Sharan **Ramjee**

Master's Student at Stanford University

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Education

Stanford University
Stanford, CA

Master of Science in Computer Science (Concentration: Artificial Intelligence) — *Sep. 2020 - Exp. Mar. 2022*

- GPA: 4.02/4.00

Purdue University
West Lafayette, IN

Bachelor of Science in Computer Engineering — *Aug. 2016 - May. 2020*

- Graduated with Highest Distinction; GPA: 4.00/4.00

Industry Experience

Stripe
San Francisco, CA

Software Engineering Intern — *Jun. 2021 - Sep. 2021*

- Worked with the Fraud Intelligence team (Merchant Intelligence Engineering Org) on using ML models for detecting fraudulent merchants
- Deployed model interpretability methods (LIME, SHAP, etc) to investigate false positive and negative predictions made by the models
- Explored various feature encoding methods for numerical, categorical, and boolean features to gauge trade-offs and improve model performance

Google
Seattle, WA

Software Engineering Intern — *Sep. 2019 - Dec. 2019*

- Worked with the Google Cloud AI team on using Model Distillation to create Explainable AI by generating rules that explain Deep Learning models
- Created a system to tune the complexity of rules generated, number of rules generated, and accuracy of the Deep Learning model
- Implemented Soft Decision Trees, Random Forests, and Gradient Boosted Decision Trees to compare their trade-offs for Model Distillation

Qualcomm
San Diego, CA

Machine Learning Intern — *May. 2019 - Aug. 2019*

- Worked with the ML Application Analysis Team on using Deep Learning to make Qualcomm Snapdragon chips more power-efficient
- Upgraded the automation tool of the QoS logger to run multimedia applications on Android Q and parse log files
- Generated LSTM models using Neural Architecture Search (NAS) to estimate QoS parameters for minimal power consumption

Publicis Groupe
Bengaluru, India

Data Science Intern — *May. 2017 - Jul. 2017*

- Rebuilt the "pandas" library in python and converted it into libraries in Apache Spark, Apache Flink, and TensorFlow
- Created clusters in TensorFlow for generating a distributed network that enabled efficient data processing
- Performed big data analytics using Apache Spark, Hadoop and Microsoft Azure

Research Experience

Google Scholar: [LINK] | Research Interests: Computer Vision, Natural Language Processing, Signal Processing

Stanford Vision and Learning Lab
Stanford, CA

Graduate Researcher — *Sep. 2020 - Jan. 2021*

- Worked on robot learning for intuitive human-robot interaction using Computer Vision at the Stanford Vision and Learning Lab (SVL)
- Researched improvements in human-robot interaction performance obtained using parallelized learning and generated mesh grids for parallel Reinforcement Learning on Gibson using Blender

Massachusetts Institute of Technology
Boston, MA

Research Assistant — *Jul. 2020 - Aug. 2020*

- Worked on bridging the gap between human intelligence and machine intelligence at the MIT Center for Brains, Minds, and Machines (CBMM)
- Researched the synergy between Computer Vision and Physiological Optics with a focus on low-level vision, binocular vision, accommodation, and vision modeling based on how human vision is interpreted by our brains

Purdue University DARPA SC2 Research *West Lafayette, IN*

Research Assistant *May. 2018 - May. 2020*

- Researcher at the Purdue DARPA SC2 Research Team (BAM!) in collaboration with Texas A&M
- Qualified for the final round (will take place in Dec 2020) of the DARPA SC2 challenge and won $750,000 in funding from DARPA for finishing in the top 10 teams in the 1st round and $375,000 for finishing in the top 5 teams in the 2nd round

Purdue University Summer Undergraduate Research Fellowship *West Lafayette, IN*

Research Fellow *May. 2018 - Aug. 2018*

- Designed Deep Learning models for modulation classification with a focus on online training for network tuning using PCA, LDA, and Autoencoders aided by selective SNR training for Wireless Signal Modulation Classification using Deep Neural Networks with Prof. Aly El Gamal
- Currently hold the record for the highest classification accuracy (99%) with the RML dataset (previous record – 93%)

Publications

Accepted/Published

[$J3$] **Sharan Ramjee**, Shengtai Ju, Diyu Yang, Xiaoyu Liu, Aly El Gamal, Yonina C. Eldar. "Ensemble Wrapper Subsampling for Deep Modulation Classification". IEEE Transactions on Cognitive Communications and Networking **(TCCN)**, Aug. 2021 [LINK]

