Rishabh Singh

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PhD candidate (advisor: Prof. Jose C. Principe) at Computational NeuroEngineering Lab (University of Florida) seeking positions in areas such as uncertainty in AI, trusted/interpretable AI research, physics inspired AI and time-series analysis.

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 functional methods in the RKHS for obtaining representations of **data** and **neural network models** useful for following application domains:
  (i) Predictive uncertainty quantification of **deep learning 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).
• Implemented Hierarchical Linear Dynamical Systems (HLDS) for video game **action sequence segmentation** (DARPA project) and for **dynamic texture synthesis**.
• Implemented a deep CNN using **tensorflow** to construct photo-realistic versions of human face sketches (CELEB-A database).

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

RESEARCH SCIENTIST INTERN Boca Raton, USA
Aventusoft LLC May 2020 - Aug 2020
• Implemented **deep learning algorithms for detecting fiducial points in Electrocardiography** time series data as part of a downstream task of arrhythmia detection. The work was incorporated into company's product.

ASSISTANT MANAGER Pune, India
Tata Motors Limited 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. [**paper 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. [**paper 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**]

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.