Nilanjan Banerjee

Professor of Computer Science and Electrical Engineering

University of Maryland

Zoom link:
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174413

RestEaze: Sleep fragmentation determination and micro-cortical arousal inference by characterizing leg movements during sleep

March 4 • 12:05 – 1:20 p.m.

ABSTRACT

Clinical and animal studies indicate frequent small micro-arousals (McA) fragment sleep, leading to health complications. McA in humans is defined by changes in electroencephalogram (EEG) and Electromyography (EMG) monitoring during sleep. Complex EEG recordings during the night are usually required to detect McA, limiting large-scale, prospective studies on McA and their impact on health. Even with the use of EEG, reliably measuring McA can be difficult because of low inter-scorer reliability. Surrogate measures in place of EEG could provide easier and possibly more reliable measures of McA. These have usually involved measuring heart rate and arm movements. They have not provided a reliable measurement of McA in part because they cannot adequately detect short wake periods and periods of wake after sleep onset. Leg movements in sleep (LMS) offer an attractive alternative. LMS and cortical arousal, including McA, commonly occur together. Not all McA occur with LMS, but the most clinically significant ones may be those with LMS. Conversely, most LMS do not occur with McA, but LMS vary considerably in their characteristics. Evaluating LMS characteristics may serve to identify the LMS associated with McA.

In this talk, Dr. Banerjee will present the design of a novel ankl- worn wearable device and analytics for characterizing leg movements during sleep and preliminary results on finding associations between leg movements during sleep and McA. Further, he will introduce a set of human subject studies and data sets collected in his lab at University of Maryland, Baltimore County with researchers at Combat Capabilities Development Command Army Research Laboratory to understand individual and team performance.

BIO

Dr. Nilanjan Banerjee is a professor of computer science and electrical engineering at University of Maryland, Baltimore County. He is the chief executive officer and chief security officer of two startup companies, Tanzen Medical, Inc., and Lifeplus, Inc., that focus on developing sensors systems for physiological monitoring. He is a National Science Foundation CAREER Awardee, a Microsoft Research Software Engineering Innovations Awardee, and has received few awards for his entrepreneurship endeavors. He research focuses on two diverse areas: sensor system design for physiological monitoring and cybersecurity as it relates to manufacturing systems.