

# Sharad CHITLANGIA

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## EDUCATION

**Present** | **Birla Institute of Technology and Science Pilani, GOA, India**  
**August 2017** | Bachelor of Engineering (Hons.), Electronics & Instrumentation. CGPA = 7.64

## EXPERIENCE

**Present** | **Microsoft Research | New York City**  
**April 2020** | *Independent Developer and Collaborator | Advisor: [Rajan Chari](#)*  
Working as part of the [Reinforcement Learning Open Source Fest](#) on increasing performance of the Decision Service and Reinforcement Learning products. Development of Flatbuffers and Protocol Buffers for [VowpalWabbit](#). One of only 6 students selected globally.

**Present** | **Multimodal Digital Media Analysis Lab**  
**April 2020** | *Remote Research and Development Intern | Advisor: [Rajiv Ratn Shah](#)*  
Development of techniques for Meta Learning by the use of Reinforcement Learning in particular Contextual Bandits.

**Present** | **Anuradha and Prashanth Palakurthi Centre for Artificial Intelligence Research (APPCAIR)**  
**Jan 2020** | *Undergraduate Researcher | Advisor: [Ashwin Srinivasan](#)*  
Work on Interpretable and Explainable Neural Networks (Deep Relational Machines) using Causal Machine Learning. Research on top of Neural Network Attribution by computation of Average Causal Effect (ACE) using Interventional Expectations.

**August 2019** | **Harvard University | Edge Computing Lab**  
**June 2019** | *Research Intern | Advisor: [Vijay Janapa Reddi](#)*  
Worked at intersection of Image Deep Reinforcement Learning and Energy Efficiency for Drones. Extensive use of Tensorflow and TFLite. Performed >350 experiments to **show effects of Quantization in RL, Quantization during training** to be a better regularizer than traditional techniques and thus enable higher exploration and generalization.

**August 2019** | **CERN-HSF**  
**May 2019** | *Google Summer of Code 2019 | Mentors: [Moritz Kiehn](#), [David Rousseau](#), [Andreas Salzburger](#) and [Jean-Roch Vlimant](#)*  
Particle Track Reconstruction using Machine Learning. Ported top solutions from TrackML challenge to ACTS Framework. Added an example of running pytorch model in ACTS using Pytorch's C++ frontend libtorch in an end-to-end fashion to enable rapid testing of models and thread safe fashion to allow massive parallel processing. Testing with GNNs.

**August 2018** | **UnFound.ai**  
**May 2018** | *Machine Learning & NLP Intern | Mentor: [Ankur Pandey](#)*  
Revamped the existing Information Retrieval system to focus more on distributional semantics. Developed embeddings from a deep learning based model which could capture Semantic, Syntactic as well as Contextual information - **ELMo**. Training and deploying Stance Detection models - **ESIM**

## PUBLICATIONS

Srivatsan Krishnan\*, **Sharad Chitlangia\***, Maximilian Lam\*, Zishen Wan, Aleksandra Faust, Vijay Janapa Reddi  
"Quantized Reinforcement Learning (QuaRL)"  
Resource Constrained Machine Learning Workshop at 3rd Conference on Machine Learning and Systems - **MLSys**  
[Arxiv](#), [Code](#)

## SELECT PROJECTS

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### GenRL: A Pytorch library of Reinforcement Learning Algorithms

APRIL'20

[Code](#)

- > Maintainer and co-author
- > SOTA algorithms ranging from Deep Reinforcement Learning like PPO1, DDPG, SAC, TD3, DQN, etc to classical algorithms like Q-learning, Dyna framework, Bandits, Multi-armed bandits.

### Neural Voice Cloning with Few Samples

JAN'18 - MAY'18

[Code](#)

- > Few Shot Learning based Methodology. Encoder Captures Speaker Features in Latent Space.
- > Speaker Features fed to multi-speaker generative model (Deep Voice 3) + WaveNet to generate speaker conditioned Voices.
- > Close to 150 ★ on GitHub. [Final Voices](#)

### Autonomous Drone Navigation using Deep Reinforcement Learning

AUG '18 - MAY '19

[Code](#) | Funded Project

- > Imitation Learning on IDSIA Dataset to classify directional commands for UAV to navigate. ResNet18 to classify images.
- > Tested some features with Mask RCNN for segmentation of forest paths as navigable by UAV.
- > Project nominated by Institute and EEE Department to be one of the few sponsored projects.

### Particle Track Reconstruction using Machine Learning

AUG '18 - DEC '18

[Code](#), [Report](#), [Design Project](#) with [Kinjal Banerjee](#)

- > Initial Candidate Pair and Triplet estimation using Machine Learning except Graph Neural Networks.
- > Followed by reconstruction using Outlier Density Estimation Algorithm.
- > GNN model directly predicted weights between candidates for direct reconstruction.

