

Sharad Chitlangia

Research Scientist
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EDUCATION

BITS Pilani K K Birla Goa Campus

2017 - 2021

B.E. in Electronics and Instrumentation (First Division)

Advisor: Prof. Ashwin Srinivasan, Prof. Tirtharaj Dash

WORK EXPERIENCE

Amazon

2021 - present

Research Scientist

Advisors: Dr. Hemant Kowshik

Machine Learning for Traffic Quality and Advertising Technology

Edge Computing Lab, Harvard University

2021

Research Intern

Advisors: Prof. Vijay Janapa Reddi

Data engineering for few/zero shot multilingual keyword spotting.

APP Centre for AI Research, BITS Pilani

2021

Undergraduate Researcher

Advisors: Dr. Gautam Shroff & Dr. Lovekesh Vig

Inductive Programming and its applications to Bongard Problems

Safe AI Lab, Carnegie Mellon University

2020

Remote Research Intern (Bachelor's Thesis)

Advisors: Prof. Ding Zhao

Examining the effect of LiDAR Placement on Perception of an Autonomous Vehicle.

Amazon

2020

Research Engineering Intern

Advisors: Sachin Farfade

Search Query Disambiguation and data engineering as part of the larger Guided Search Project

Microsoft Research

2020

Independent Developer

Advisors: Rajan Chari

Integrating Flatbuffers as an input format for Vowpal Wabbit. Demonstrated speedups by upto 60%

APP Centre for AI Research, BITS Pilani

2020

Undergraduate Researcher

Advisors: Prof. Ashwin Srinivasan & Dr. Lovekesh Vig

Extracting interpretable causally attributed explanations in Neuro-symbolic Machines

Edge Computing Lab, Harvard University

2019

Research Intern

Advisors: Prof. Vijay Janapa Reddi

Systems and Reinforcement Learning.

CERN-HSF

2019

Google Summer of Code Intern

Advisors: Dr. Andreas Salzburger

Track Reconstruction using Machine Learning.

UnFound.ai

2018

Machine Learning Intern

Advisors: Ankur Pandey

Pre-training large scale NLP models & Deploying NLP-based services

PUBLICATIONS

Journal Publications

3. **A Review of Some Techniques for Inclusion of Domain-Knowledge into Deep Neural Networks**
Tirtharaj Dash, **Sharad Chitlangia**, Aditya Ahuja, Ashwin Srinivasan
Nature Scientific Reports, 2021
2. **Reinforcement Learning and its Connections with Neuroscience and Psychology.**
Ajay Subramanian, **Sharad Chitlangia**, Veeky Baths.
Elsevier Neural Networks, 2021
1. **Widening Access to Applied Machine Learning**
Reddi *et. al.* including Sharad Chitlangia
Harvard Data Science Review, 2021.

Conference Publications

1. **Multilingual Spoken Words Corpus**
Mark Mazumder, **Sharad Chitlangia**, Colby Banbury, Yiping Kang, Juan Manuel Ciro, Keith Achorn, Daniel Galvez, Mark Sabini, Peter Mattson, David Kanter, Greg Diamos, Pete Warden, Josh Meyer, Vijay Janapa Reddi
Neural Information Processing Systems Track on Datasets and Benchmarks, 2021.

Workshop Publications

* - equal contribution

4. **Improving Perception via Sensor Placement: Designing Multi-LiDAR Systems for Autonomous Vehicles**
Sharad Chitlangia*, Zuxin Liu*, Akhil Agnihotri, Ding Zhao
Autonomous Driving: Perception, Prediction and Planning Workshop at 37th CVPR, 2021
3. **ActorQ: Quantization for Actor-Learner Distributed Reinforcement Learning**
Maximilian Lam*, **Sharad Chitlangia***, Srivatsan Krishnan*, Zishen Wan, Gabriel-Barth Maron, Aleksandra Faust and Vijay Janapa Reddi.
Hardware Aware Efficient Training Workshop at 9th ICLR, 2021
2. **Quantized Reinforcement Learning (QuaRL)**
Maximilian Lam*, **Sharad Chitlangia***, Srivatsan Krishnan*, Zishen Wan, Gabriel-Barth Maron, Aleksandra Faust and Vijay Janapa Reddi.
Resource Constrained Machine Learning Workshop (ReCoML) at 3rd MLSys, 2020
1. **Using Program Synthesis and Inductive Logic Programming to solve Bongard Problems**
Sharad Chitlangia*, Atharv Sonwane*, Tirtharaj Dash, Lovekesh Vig, Gautam Shroff, Ashwin Srinivasan
10th International Workshop on Approaches and Applications of Inductive Programming 2021

Thesis

1. **On the Interplay between LiDAR Placement and Perception Performance in Autonomous Vehicles**
Sharad Chitlangia, Zuxin Liu and Ding Zhao.
College of Engineering, Carnegie Mellon University.

