

## Education

### Northwestern University

Master of Science in Computer Science, **GPA: 4.0/4.0**

Evanston, Illinois

Sep 2019 – Mar 2021

**Coursework:** Machine Learning, Statistics, Deep Learning Foundations, Advanced Deep Learning, Data Science Seminar, Statistical Language Modeling, Algorithms, Social Network Analytics

**Labs/Groups:** REALM Lab, MAGICS Lab, AI Journal Club

### K.J Somaiya College of Engineering

Bachelor of Technology in Computer Engineering, **GPA: 8.99/10**

Mumbai, India

Aug 2015 – May 2019

**Coursework:** Machine Learning (Topper), Neural Nets, Image Analysis (Topper), AI, Data Structures, Algorithms, Operating System (Topper)

## Work Experience

### Alchera Labs

Applied Scientist

San Diego, California

Jul 2021 – Oct 2022

- Developed an early detection system for wildfires which can detect wildfire smoke with 91.6% accuracy. The system is actively being used in the USA to monitor near real-time data from hundreds of cameras daily.
- Researched the emergence and importance of class-selective neurons during the early epochs of training and demonstrated through a set of experiments that class selectivity is essential for successful training.

### CIERA

Researcher | Prof. Vicky Kalogera's Group

Evanston, Illinois

Jun 2020 – Jun 2021

**Earthquake Detective | Prof. Suzan Van Der Lee**

- Compiled and processed the first ever comprehensive ML benchmark dataset of potentially triggered earthquakes and tremors with 130k+ samples.
- Developed a ML model which uses Wavelet Scattering and Image Convolutions to detect low amplitude earthquake and tremor signals with 90.4% accuracy.
- Developed a retirement algorithm to effectively retire labeled seismic samples on Earthquake Detective - a crowdsourcing platform.

### Northwestern University

Graduate Research Assistant | Prof. Prem Seetharaman

Evanston, Illinois

Jan 2020 – Jun 2020

- Developed Otoworld, an interactive environment for training Reinforcement Learning agents for Computer Audition.
- Agents trained in this environment implicitly learn to separate audio sources by learning to maximize the reward of "turning-off" these sources.
- Developed a RL agent with a Monaural Separation Model, Spatial Feature Extractor and a Q-Network to navigate this environment.

### K.J Somaiya College of Engineering

Research Intern | Prof. Grishma Sharma

Mumbai, India

Jan 2018 – Apr 2018

- Researched k-shot learning methodologies and developed a facial recognition system which can be trained on limited data. (k=number of training samples per class).
- The system gives 100% accuracy for k=3 and subjects less than 20. For 20-30 subjects and k=3, accuracy ranges from 80 to 90%.

### Accelo Innovation

Machine Learning Intern

Mumbai, India

Aug 2017 – Oct 2017

- Implemented depth mapping module using Stereo Vision and achieved a 98% accuracy (2 cm error) for objects up to 5m away. Objects 20m away were estimated with 95% accuracy.
- Implemented object detection module with a combination of Haar Cascades, Histogram of Gradients and a CNN model.
- Implemented lane detection module using Inverse Perspective Mapping.

