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 (Topper), Neural Nets, Image Analysis (Topper), AI, Data Structures, Algorithms, Operating System (Topper)

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

Work Experience

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

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.
- Developing a ML based retirement algorithm to effectively retire labeled seismic samples on Earthquake Detective - a crowdsourcing platform.

Northwestern University — Evanston, Illinois
Graduate Research Assistant | Prof. Prem Seetharaman — *Jan 2020 – Jun 2020*

- Developed Otoworld, an interactive environment for training Reinforcement Learning agents for Computer Audition.
- Agents are rewarded for "turning-off" sources which are spawned in the environment.
- Agents trained in this environment implicitly learn to separate the sources by learning to maximize the reward.
- 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 — Mumbai, India
Research Intern | Prof. Grishma Sharma — *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 — Mumbai, India
Machine Learning Intern — *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++, HTML, CSS, PHP, Javascript, AngularJS, Node.js
Analytics/Tools: PostgreSQL, MySQL, AWS, Git, Docker, Spark, Tableau, Trifacta, Matplotlib, D3.js
Libraries: Pytorch, Tensorflow, OpenCV, OpenAI-Gym, Numpy, Pandas, Scikit-Learn, NLTK, Keras

Publications

1. **O. Ranadive**, S. van der Lee, T. Vivian, and C. Kevin, "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.
4. **O. Ranadive** and D. Thakkar, "K-shot learning for face recognition," *International Journal of Computer Applications 181 (18)*, pp. 43–48, Sep. 2018.

Projects

Reinforcement Learning for High-Frequency Trading
- Developed an environment to process HFT data and maintain a limit-order book in real-time.
- Developing RL agents to leverage 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.

Talks

- 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*

Teaching

- 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*

Awards & Activities

- Undergraduate Final Year, **Rank 2** *2019*
- Winner of **IEEE** Technical Paper Presentation for the paper "Framework for low cost driver-assistance system". *2017*
- Council Member of **Computer Society of India.** *2016-2017*