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Biography:

Venu Govindaraju, PhD, is Vice President for Research and Economic Development and SUNY Distinguished Professor of Computer Science and Engineering at the University at Buffalo (UB) – a flagship of the State University of New York system. At UB, he established the Institute for Artificial Intelligence (AI) and Data Science, National AI Institute for Exceptional Education, and is the founding director of the Center for Unified Biometrics and Sensors. He has led sponsored projects totaling nearly \$100M, holds six patents, and authored close to 500 refereed scientific papers. Govindaraju is the Chief Research Officer of UB, where he oversees the university's entire research enterprise of \$450M annual expenditures.

Talk Title: The Evolution of AI in Handwriting Recognition: Insights and Innovations

Abstract: In this talk, we present an overview of nearly three decades of innovation in handwriting recognition – providing insights into the evolution of research in this field and its future directions. Too, we explore how the approach to AI has been transformed from human-centric engineering to contemporary machine learning paradigms, driven by the confluence of supercomputing power, the ubiquity of cameras capturing document images, and the plentiful availability of data.

We revisit our seminal work in handwriting recognition, which was integral to the first handwritten address interpretation system used by the U.S. Postal Service, a landmark achievement in the practical application of AI. Our journey through the handwriting recognition landscape will highlight the transition from lexicon-based to lexicon-free approaches, and from heuristic-driven techniques to the principled methodologies we pioneered. Initially, our focus was on practical applications such as automated processing of postal addresses, bank checks, and medical forms. These applications have evolved to target new challenges and opportunities, such as leveraging handwriting recognition to aid in the diagnosis and support of dyslexia and Parkinson's disease, and exploring how handwriting can stimulate cognitive development in children. For example, a learning science question of interest is whether speech communication impediments among children can be overcome more effectively when exercises of vocal repetitions with corrections under the guidance of a speech pathologist are supplemented with simultaneous handwriting of the words.

The talk concludes with a forward-looking perspective on the digital humanities space and innovative ideas, such as the potential applications of whiteboard recognition technologies in flipped classroom settings.