Omkar Ranadive

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Omkar-Ranadive · omkar-ranadive

Education

Northwestern University — Evanston, Illinois
Master of Science in Computer Science, **GPA: 4.0/4.0** — *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 — Mumbai, India
Bachelor of Technology in Computer Engineering, **GPA: 8.99/10** — *Aug 2015 – May 2019*
Coursework: Machine Learning, Neural Nets, Image Analysis, Artificial Intelligence, Data Structures, Algorithms, Operating System

Work Experience

Machine Medicine — London, England
Machine Learning Engineer — *Sep 2024 – Present*

- Developed a scalable MLOps infrastructure on GCP using Metaflow, Kubernetes, and Argo Workflows to orchestrate complex ML workflows.
- Built a Dash-based web app enabling users to perform ML analysis on patient data (PHI) securely using GCP Cloud Run, leveraging Firestore DB and Cloud Storage for data management.
- Developing a foundational deep learning model for neurological disorders.

NU Earth — Evanston, Illinois
Research Specialist | Prof. Suzan Van Der Lee — *Nov 2022 – Apr 2024*

- Developed an unsupervised clustering method and an attention-based transformer architecture for detecting seismic events in time series data of urban areas.
- Developed multiple optimization algorithms, including an Ensemble Genetic Algorithm, clustering-based methods, and deep learning techniques, to select a small subset of rows from a large matrix that maximizes sensitivity volume.
- Developed Earthtunes, the first mobile app to make inaudible seismic data accessible to the general public through sonification.
- Contributed to Pysmo, a modular Python library for seismology which has achieved over 41,000 downloads (top 25% of pip packages).

Alchera Labs — San Diego, California
Applied Scientist — *Jul 2021 – Oct 2022*

- Developed an early detection system using computer vision for detecting 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.
- Investigated the emergence and role of class-selective neurons in deep neural networks on image data through mechanistic interpretability and demonstrated that class selectivity is essential for successful training.

CIERA — Evanston, Illinois
Researcher | Prof. Vicky Kalogera's Group — *Jun 2020 – Jun 2021*

Earthquake Detective | Prof. Suzan Van Der Lee

- Compiled and processed the first comprehensive ML benchmark dataset of potentially triggered earthquakes and tremors with over 130,000 time series and image data samples.
- Developed an ML model that 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 Evanston, Illinois
Graduate Research Assistant | Dr. Prem Seetharaman *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 an RL agent with a Monaural Separation Model, Spatial Feature Extractor, and a Q-Network to navigate this environment.

K.J Somaiya College of Engineering Mumbai, India
Research Intern | Prof. Grishma Sharma *Jan 2018 – Apr 2018*

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

Accelo Innovation Mumbai, India
Machine Learning Intern *Aug 2017 – Oct 2017*

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

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)***, Apr. 2019.

Journal Articles

1. A. M. Thomas, **O. Ranadive**, and S. van der Lee, "Characterizing seismic events in an industrial corridor of the chicago area," *Seismological Research Letters **(SRL)***, Aug. 2025.
2. **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 **(TMLR)***, Sep. 2023.
3. **O. Ranadive** and D. Thakkar, "K-shot learning for face recognition," *International Journal of Computer Applications 181 (18) **(IJCA)***, pp. 43–48, Sep. 2018.

Abstracts

1. S. van der Lee, M. Sita, V. Agaba, G. P. Babirye, **O. Ranadive**, and C. Ciardelli, "Estimating faulting mechanisms from single-seismometer body waves," in *AGU Fall Meeting Abstracts **(AGU)***, Dec. 2024.
2. A. M. Thomas, **O. Ranadive**, and S. van der Lee, "Characterizing seismic data in a noisy urban environment," in *AGU Fall Meeting Abstracts **(AGU)***, Dec. 2024.
3. A. M. Thomas, **O. Ranadive**, and S. van der Lee, "Towards detecting small, local earthquakes in greater chicago using single-station data," in *AGU Fall Meeting Abstracts **(AGU)***, Dec. 2023.
4. 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 **(SSA)***, Apr. 2023.
5. 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 **(AGU)***, Dec. 2021.

