag Journal of Intelligent Service Robotics. He has been serving as the Chair of several National Committees for developing the Science and Technology policies and R&D plans for Korea.