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.