Projects

- **Reinforcement Learning for Financial Time Series Analysis** : Developed an RL environment and a double deep Q-network agent to make intelligent trading decisions based on high-frequency limit order book data.
- **Analyzing spread of COVID-19 using Graph Neural Networks** : Created an end-to-end pipeline to predict the spread of COVID-19 in US states by applying Graph Neural Networks to census, travel, and time-series data.
- **Domain Adaptation with 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.
- **Citizens Police Data Project** : Analyzed police complaint data in Chicago by applying NLP to reports, creating a co-accusal officer network with graph analytics, and visualizing crime trends.

Skills

Languages: Python, Java, R, C, C++

Web: Flask, HTML, CSS, PHP, Javascript, AngularJS, Node.js, React, Flutter, Dash

Analytics: Spark, Tableau, Trifacta, Matplotlib, D3.js, Google Earth Engine, ArcGIS

DevOps: AWS, GCP, Kubernetes, Docker, Metaflow, Argo Workflows, Git, Jira, Confluence, Terraform

Databases: PostgreSQL, MySQL, MongoDB, Firestore

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

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

Teaching

- Invited Lecturer - Machine Learning, ROSES'21, American Geophysical Union *2021*
- Graduate Student Instructor, CS496 - Advanced Deep Learning, Northwestern University *2021*
- Graduate Student Instructor, STAT461 - Statistical Machine Learning, Northwestern University *2021*
- Lecturer, Machine Learning Workshop, CSI, K.J Somaiya College of Engineering *2016*
- Lecturer, Cryptography Workshop, CSI, K.J Somaiya College of Engineering *2016*

Talks

- **NeurIPS 2022:** Tackling Climate Change with Machine Learning Workshop *Dec 2022*
- **NICO:** Using machine learning to detect wildfires *Oct 2021*
- **AI Journal Club:** MuZero: Learning to plan in unknown environments *Feb 2021*
- **NeurIPS 2020:** AI for Earth Sciences Workshop, *Dec 2020*
- **AI Journal Club:** Agent57: Surpassing human performance on Atari Games *Oct 2020*
- **ICML 2020:** Self-Supervision in Audio and Speech Workshop *Jul 2020*
- **AI Journal Club:** Imagination and Curiosity in Reinforcement Learning *May 2020*
- **AI Journal Club:** Multi-Agent Reinforcement Learning *Feb 2020*

Media Coverage

- **EarthScope:** Chicago's seismicity captured by single seismic station *Oct 2025*
- **Government Technology:** PG&E Beefs Up Wildfire Detection Via FireScout AI Cameras *Jul 2022*
- **Popular Science:** A network of 1,000 cameras is watching for Western wildfires *May 2022*
- **TV Interview:** Alchera & Sierra Home Health Care Collaboration *Apr 2022*
- **Fox Weather:** The future of wildfire detection is here: Artificial Intelligence *Feb 2022*
- **ABC7 News:** AI helping alert crews to fires as soon as they start in Sonoma County *Jul 2021*
- **Data Skeptic Podcast:** Earthquake Detection using crowd-sourced data *Dec 2020*
- **Phys Org:** Citizen scientists help geologists to identify earthquakes and tectonic tremors *Aug 2020*

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*

Mentoring

- Matthew Khoriaty, Undergraduate Researcher, NU Earth *2024*
- Samarth Shah, Machine Learning Intern, Alchera Labs *2022*

Service

- Reviewer, Transactions on Machine Learning Research (TMLR) *2024 - Present*
- Reviewer, Geophysical Journal International *2024*
- Reviewer, PeerJ Computer Science Journal *2022*
- Council Member, Computer Society of India *2016-2017*