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*

- Distinction in Research; GPA: 4.00/4.00

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

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

[$J2$] 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]

[$J3$] **Sharan Ramjee**, Shengtai Ju, Diyu Yang, Xiaoyu Liu, Aly El Gamal, Yonina C. Eldar. "Ensemble Wrapper Subsampling for Deep Modulation Classification". Submitted to IEEE Transactions on Cognitive Communications and Networking **(TCCN)**, May. 2020 [PREPRINT]

Talks

QoS Optimization with ML *San Diego, CA*
Qualcomm Applied Machine Learning (QAML) Symposium 2019 [link] *Aug. 2019*

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*

An Introduction to Deep Learning for Style Transfer *West Lafayette, IN*
Purdue IEEE Computer Society (CSOCIETY) Symposium 2018 [link] *Jan. 2018*

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

Honors & Awards

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*
12th Board Exam Scholarship, DRDO *May. 2016*
10th Board Exam Scholarship, DRDO *May. 2014*

Skills

Languages Python, C, C++, Java, 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

Projects

Cov2GenX | Healthcare ML App

Stanford, CA

Stanford AIMI-HIAE COVID-19 Researchathon 2020 [LINK] *Jun. 2020*

- Cov2GenX is a Machine Learning pipeline for predicting mutation-resistant peptide candidates for COVID-19 vaccines
- Trained Gradient Boosted Decision Trees written in Python using XGBoost to generate a mutation-aware vaccine suite
- Awarded an honorable mention for curating a robust dataset of HLA-specific peptide data with over 347 million examples

StrataGem | Fintech Android App

Madison, WI

MadHacks 2018 – University of Wisconsin-Madison [LINK] *Nov. 2018*

- StrataGem is an integrated platform to take care of all your finances - Personal Banking to Investment Advisory
- Written in Java and XML for Android with ML merger prediction and sentiment analysis algorithms written in Python
- Won the “Wolfram Alpha Award” sponsored by Wolfram Alpha and the ”Best Payment Solution” award sponsored by Authorize.net

Vitamin.AI | Health & Fitness Android App

West Lafayette, IN

BoilerMake VI – Purdue University [LINK] *Oct. 2018*

- Vitamin.AI is a Computer Vision driven health & fitness tracking Android App that is an upgrade to FitScan, another android app I made in 2017 [LINK]
- Uses Google Cloud Vision API to classify brand names and AR to detect the size/calories of the products consumed
- Automatically schedules a run for the user using Google Maps APIs so that the user burns the calories that were consumed on that day

USB AHB-Lite | ASIC SoC Module

West Lafayette, IN

SoC Team *Dec. 2018*

- USB Full-Speed Bulk-Transfer Endpoint AHB-Lite SoC Module facilitates bulk transfers of data from a USB Endpoint to a Host
- Coded in SystemVerilog with an emphasis on the ASIC design aspects with regards to the AHB-Lite Slave Interface, Data Buffer, Protocol Controller, USB RX, and USB TX that consist of the submodules for the SoC top-level module

Peer Reviews

TCCN21, IEEE Transactions on Cognitive Communications and Networking *Mar. 2021*
CL2021, IEEE Communication Letters *Mar. 2021*
NCC2021, National Conference on Communications *Mar. 2021*
CL2021, IEEE Communication Letters *Feb. 2021*
WCL2021, IEEE Wireless Communication Letters *Jan. 2021*
WCL2020, IEEE Wireless Communication Letters *Jan. 2021*
CVPR2021, Conference on Computer Vision and Pattern Recognition *Dec. 2020*
WCL2020, IEEE Wireless Communication Letters *Sep. 2020*
CL2020, IEEE Communication Letters *Sep. 2020*
GC2020, IEEE GLOBECOM 2020 Workshop on Edge Learning over 5G Networks and Beyond *Aug. 2020*
5GWF20, IEEE 3rd 5G World Forum *Jul. 2020*
TCCN20, IEEE Transactions on Cognitive Communications and Networking *Jun. 2020*
WCL2020, IEEE Wireless Communication Letters *May. 2020*
TCCN20, IEEE Transactions on Cognitive Communications and Networking *Apr. 2020*
TCOM19, IEEE Transactions on Communications *Feb. 2020*
WCL2019, IEEE Wireless Communication Letters *Jan. 2020*
CL2019, IEEE Communication Letters *Nov. 2019*
SPAWC19, IEEE Signal Processing Advances in Wireless Communications *Jul. 2019*

Activities

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

Teaching Assistantships

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*

Relevant Coursework

Stanford University

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

Certifications

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

Machine Learning
Coursera [LINK]
Stanford University
Sep. 2017