SOFTWARE

1. **GenRL: A Pytorch Reinforcement Learning Library.**
Co-author and Maintainer (until Oct. 2020)
Society for Artificial Intelligence and Deep Learning, 2020
Stats as of February 2021: ★ 352

SELECTED AWARDS AND HONORS

- Selected among 3 undergraduate (out of 200+ applicants) candidates globally to take part in the Reinforcement Learning Open Source Festival 2020
- Selected among 50 students to attend Google Research India's AI Summer School (AI4SG track) 2020
- Selected among 250 (out of 1000) candidates globally to take part in Montreal Institute of Learning Algorithms' Deep Learning and Reinforcement Learning Summer School (DLRL SS) 2020
- Winner of the special Bounty Prize (US\$500) at HackInOut, India's largest Community Hackathon 2019
- Selected among 40 students globally to be participate in the Google Summer of Code 2019 under CERN-HSF 2019

TALKS

- **Pushing the limits of Vowpal Wabbit with Flatbuffers**
 - Microsoft Research, NYC

PROFESSIONAL RESPONSIBILITIES

- *Reviewing*
 - Data Centric AI Workshop at NeurIPS '21
- *Undergraduate Teaching Assistantship*
 - **Meta Learning** - *Dr. Gautam Shroff & Prof. Tirtharaj Dash* *Spring 2021*
 - * Classwork development for Tutorial and Laboratory Sessions
 - * Assisted in Final Project Evaluations
 - **Reading Course on AI+Neuroscience** - *Prof. Veeky Baths* *Fall 2020*
 - * Supervised projects on Inductive Bias, Social Cognition & Grounded Language Learning
- *Positions of Responsibility* - BITS Pilani, K K Birla Goa Campus
 - **President**, Society for Artificial Intelligence and Deep Learning *2019-2020*
 - **Coordinator**, Society for Artificial Intelligence and Deep Learning *2019*
 - **Panel Coordinator**, Quark (Annual Technical Festival) *2019*
 - **Course Instructor & Project Mentor**, Technology Incubator Programme(TIP) *2019*
 - **Project Lead and Mentor**, SEDS Celestia *2018*
- *Contributor*
 - tinyML EdX professional certificate program - *Prof. Vijay Janapa Reddi* *Fall 2020*

SELECTED PROJECTS

1. Quantized Reinforcement Learning (QuaRL)

- Applied and benchmarked uniform, symmetrical Quantizer based Post Training Quantization techniques on state-of-the-art RL algorithms (PPO, DDPG) on common RL environment suites such as Gym, Atari, Mujoco, etc
- Experimented on Quantization Aware training to explore application of Fake Quantization to enable more stable quantized RL agents
- Established (through experiments) that quantization noise results in increase of reward in traditional RL training
- Collaborated with team to design and evaluate experiments on speeding up distributed RL training through a novel training algorithm, ActorQ, that runs actors on quantized precision (8/16) to show speedups of up to 1.5-2.5x
- Researched formulation of Quantization Noise as Exploration Process; benchmarked on ProcGen

2. Pushing the limits of Vowpal Wabbit with Flatbuffers

- Designed input schemas for VowpalWabbit to utilise Flatbuffer protocols
- Benchmarked inference performance for various formats to demonstrate a speedup by 60%
- Modified CI/CD DevOps workflows for automatic installation of Flatbuffers in Docker Images

3. On the Interplay between LiDAR Placement and Perception Performance in Autonomous Vehicles

- Designed a novel Information Theoretic Surrogate Cost function to represent placement position as an optimization problem
- Designed an automated experimental data collection pipeline and tool based on Carla with specification on Traffic Scenarios
- Benchmarked state-of-the-art pointcloud based 3D object detection machine learning models on the generated data to demonstrate placement optimization can lead to better perception performance.

COURSEWORK

On-Campus

Machine Learning, Applied Statistical Methods, Neural Networks and Fuzzy Logic, Object Oriented Programming, Digital Image Processing, Probability and Statistics, Linear Algebra and Complex Analysis, Multivariable Calculus, Differential Equations, Digital Design, Microprocessors and Interfacing, Control Systems, Meta-Learning (as a Teaching Assistant)

Online

Machine Learning (Stanford), CS231n (Stanford), CS224n (Stanford), CS284 (UCB)

TECHNICAL SKILLS

Languages: Python, C++, Scala, Spark, L^AT_EX

Operating Systems: Unix, MacOS

Technologies: AWS, GCP, Heroku, Docker, Git, Hadoop, CI & CD, DevOps