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강연제목: 실시간 신경신호시각화 및 다중 폐루프 신경자극을 위한 무선 엣지 컴퓨팅 디바이스(An Wireless Edge Computing Device for real-time neuro reporting and low latency multiple closed loop neuromodulation)

Abstract: It will be presented the bi-directional edge computing device for rodent that incorporates wireless communication technology and mobile edge computing (MEC) to perform real-time neuro reporting of brain activity in social behavior applications, as well as low latency multiple closed loop neuromodulation in Spinal cord injury applications.

Despite recent dramatic improvements in our understanding of all the levels of the brain, one of the issues of brain scientists is the study of what happens in the brain while humans or animals interact. In contrast to many brains of naturally interacting social members, the majority of the findings have been made from individually measured brains. We developed the concept of an immediate report of brain activation right on the animals' heads to accommodate the various facets of social interaction. This allows the researchers to observe the behaviors as well as the occurrence of specific brain activation together.

Injury to the cervical spinal cord (SCI) can cause severe impairments to the hands and arms. In a reach-and-grasp test involving food pellets, we have demonstrated that targeted, activity-dependent spinal stimulation at a single spinal location coordinated to voluntary contractions of a damaged forelimb muscle achieved significant functional gains in comparison to controls. To make therapy more effectively in triggering spinal stimulation on single motor unit action potentials from muscles of the impaired forelimb, we have applied the edge computing, wireless device that delivers real-time activity-dependent stimulation with small latency (~1.2msec) in multiple closed loop.

Brief Biosketch

SUNG Q LEE received the B.S. degree in Mechanical Engineering from Korea Advanced Institute of Science and Technology in 1994, 1996 and 2001, respectively. From 2001 to present, he has worked as a principal researcher at Electronics and Telecommunications Research Institute (ETRI). As a director of the Brain links creative research lab, he was awarded ETRI outstanding researcher in 2011, and received the Prime Minister' Award in 2018. His main areas of interest are MEMS microphone, sound field security sensor, sound source localization, piezoelectric devices, and implantable neuro-prosthetic device and brain computer interface.