Modern Tools for Noninvasive Analysis of Brainwaves: Applications in Assistive Technologies and Medical Diagnostics

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Digital signal processing is arguably one of the most important segments of any modern medical equipment. Recent advances in intelligence signal processing have married machine learning methods to traditional signal analysis and classification practices. In this talk, I will review state of the art brainwave analysis methods and our related advances in quantitative electroencephalogram (qEEG) analysis for brain computer interfaces (thought translation devices), as well as cerebral ischemia localization (e.g. for clamp monitoring during inetroperative carotid endarterectomy). The presentation will conclude with a discussion on corresponding R&D trends, especially near infrared spectroscopy (NIRS) as a new complementary modality to EEG for portable and affordable monitoring of brain functions.

Presenter's short bio:

Reza Derakhshani, Ph.D.,(M'98) - joined the UMKC School of Computing and Engineering as an assistant professor in 2004. His research focuses on computational intelligence with applications in biometrics and biomedical signal analysis. He earned his Ph.D. and Master's degrees in Computer Engineering and Electrical Engineering respectively from West Virginia University. He earned his bachelor's degree in Electrical Engineering from Iran University of Science and Technology. His work has been mainly funded by the National Science Foundation, and has resulted in a number of peer-reviewed publications and a U.S. patent.