### Epileptic Seizure Detection using Deep Learning

AUG'18

[Code](#), [Report](#), [Course Project](#) in *Cognitive Neuroscience* with [Veeky Baths](#)

- > Implementation of End-to-end Deep Learning models used to predict seizures on first 60 seconds of EEG Recordings
- > 32 channel Data - TUH EEG Corpus.

### Pneumonia Detection using Deep Learning

AUG'18 TO DEC'18

[Code](#) with [TCS Research](#)

- > Benchmarked SOTA models in Image Classification and Segmentation on RSNA Pneumonia Detection Dataset.
- > Models tested - DenseNet, InceptionNetV3, MaskRCNN to transfer learn on the dataset,

### Human Swarm Intelligence for Reconnaissance

OCT'18 - DEC'18

In collaboration with DRDO India

- > Phase 1 - Made a waypoint controller system for Multi-drone systems in ROS.
- > [Certificate](#)

## TALKS AND CONFERENCES

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### ASCII Orientation

BITS GOA, INDIA, SEP'19

Delivered a talk. Audience: Freshman year students

Invited to give a talk on the recent advances of Machine Learning in technology, it's prospectives as a career and how to start.

## OPEN SOURCE

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- > Participated in **Google Summer of Code 2019** with CERN-HSF to work on contributing to the ACTS framework. [Final Product](#)
- > All projects open-sourced on GitHub.

## TEACHING AND LEADERSHIP ROLES

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**Present**  
**May 2019**

### Society for Artificial Intelligence and Deep Learning

*President*

Leading and mentoring a group of 15 talented individuals in the field of Artificial Intelligence and Deep Learning.

**Present**  
**July 2019**

### Intel Student Ambassador for Artificial Intelligence

Working on publishing technical articles on Artificial Intelligence using Intel technologies. Latest article on Particle Track Reconstruction using Machine Learning

October 2019 June 2019	<b>Pixxel</b> <i>Research</i> Study of Applications of Hyperspectral Unmixing. <a href="#">Report</a>
December 2019 August 2019	<b>Python BootCamp</b> <i>Organiser and Instructor</i> Initiative to teach Python to freshman year students. To get them upto speed with various projects happening on Campus
December 2019 August 2019	<b>Project Mentor</b> <i>Instructor and Mentor</i> Leading and mentoring 4 projects on campus spanning the field of AI - <i>Language Research, Applications of Cognitive Neuroscience in AI, Learning how to play games using Reinforcement Learning, and Generation of Speech from Images - Image2Speech in MNIST.</i>
December 2018 August 2019	<b>Introduction to Deep Learning</b> <i>Co-Instructor</i> Introduced students to the concepts of Deep Learning. The course structure followed was similar to Stanford's CS231n. <a href="#">Course Material</a>
February 2020 March 2019	<b>Quark</b> <i>Panel Coordinator - BITSHack (Hackathon) and Programmer's Inc</i> Responsible for leading the organising team of the hackathon and other programming events. Raised more than <b>10K\$</b> for sponsorship. Record of <b>1000+ registrations</b> from all over India.

## RELEVANT COURSEWORK

Machine Learning\*, Neural Networks and Fuzzy Logic, Data Mining\*, Probability and Statistics, Object Oriented Programming, Digital Image Processing, Digital Signal Processing, Microprocessors and Interfacing, Digital Design, Signals & Systems, Control Systems, Stanford's CS231n: Convolutional Neural Networks for Visual Recognition@, UCB's CS295: Deep Reinforcement Learning@, Stanford's CS224n: Natural Language Processing with Deep Learning@, Stanford's CS229: Machine Learning@. (\* = Auditing, @ = Online)

## HONOURS AND AWARDS

<b>Hack InOut</b>	BENGALURU, '19
<i>Special Bounty Prize Winner</i>	
Won the special prize for designing a complete blockchain backed application - Decent League - A decentralized fantasy league. Prize given to only <b>1 out of 5400 teams</b> across India.	

## SKILLS

<b>Languages</b>	Python, C++, Ruby, Julia, SQL
<b>Frameworks</b>	Tensorflow, Pytorch
<b>Technologies</b>	Heroku, AWS EC2, Travis CI, Docker, $\LaTeX$ , Git
<b>Operating Systems</b>	Ubuntu, macOS
<b>Spoken Languages</b>	English, Hindi, French

## REFERENCES

<b>Vijay Janapa Reddi</b> Associate Professor HARVARD SEAS vj@eecs.harvard.edu	<b>Moritz Keihn</b> Post-doc Assistant UNIGE & ATLAS-CERN Moritz.Kiehn@unige.ch	<b>Kinjal Banerjee</b> Assistant Professor BITS PILANI kinjalb@goa.bits-pilani.ac.in	<b>Basabdatta Sen Bhattacharya</b> Associate Professor BITS PILANI basabdattab@goa.bits-pilani.ac.in
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