Rishabh Singh

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EDUCATION

UNIVERSITY OF FLORIDA — Gainesville, USA
Doctor of Philosophy in Electrical and Computer Engineering (GPA: 3.71/4) — Expected 2022
Master of Science in Electrical and Computer Engineering (GPA: 3.71/4) — Aug 2016 - May 2018
Research Areas: Kernel Methods, Information Theory, Uncertainty Quantification, Machine Learning.
Coursework: Deep Learning, Big Data Ecosystems, Machine Learning in Time Series, Pattern Recognition, Noise in Linear Systems, Image Processing and Computer Vision, Quantum Information Science.

VELLORE INSTITUTE OF TECHNOLOGY — Vellore, India
Bachelor of Science in Electrical and Electronics Engineering (GPA: 8.46/10) — Aug 2010 - May 2014

RESEARCH EXPERIENCE

UNIVERSITY OF FLORIDA - COMPUTATIONAL NEUROENGINEERING LAB (CNEL) — Gainesville, USA
Research Assistant & PhD Candidate — Aug 2017 - Present
• Developing physics inspired RKHS based frameworks for **predictive uncertainty quantification** of deep learning models and **functional signal processing** with **Prof. Jose C. Principe**. Specific application domains:
(i) Predictive uncertainty quantification of **benchmark image classification models** under **data distributional shifts**.
(ii)**Transfer learning** applications and quantification of **data transferability**.
(iii) Optimal transport based **time-series dependency** quantification and **domain adaptation** techniques (in progress).
• Developed a Correntropy based hierarchical linear dynamical system (HLDS) for **speech phoneme clustering**.
• Implemented HLDS for video game **action sequence segmentation** (DARPA project) and for **dynamic texture synthesis**.

VELLORE INSTITUTE OF TECHNOLOGY — Vellore, India
Undergraduate Researcher — Jan 2013 - May 2014
• Performed a comparative analysis of induction motor **dynamic braking** schemes using **MATLAB and Simulink**.
• Collaborated with a **team of 40** members to build an electric car for **Formula Student (FS)** competition, UK (July, 2013).

INDUSTRY EXPERIENCE

AVENTUSOFT LLC — Boca Raton, USA
Research Scientist Intern — May 2020 - Aug 2020
• Implemented **deep learning architectures for analyzing Electrocardiography** time series data.

TATA MOTORS LIMITED — Pune, India
Assistant Manager — Aug 2014 - May 2016
• Oversaw and improved vehicle **assembly line automation** systems with respect to safety, maintenance and productivity.

RELEVANT PUBLICATIONS

• **Singh, R.** & Principe, J.C. (2021). **Quantifying Model Predictive Uncertainty with Perturbation Theory**. under review. [**arxiv link**]
• **Singh, R.** & Principe, J.C. (2020). **Toward a Kernel-based Uncertainty Decomposition Framework for Data and Models**. Neural Computation 2021; 33 (5): 1164–1198. [**arxiv link**]
• **Singh, R.** & Principe, J.C. (2020). **Time Series Analysis using a Kernel based Uncertainty Decomposition Framework**. Conference on Uncertainty in Artificial Intelligence (UAI) 2020. [**paper link**]
• **Singh, R.**, Yu, S., & Principe, J.C. (2020). **Composite Dynamic Texture Synthesis using Hierarchical Linear Dynamical System**. 2020 IEEE International Conference on Acoustics, Speech and Signal Processing. [**paper link**]
• **Singh, R.** & Principe, J.C. (2018). **Correntropy Based Hierarchical Linear Dynamical System for Speech Recognition**. In proceedings of 2018 International Joint Conference on Neural Networks (IJCNN).[**paper link**]
• **Singh, R.**, Li, K., & Principe, J.C. (2018). **Nearest-Instance-Centroid-Estimation Linear Discriminant Analysis**. In proceedings of 2018 IEEE International Conference on Acoustics, Speech and Signal Processing.[**paper link**]

COURSE PROJECTS

• Implemented a deep CNN using **tensorflow** to construct photo-realistic versions of human face sketches (CELEB-A database).

COMPUTER SKILLS

• **Programming:** Python, MATLAB, LaTeX. **Deep Learning Frameworks:** Keras, TensorFlow.

AWARDS

• University of Florida College of Engineering **Achievement Award** for New Engineering Graduate Students, 2016.