[$J2$] Xingchen Wang, Shengtai Ju, Xiwen Zhang, **Sharan Ramjee**, Aly El Gamal. "Efficient Training of Deep Classifiers for Wireless Source Identification using Test SNR Estimates". IEEE Wireless Communication Letters **(WCL)**, Apr. 2020 [LINK]

[$C1$] Xiwen Zhang, Tolunay Seyfi, Shengtai Ju, **Sharan Ramjee**, Aly El Gamal, Yonina C. Eldar. "Deep Learning for Interference Identification: Band, Training SNR, and Sample Selection". IEEE Signal Processing Advances in Wireless Communications **(SPAWC)**, Jul. 2019 [LINK]

[$J1$] **Sharan Ramjee**, Shengtai Ju, Diyu Yang, Xiaoyu Liu, Aly El Gamal, Yonina C. Eldar. "Fast Deep Learning for Automatic Modulation Classification". IEEE Machine Learning for Communications Emerging Technologies Initiatives **(MLCETI)**, Jan. 2019 [LINK]

Under Review

[$J4$] **Sharan Ramjee**, Aly El Gamal. "Efficient Wrapper Feature Selection using Autoencoder and Model Based Elimination". Submitted to IEEE Letters of the Computer Society **(LOCS)**, May. 2020 [PREPRINT]

Talks

Research Talks

Deep Learning for Interference Identification: Band, Training SNR, and Sample Selection *Cannes, France*
IEEE Signal Processing Advances in Wireless Communications (SPAWC) 2019 [LINK] *Jul. 2019*

Deep Neural Network Architectures for Modulation Classification using PCA *West Lafayette, IN*
The Summer Undergraduate Research Fellowship (SURF) Symposium [LINK] *Aug. 2018*

A PyTorch Framework for Automatic Modulation Classification *West Lafayette, IN*
The Summer Undergraduate Research Fellowship (SURF) Symposium [LINK] *Aug. 2018*

Other Talks

AutoChef: Computer Vision for Automated Ingredient-to-Recipe Matching *Stanford, CA*
Stanford University CS 329S: Machine Learning Systems Design [LINK] *Mar. 2022*

FLITE: Focusing LITE for Memory-Efficient Meta Learning *Stanford, CA*
Stanford University CS 330: Deep Multi-Task and Meta Learning [LINK] *Dec. 2021*

Project Aerial: CAASM for Palo Alto Networks *Stanford, CA*
Stanford University EE 205: Product Management for Electrical Engineers and Computer Scientists [LINK] *Dec. 2021*

Context-Aware Action Recognition via Spatial and Temporal Transformer Networks *Stanford, CA*
Stanford University CS 231N: Convolutional Neural Networks for Visual Recognition [LINK] *Jun. 2021*

Unsupervised Neural Network Models of the Ventral Visual Stream *Stanford, CA*
Stanford University CS 431: High-level Vision: From Neurons to Deep Neural Networks [LINK] *Mar. 2021*

Single-Image Stereo Depth Estimation using GANs *Stanford, CA*
Stanford University CS 231A: Computer Vision, From 3D Reconstruction to Recognition [LINK] *Mar. 2021*

Super-Resolution of Low-Quality Images for Realtime Pothole Detection *Stanford, CA*
Stanford University CS 230: Deep Learning [LINK] *Nov. 2020*

Model Distillation *Seattle, WA*
Google Cloud AI [LINK] *Dec. 2019*

QoS Optimization with ML *San Diego, CA*
Qualcomm Machine Learning Analysis [LINK] *Aug. 2019*

Teaching Assistantships

Artificial Intelligence — *Stanford, CA*
CS 221 - Stanford University — *Spring 2022*

Web Applications — *Stanford, CA*
CS 142 - Stanford University — *Winter 2022*

Deep Learning — *Stanford, CA*
CS 230 [Head TA] - Stanford University — *Fall 2021*

Computer Organization & Systems — *Stanford, CA*
CS 107 - Stanford University — *Spring 2021*

Microprocessor Systems and Interfacing — *West Lafayette, IN*
ECE 362 - Purdue University — *Spring 2019*

ASIC Design Laboratory — *West Lafayette, IN*
ECE 337 - Purdue University — *Spring 2019*

Advanced C Programming — *West Lafayette, IN*
ECE 264 - Purdue University — *Spring 2019*

Electronic Measurement Techniques — *West Lafayette, IN*
ECE 207 - Purdue University — *Fall 2018*