## Skills

**Languages/Web:** Python, Java, R, C, C++, Flask, HTML, CSS, PHP, Javascript, AngularJS, Node.js, React

**Analytics/Tools:** AWS, Git, Docker, Spark, Tableau, Trifacta, Matplotlib, D3.js, Google Earth Engine, ArcGIS

**Databases:** PostgreSQL, MySQL, MongoDB

**Libraries:** Pytorch, Tensorflow, OpenCV, Gym, Numpy, Pandas, SkLearn, NLTK, Keras

**Certifications:** Deep Learning Specialization (DeepLearning.AI), Machine Learning (Stanford, Coursera)

## Publications

### Conference Papers

1. **O. Ranadive**, S. van der Lee, V. Tang, and K. Chao, "Applying machine learning to crowd-sourced data from earthquake detective," in *AI for Earth Sciences Workshop, Thirty-fourth Conference on Neural Information Processing Systems (NeurIPS'20)*, Dec. 2020.
2. **O. Ranadive**, G. Gasser, D. Terpay, and P. Seetharaman, "Otoworld: Towards learning to separate by learning to move," in *Self Supervision in Audio and Speech Workshop, 37th International Conference on Machine Learning, Vienna, Austria (ICML'20)*, Jul. 2020.
3. K. Joisher, S. Khan, and **O. Ranadive**, "Simulation environment for development and testing of autonomous learning agents," in *2nd International Conference on Advances in Science & Technology (ICAST'19, Elsevier SSRN)*, Apr. 2019.

### Journal Articles

1. **O. Ranadive** and D. Thakkar, "K-shot learning for face recognition," *International Journal of Computer Applications* 181 (18), pp. 43–48, Sep. 2018.

### Abstracts

1. M. P. Flanagan, V. Tang, **O. Ranadive**, A. M. Thomas, and S. van der Lee, "Earthquake detective: Citizen scientists use eyes and ears to classify small seismic events," in *AGU Fall Meeting Abstracts*, Dec. 2021.

## Projects

### Reinforcement Learning for High-Frequency Trading

- Developed an environment to process HFT data and maintain a limit-order book in real-time.
- Developed a DDQN agent which leverages the level-2 data to take intelligent trading decisions.

### LinkedIn Network Analytics

- Analyzed how LinkedIn network has changed in the post-COVID era and identified key users using centrality measures and sentiment analysis.
- Analyzed emergence and changes in communities using k-core decomposition and cluster decomposition algorithms.
- Used SIENA and STERGM models to fit the network and validate hypotheses.

### Analyzing spread of COVID-19 using Graph Neural Networks

- Developed an end-to-end pipeline to process COVID-19 data into graph structures and analyze it.
- Predicted future spread in US states using Graph Convolution Network and Message Passing Network based on census data, time series info, travel data and distances between US states.

### Domain Adaptation using CycleGAN

- Developed a CycleGAN architecture to map simulated images to real-world images to reduce the domain gap between real-world data and virtual environment data.
- Developed a multi-iterative CycleGAN architecture to enhance the GAN output.

### Citizens Police Data Project

- Analyzed crime trends, officers, and incidents using SQL, Tableau and D3.js.
- Created a co-accusal network of officers and used graph analytics to identify key officers.
- Applied NLP on reports to find important keywords and assign severity scores.

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## Teaching

- Invited Lecturer - Machine Learning, ROSES'21, American Geophysical Union 2021
- Advanced Deep Learning, Graduate Student Instructor, Northwestern University 2021
- Statistical Machine Learning, Graduate Student Instructor, Northwestern University 2021
- Machine Learning Workshop, CSI, K.J Somaiya College of Engineering 2016
- Cryptography Workshop, CSI, K.J Somaiya College of Engineering 2016

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## Talks

- Using machine learning to detect wildfires, NICO Oct 2021
- MuZero: Learning to plan in unknown environments, AI Journal Club Feb 2021
- Earthquake Detection using crowd-sourced data, Data Skeptic Podcast Dec 2020
- AI for Earth Sciences Workshop, NeurIPS 2020 Dec 2020
- Agent57: Surpassing human performance on Atari Games, AI Journal Club Oct 2020
- Self-Supervision in Audio and Speech Workshop, ICML 2020 Jul 2020
- Imagination and Curiosity in Reinforcement Learning, AI Journal Club May 2020
- Multi-Agent Reinforcement Learning, AI Journal Club Feb 2020

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## Awards

- Undergraduate Final Year, Rank 2 2019
- Winner of IEEE Technical Paper Presentation for the paper "Framework for low cost driver-assistance system" 2017

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## Service

- Reviewer, PeerJ Computer Science Journal
- Council Member of Computer Society of India 2016-2017