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Edition IV

भारतीय विज्ञान संस्थान

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Energy-Efficient Computing for Robust Brain Machine Interface

Abstract: This talk focuses on designing and developing energy-efficient architectures and algorithms for robust and accurate Brain Machine interfaces (BMI). A BMI is a technological system that records neural signals and maps them to control prosthetic device parameters. Thus, enabling patients with motor impairments to interact seamlessly with their environment. The talk will focus on intracortical BMIs in human participants and animal models (where electrodes are implanted in specific cortical areas). The talk will cover the general challenges involved in developing the implanted BMIs. Further, the talk will present results that show improvement in accuracy and robustness using neural network-based algorithms. Additionally, talk will discuss strategies for software-hardware codesign to enable high energy efficiency without loss of accuracy.

Brief Bio: *Dr. Sahil Shah is an Assistant Professor in the Department of Electrical & Computer Engineering at the University of Maryland, College Park. He officially joined the UMD ECE Department in Spring 2021. His area of expertise is low-power analog & mixed-signal systems for energy-efficient computation. His lab investigates & designs low-power systems that can compute efficiently in a low-resource environment, such as implantable or wearable platforms. Prior to his arrival at the University of Maryland, Sahil was a postdoctoral associate in the department of Electrical Engineering at California Institute of Technology. At Caltech, he pursued research on developing robust brain-machine interface for enabling patients to control prosthetic devices. He received his PhD in Electrical Engineering from Georgia Institute of Technology in 2018 where he developed reconfigurable mixed-signal neural networks for monitoring vital & physiological signals. His research interests fall into three major areas: Energy-Efficient integrated circuits, Embedded Machine learning, and Bio-Sensing & Monitoring. Sahil's long term goal is to develop robust & energy-efficient devices that will equip physicians with tools to make better diagnosis, tailor rehabilitation process for patients and technology that will help us better understand physiological and neurological activity.*