Ritik Raina
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Education

- **Stony Brook University** — Stony Brook, NY
  Ph.D. in Cognitive Science — **08/2023 – 06/2027 (***expected)*
  - **Research directions**: Developing brain-inspired computer vision models, bridging human and machine visual perception via top-down modulations.
- **University of California, San Diego** — La Jolla, CA
  B.S. in Cognitive Science — **09/2018 – 06/2022**

Work Experience

- **EyeCog Lab - Stony Brook University**, Graduate Student Researcher — **08/2023 - Present**
  Advisor: *Dr. Gregory Zelinsky*
  - Currently working on inventing novel image synthesis techniques using eye movements and foveated inputs to predict and generate high-resolution images based on language cues.
- **de Sa Lab - UC San Diego**, Pre-Doctoral Researcher — **02/2021 - 06/2023**
  Advisor: *Dr. Virginia R. de Sa*
  - Led a project on the exploration of racial biases across facial expression analysis models via artificially-generated faces with varying manipulations to skin color, facial morphology, and facial muscle activation.
  - Worked on developing bio-inspired convolutional networks, "DivNormEI", and their integration into modern deep neural networks. This research is supported by the Sony Research Award Program.
  - Papers summarizing our research accepted at NeurIPS, VSS, and COSYNE.
- **Intel Corporation**, Researcher — **01/2022 - 06/2023**
  Mentors: *Dr. Jamel Tayeb, Dr. Farnaz Abdollahi, Dr. Bijan Arbab, Dr. Virginia R. de Sa*
  - Led the development on a real-time anomaly detection system, leveraging Bi-LSTM architecture to provide long-term forecasting of PC hardware and software metrics.
  - Implemented an actuator library to streamline and automate the anomaly detection process, encompassing data preprocessing, model integration, and real-time output analysis.
  - Employed an EfficientNet-based facial emotion recognition model upon understanding the relationship between technology performance and user experience.

Select Publications

- **Adaptive recurrent vision performs zero-shot computation scaling to unseen difficulty levels** [Paper]
  Veerabadran, V., Ravishankar, S., Tang, Y., **Raina, R.**, & de Sa, V. R.
  Neural Information Processing Systems (**NeurIPS**) 2023
- **Cortically motivated recurrence enables visual task extrapolation** [Poster]
  Veerabadran, V., Ravishankar, S., Tang, Y., **Raina, R.**, & de Sa, V. R.
  Vision Sciences Society (**VSS**) 2023, Computational and Systems Neuroscience (**COSYNE**) 2023
- **Analyzing Biases in AU Activation Estimation Toward Fairer Facial Expression Recognition** [Paper]
  Monares, M., Tang, Y., **Raina, R.**, & de Sa, V.R.
  ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**) 2023
- **Exploring Biases in Facial Expression Analysis using Synthetic Faces** [Paper]
  Raina, R., Monares, M., Xu, M., Fabi, S., Xu, X., Li, L., Sumerfield, W., Gan, J., & de Sa, V.R.
  SyntheticData4ML Workshop (**NeurIPS**) 2022

- **Bio-inspired divisive normalization improves object recognition performance in ANNs** [Poster]
  Veerabadran, V., **Raina, R.**, & de Sa, V. R.
  Vision Sciences Society (**VSS**) 2022

- **Bio-inspired learnable divisive normalization for ANNs** [Paper]
  Veerabadran, V., **Raina, R.**, & de Sa, V. R.
  SVRHM Workshop (**NeurIPS**) 2021

Honors & Awards

- Financial grants awarded for supporting my research:
  IBM-UCSD Research Collaboration (07/2020 - 04/2021)
  UCSD-HDSI & Intel DCA Collaboration (01/2022 - 06/2023)

Skills

Languages	Python (proficient), C++ (moderate), Julia, MATLAB, R, Bash, LaTeX
Frameworks	PyTorch (proficient), TensorFlow / Keras (proficient), OpenAI Gym, CUDA, OpenCV, git

Mentoring

- **Stony Brook University**, Graduate Teaching Assistant
  Memory, *Prof. Suparna Rajaram* **Fall 2023**

Professional Service

- Reviewer for NeurIPS workshops (2022)