Aditya Ranganath

https://github.com/aranganath

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Education

- **University of California** — Merced, CA
  PhD Candidate in Electrical Engineering and Computer Science — *Aug. 2018 – Graduating 15th Aug., 2023*
- **University of California** — Merced, CA
  Masters in Electrical Engineering and Computer Science — *Aug. 2016 – Aug. 2018 (Switched to PhD)*
- **Loyola-ICAM College of Engineering and Technology** — Chennai, Tamil Nadu, India
  B.E. in Electrical and Electronics Engineering — *Aug. 2010 - Aug. 2014*

Experience

- **Meta Inc.** — Menlo Park, CA
  Applied Research intern — *May 2022 - August 2022*
  - Infrastructure: Built natural language processing pipelines for suggested replies under the Business messaging services team across Instagram, Facebook, Whatsapp with user privacy in mind
  - Machine learning: Leveraged deep learning and machine learning tools to infer over data potentially impacting billions of people
- **Nebbiolo Technologies** — Mountain View, CA
  Software Engineer Intern — *June 2017 - Aug. 2017*
  - Paramiko: Engineered pipelines to remote toggle "fog" nodes using a python interface paramiko.
  - Robot manipulation: Analysed stress on fog nodes and performing load balance on these nodes.
- **University of California - Merced** — Jan. 2017 - Current
  Teaching/Research Assistant — *Merced, CA*
  - Teaching Assistant: Teaching Flask, HTML, javascript, CSS, SQL, C++, Calculus, Finite element methods, linear algebra for undergraduate Junior and Senior years
  - Research Assistant - Machine Learning: Designing time-dependent data starved models to understand particle dynamics on the subatomic level. Also, learning to design models for highly chaotic dynamical systems like the double pendulum

Programming Skills

- **Languages**: Python, Javascript, C++, SQL, Java, MATLAB
- **Libraries**: TensorFlow, Pytorch, JAX, theano, numpy, scipy, scikit-learn, Presto. Spark

Projects

- QuantumRNN: Used recurrent neural netoworks, adjoint method, to compute electron-density in a Time-dependent Hartree-Fock model
- Zero-shot Learning: Analyzing the prediction capability of Deep neural network model on data it has never seen
- Numerical optimization: Adaptive regularization using cubics: Built a third-order optimizer which has the same compute complexity as L-BFGS and faster convergence rate
- Image-Denoising: Designed an RNN to reduce Gaussian and Poisson noise in stages
- Adversarial attacks: Used Discrete-cosine Transforms to compress images and analyse the effect of white-box attack on deep networks using RBF support vector machines.
- Optimization scheme for Reinforcement learning: Constrained optimization approach, involving a combination of log-barrier method, quasi-Newton approaches such as L-BFGS/L-SR1 and Lagrange-multipliers

Courses

- Graduate Courses: Intro to Robotics, Database Implementation systems, Numerical Methods for Differential Equations, Deep Learning, Advanced Topics in Networks and Distributed Systems, Computational Geometry, Cloud Computing, Robot Algorithms, Distributed Systems, Computer Graphics
- Undergraduate Courses: Tranforms and Partial Differential Equations, Numerical Methods, Transmission and Distribution, Power Electronics, Object Oriented Programming, Data Structures, Digital Signal Processing, Electromagnetic Theory, Power Plant Engineering, Biemedical Engineering

Publications

- Aditya Ranganath, Omar Deguchy, Mukesh Singhal, Roummel Marcia,: "Second Order Helping: A Hessian-Free approach for data-hungry Inferences", Accepted *European Signal Processing Conference, 2021*
- Aditya Ranganath, Omar Deguchy, Mukesh Singhal, Roummel Marcia,: "Gaussian Multi Stage Denoising using Recurrent Neural Networks", Accepted to *ASILOMAR conferences, 2021*
- Aditya Ranganath, Mukesh Singhal, Roummel Marcia,: "LSR-1 Adaptive Regularization by Cubics for Deep learning", Submitted *Taylor and Francis "Optimization Methods and Software", 2022*
- Aditya Ranganath, Omar Deguchy, Fabian Santiago, Mukesh Singhal, Roummel Marcia,: "Recurrent Neural Imaging: An evolutionary approach to image denoising", Accepted *ICMLA: International Conference on Machine Learning and Applications, 2022*
- Jason Van Tuinen, Aditya Ranganath, Goran Konjevod, Mukesh Singhal, Roummel Marcia: "Novel Adversarial defense techniques for white-box attacks", Accepted *ICMLA: IEEE International Conference on Machine Learning and Applications, 2022*
- Boaz Ilan, Aditya Ranganath, Shilpa Khatri, Roummel Marcia: "Interpretability of ReLU for Inversion", Accepted *ICMLA: IEEE International Conference on Machine Learning and Applications, 2022*
- Azar Alizadeh, Vahid Behzadan, Pooya Tavallali, Aditya Ranganath, Mukesh Singhal: "Stochastic induction of decision trees with application to learning Haar trees", Accepted *ICMLA: IEEE International Conference on Machine Learning and Applications, 2022*
- Pooya Tavallali, Vahid Behzadan, Azar Alizadeh, Aditya Ranganath, Mukesh Singhal: "Adversarial label-poisoning attacks and defense for genera multi-class models based on synthetic reduced nearest neighbor", Accepted *ICMLA: IEEE International Conference on Machine Learning and Applications, 2022*
- Azar Alizadeh, Vahid Behzadan, Pooya Tavallali, Aditya Ranganath, Mukesh Singhal: "A novel approach for Synthetic reduced nearest-neighbor leveraging neural networks ", Accepted *ICIP: IEEE International Conference on Image Processing, 2022*

Mentoring Experience

- **Denylson Fuentes**: Undergraduate Project, 2019, University of California, Merced: Image disambiguation
- **Jason Van Tuinen**: Undergraduate Project, 2022, University of California, Merced: Novel Adversarial defense techniques for white-box attacks
- **Achyuth Kolluru**: Undergraduate Project, (current), University of California, Merced: Cubic-spline video interpolation to improve frame rate
- **Abbas Siddiqui**: Undergraduate Project, (current), University of California, Merced: Optimization techniques for policy optimization in Reinforcement learning
- **Puneet Soni**: Master's Project, 2019, University of California, Merced: Zero-shot learning using manifold-mapping
- **Annesha Dasgupta**: Master's Project, (current), University of California, Merced: Cubic-spline video interpolation to improve frame rate

Reviewing

- *International Conference on Machine Learning, 2022*: Reviewer
- *Conference on Neural Information Processing Systems, 2022*: Reviewer
- *International Conference on Machine Learning, 2023*: Reviewer (Currently serving)