Programming Applications For Engineers — *West Lafayette, IN*
CS 159 - Purdue University — *Spring 2018*

Activities

Stanford TreeHacks — *Stanford, CA*

Tech Fellow [LINK] — *Jun. 2021 - Present*

- Working on improving the Stanford TreeHacks Hackathon experience as a part of the TreeHacks tech team
- Working on adding LinkedIn support for easier hackathon application processing and incorporating a project database for showcasing past projects

Purdue IEEE Computer Society (CSociety) — *West Lafayette, IN*

President [LINK] — *Aug. 2017 - Aug. 2019*

- Led several teams in the completion of projects for the Purdue Spark Challenge that is held every semester
- Served as the product manager for the 'Neural Style Transfer using Hardware Convolution' project (Spring 2019) and served as the head of the data analysis team for the 'QUEVIHN: Biomedical Robot' project (Fall 2018) [LINK]

Autonomous Motorsports Purdue (AMP) — *West Lafayette, IN*

Software Team Lead [LINK] — *Nov. 2018 - Aug 2019*

- Led the software team for the development of SLAM algorithms in preparation for the autonomous racing competition held every May [LINK]
- Successfully developed computer vision software using the YOLOv2 for the Velodyne LiDAR [LINK]
- Created onboarding documents to get new recruits up to speed with the Robot Operating System (ROS) framework

Undergraduate Research Society of Purdue (UGRSP) — *West Lafayette, IN*

Founding Ambassador [LINK] — *Oct. 2018 - Aug. 2019*

- Served as the founding ambassador for the College of Engineering to help guide students with research
- Taught students how to present their research, conduct literature reviews, write journal/conference papers
- Engaged in outreach and spreading awareness to recruit a diverse group of students that were passionate about research

Honors & Awards

Best Product Opportunity Assessment (POA) Presentation, Stanford EE 205: Product Management — *Nov. 2021*
Tech Fellowship, Stanford TreeHacks — *Jun. 2021*
Honorable Mention, Stanford AIMI-HIAE COVID-19 Researchathon — *Jun. 2020*
Graduation with Highest Distinction, Purdue University — *May. 2020*
Ideas and Innovation Tournament (I^2TC) Qualifier, Purdue University — *Feb. 2020*
Eta Kappa Nu (Beta Chapter) Outstanding Junior Scholarship, Purdue University — *2019-2020*
Eli Shay Scholarship, (3 times) Purdue University — *2017-2020*
Dean's List, (8 times) Purdue University — *2016-2020*
Wolfram Alpha Award, MadHacks (University of Wisconsin-Madison) — *Nov 2018*
Engineering Design Excellence Award, Purdue University — *Dec. 2016*
12^{th} Board Exam Scholarship, DRDO — *May. 2016*
10^{th} Board Exam Scholarship, DRDO — *May. 2014*

Skills

Languages Python, C, C++, Java, JavaScript, Solidity, Shell Scripting, MATLAB
Hardware System Verilog, Embedded C, Assembly, LTspice
Libraries PyTorch, TensorFlow, Transformers, OpenCV, XGBoost, scikit-learn
Other Git, LaTeX
OS Android, Linux, ROS

Open Source Contributions

TensorFlow *Remote*
Google Summer of Code Developer *May. 2020 - Aug. 2020*
- Worked on implementing key research data in TensorFlow Datasets (TFDS)

OpenMRS *Remote*
Google Code-In Developer *Dec. 2014 - Feb. 2015*
- Worked on detecting, documenting, and fixing bugs on the Open Medical Record System (OpenMRS) interface

Projects

AutoChef: Computer Vision for Automated Ingredient-to-Recipe Matching *Stanford, CA*
CS 329S: Machine Learning Systems Design [LINK] *Mar. 2022*
- AutoChef is a web app that uses an object detection model for automated ingredient-to-recipe matching using a single picture of your ingredients

FLITE: Focusing LITE for Memory-Efficient Meta Learning *Stanford, CA*
CS 330: Deep Multi-Task and Meta Learning [LINK] *Dec. 2021*
- FLITE is a meta learning wrapper that uses heuristics for gradient estimation during meta training for fast and memory-efficient learning

AdaLA: Adapting Gradient Estimation by Looking Ahead *Stanford, CA*
CS 361: Engineering Design Optimization [LINK] *Jun. 2021*
- AdaLA is an ML optimizer that modifies AdaBelief by using a "look-ahead" strategy to adaptively estimate step sizes to take during gradient descent

