



이름: 정지훈/Ji-Hoon Jeong

직위: 조교수/Assistant professor, Ph. D.

소속: 충북대학교/Chungbuk National University

기타소속:

강연제목: 스마트 뇌-컴퓨터 인터랙션: 심층 신경 활성 학습 기반 의미론적 발화 상상 해독 기술
Smart Brain-Computer Interaction: Semantic Decoding of Speech Imagery Based on Deep Neural Active Learning

Abstract:

Brain-Computer Interface (BCI) is explored to deciphering and categorizing brain signals via advanced machine or deep learning techniques, for a variety of applications. Recent advances focused on decoding speech imagery, where analyzing the brain's response to imagined speech (without actual speech) by an individual. Furthermore, we concentrate on towards merging data on brain activity, captured using the non-invasive method of electroencephalogram (EEG), with large language models (LLMs) to achieve sentence-level semantic decoding. This approach successfully interprets intended meanings and combines them with LLMs to creating neural command as sentences. In this process, EEG data is acquired as individuals perform speech imagery about a specific keyword, which is then preprocessed and decoded based on real-time deep neural active learning. The identified keywords are used as LLM prompt to generate sentences. Our investigations in speech imagery decoding has shown promise in enhancing decoding accuracy and specificity, potentially leading to a novel method of intuitive communication between humans and machines through smart BCI interactions.

Brief Biosketch

Ji-Hoon Jeong received a Ph.D. degree in Brain & Cognitive Engineering from Korea University, Seoul, Republic of Korea in 2021. He was also a visiting scholar in MPI for intelligent System, Stuttgart, and worked at a research professor in AI Research Center at Korea University. Since 2022, he is currently an Assistant Professor at the School of Computer Science, Chungbuk National University, Republic of Korea. He has taken up a Technical Advisor in Injewelme Asia Pacific PTE. LTD. from 2023. He is an associate member of IEEE, regular member of IEEE EMBS, SMC, SPS, ACM/SIGAPP, KOSOMBE, and KEEG. His research interests include brain-machine interface, artificial intelligence, veterinary medicine application.