

## Education

### Northwestern University

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

**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

Evanston, Illinois

Sep 2019 – Mar 2021

### K.J Somaiya College of Engineering

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

**Coursework:** Machine Learning, Neural Nets, Image Analysis, Artificial Intelligence, Data Structures, Algorithms, Operating System

Mumbai, India

Aug 2015 – May 2019

## Work Experience

### NU Earth

**Research Specialist | Prof. Suzan Van Der Lee**

Evanston, Illinois

Nov 2022 – Present

- Developing unsupervised learning algorithms to analyze and detect small seismic events in highly fluctuating and noisy urban seismic data from Greater Chicago area.

### 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

- Developed a few-shot facial recognition system which can be trained to a high accuracy (90-100%) using only 3 samples per class.

- Developed depth mapping, lane detection, and object detection modules for assistive driving system.
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## Publications

### Conference Papers

1. **O. Ranadive**, J. Kim, S. Lee, Y. Cha, H. Park, M. Cho, and Y. K. Hwang, "Image-based early detection system for wildfires," in *Tackling Climate Change with Machine Learning workshop, Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS'22)*, Dec. 2022.
2. **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.
3. **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.
4. 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**, N. Thakurdesai, A. S. Morcos, M. L. Leavitt, and S. Deny, "On the special role of class-selective neurons in early training," *Transactions on Machine Learning Research*, 2023.
2. **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. A. M. Thomas, **O. Ranadive**, and S. van der Lee, "Feature engineering and clustering for single-station seismic waveform classification in an urban environment," in *SSA Annual Meeting*, Apr. 2023.
  2. 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.
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## Projects

### Reinforcement Learning for High-Frequency Trading

- Developed an environment to process HFT (level-2) 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 changes in the LinkedIn network in the post-COVID era using centrality measures, sentiment analysis, decomposition algorithms, and social network models.

### 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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## 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)

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## Teaching

- Invited Lecturer - Machine Learning, ROSES'21, American Geophysical Union 2021
  - CS496 - Advanced Deep Learning, Graduate Student Instructor, Northwestern University 2021
  - STAT461 - 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

- Tackling Climate Change with Machine Learning Workshop, NeurIPS 2022 Dec 2022
  - Using machine learning to detect wildfires, NICO Oct 2021
  - MuZero: Learning to plan in unknown environments, AI Journal Club Feb 2021
  - 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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## Media Coverage

- Alchera & Sierra Home Health Care Collaboration, TV Interview Apr 2022
  - Earthquake Detection using crowd-sourced data, Data Skeptic Podcast Dec 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
  - Undergraduate highest marks (rank 1) for courses - Machine Learning, Image Analysis, Operating Systems, Communication Skills, Advanced Internet Technology 2015-2019
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## Mentoring

- Samarth Shah, Machine Learning Intern, Alchera Labs 2022
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## Service

- Reviewer, PeerJ Computer Science Journal 2022
- Council Member of Computer Society of India 2016-2017