Context-Aware Skeleton Action Recognition via Spatial and Temporal Transformer Networks *Stanford, CA*
CS 231N: Convolutional Neural Networks for Visual Recognition [LINK] *Jun. 2021*
- The Spatial-Temporal Context-aware Transformer Network (ST-CTR) uses graph learning on pose skeletons for improved action recognition

Single-Image Stereo Depth Estimation using GANs *Stanford, CA*
CS 231A: Computer Vision, From 3D Reconstruction to Recognition [LINK] *Mar. 2021*
- The single-image stero depth estimation pipeline uses two GANs in sequence to generate a stereo image counterpart for depth estimation

Histogram Gradient Boosting Trees for Graph Learning with Wasserstein Embeddings *Stanford, CA*
CS 224W: Machine Learning with Graphs [LINK] *Mar. 2021*
- HGBTs are used to predict HIV-inhibiting properties in molecules through graph learning by embedding them in a Wasserstein space

Aspect-Target Sentiment Classification for Cyberbullying Detection *Stanford, CA*
CS 224N: Natural Language Processing with Deep Learning [LINK] *Mar. 2021*
- Aspect-Target Sentiment Classification uses BERT to perform sentiment classification with respect to a target for cyberbullying detection

Super-Resolution of Low-Quality Dashcam Images for Realtime Pothole Detection *Stanford, CA*
CS 230: Deep Learning [LINK] *Nov. 2020*
- Super-Resolution GANs are used to address the domain mismatch issue in low-quality dashcams for improved real-time pothole detection

Image Data Augmentation for Plant Leaf Disease Classification Using Neural Style Transfer *Stanford, CA*
CS 229: Machine Learning [LINK] *Nov. 2020*
- Neural Style Transfer is used to detect new diseases in new plant species through data augmentation by transferring old diseases to new plants

Certifications

Adventures in Design Thinking: A d.school Experience *Stanford*
Stanford Graduate Summer Institute *Sep. 2021*

Deep Learning Specialization — *DeepLearning.AI*
Coursera [LINK] — *Dec. 2020*

Machine Learning — *Stanford University*
Coursera [LINK] — *Sep. 2017*

Relevant Coursework

Stanford University

CS 329T	Trustworthy Machine Learning
GENE 225	Healthcare Venture Capital
DESINST 215	The Design of Data
MS&E 472	Entrepreneurial Thought Leaders' Seminar
CS 329S	Machine Learning Systems Design
CS 259Q	Quantum Computing
CS 246	Mining Massive Data Sets
CS 522	Seminar in Artificial Intelligence in Healthcare
CS 330	Deep Multi-Task and Meta Learning
CS 251	Cryptocurrencies and Blockchain Technologies
EE 205	Product Management for Electrical Engineers and Computer Scientists
CS 523	Research Seminar in Computer Vision and Healthcare
CS 361	Engineering Design Optimization
CS 231N	Convolutional Neural Networks for Visual Recognition
CS 142	Web Applications
CS 431	High-level Vision: From Neurons to Deep Neural Networks
CS 231A	Computer Vision, From 3D Reconstruction to Recognition
CS 224W	Machine Learning with Graphs
CS 224N	Natural Language Processing with Deep Learning
CS 300	Departmental Lecture Series
CS 230	Deep Learning
CS 229	Machine Learning
CS 221	Artificial Intelligence: Principles and Techniques

Purdue University

ECE 496	Deep Learning and Neural Networks
ECE 469	Operating Systems Engineering
ECE 404	Computer Security
ECE 368	Data Structures and Algorithms
ECE 362	Microprocessor Systems and Interfacing
ECE 337	ASIC Design Laboratory
ECE 296	Deep Learning for Wireless Communications
ECE 295	Introduction to Data Science

Peer Reviews

IEEE CL, IEEE Communication Letters — *2019-2021*
IEEE WCL, IEEE Wireless Communication Letters — *2019-2021*
IEEE TCCN, IEEE Transactions on Cognitive Communications and Networking — *2020-2021*
NCC, National Conference on Communications — *2021*
CVPR, Conference on Computer Vision and Pattern Recognition — *2021*
IEEE GC, IEEE GLOBECOM 2020 Workshop on Edge Learning over 5G Networks and Beyond — *2020*
IEEE 5GWF, IEEE 3rd 5G World Forum — *2020*
IEEE TCOM, IEEE Transactions on Communications — *2019*
IEEE SPAWC, IEEE Signal Processing Advances in Wireless Communications — *2019*