Biomedical Informatics Grand Rounds

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3:00 pm – 4:00 pm

Integrated AI and multi-modal digital health data for precision medicine

Rakesh Shiradkar, Ph.D.

Assistant Professor, Department of Biomedical Engineering and Informatics, Indiana University Indianapolis

Remote Access
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Meeting ID: 956 1719 7636 Passcode: 924293

Bio: Dr. Shiradkar is an Assistant Professor in the Department of Biomedical Engineering and Informatics at Indiana University Indianapolis. Prior to his current appointment, he was a Research Assistant Professor at Emory University. He obtained his doctorate degree in Electrical and Computer Engineering from the National University of Singapore (NUS) where his research was on computer vision approaches for 3D reconstruction and material classification. He joined the Department of Biomedical Engineering at Case Western Reserve University (CWRU) for post-doctoral research which focused on Artificial Intelligence (AI) approaches for medical image processing in the context of cancer diagnosis and prognosis. His current research focuses on leveraging multi-modal health care data including imaging, pathology, genomics and demographics to improve disease diagnosis and prognosis, specifically in the context of cancer. He has extensively worked on radiomics for cancer risk stratification, diagnosis and prognosis; radio-pathologic correlations between quantitative imaging and histopathology; multi-modal image co-registration; cancer nomograms integrating radiomics with clinical parameters and genomic assays. He has >30 peer reviewed publications in high impact journals and conferences (including MICCAI, CVPR). He received an early career award from the Department of Defense (DoD) and other institutional and foundation grants. He has mentored numerous undergraduate and graduate students, and was nominated to the award for excellence in mentoring for undergraduate research at CWRU and Emory University.

Abstract: Increasing availability of large-scale digitized health data offers immense potential to mine crucial signatures and patterns associated with adverse pathology and treatment outcomes. However, given the extent of heterogeneity and disparity in disease presentation, there is a need for developing approaches that allow for personalized and precision medicine. In this talk, I will present (a) AI methodologies for integrating multi-modal health care data for improved disease characterization. Specifically, I will present computational imaging methods for quantitative disease representations which can then be used for multi-modal co-registration and correlations. (b) AI for development of quantitative biomarkers from multi-modal data for disease risk stratification, prognosis and therapy planning. I will discuss computer vision, deep learning and machine learning approaches for identifying prognostic and predictive biomarkers from radiology and pathology data. (c) Address bottlenecks for translation of AI in the context of digital health. While AI is being widely explored in numerous domains, it poses particular challenges in the context of health care specifically in terms of its reproducibility, generalizability and explainability. I will describe potential approaches to address some of these challenges and the path forward towards translation of AI for digital health.

Educational Objectives:
After participating in this lecture, attendees will be able to:

1. **Describe** AI-based approaches for integrating multi-modal healthcare data to improve disease characterization and support personalized medicine.
2. **Identify** computational methods for developing and applying quantitative imaging and pathology biomarkers to aid in disease risk stratification, prognosis, and therapy planning.
3. **Discuss** the challenges and potential strategies for translating AI into clinical practice, with a focus on enhancing reproducibility, generalizability, and explainability in digital health applications.

Disclosure Statement: The faculty and planners have no relevant financial relationship with ineligible companies, whose primary business is producing, marketing, selling, reselling, or distributing health care products used by or on patients.

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