Rayan DAOD NATHOO
Machine Learning Engineer

Experienced Machine Learning Engineer aiming to **develop solutions for real-world constrained problems**. I helped companies like **Bose** and **Logitech** innovate using novel technologies and acquired vital research and industry skills on the way. With experience in **Audio ML**, **Computer Vision**, **NLP, Model Compression,** and more, I am a team worker eager to learn and looking forward to the next challenge! Currently looking for impactful projects in AI/ML.

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◈ TECHNICAL SKILLS

| Machine Learning | Signal Processing | Data Science & Eng. | Audio ML | Computer Vision | NLP | Time Series | TinyML |

| Python | Java | C++ | TensorFlow/PyTorch | Keras | Scikit | Pandas | OpenCV | SQL | Git | Linux | Docker |

◈ WORK EXPERIENCE

Machine Learning Engineer
Bose ⧉

02/2023 - 08/2023   *Internship - Boston, MA, USA (remote)*
American company, multinational manufacturer of audio equipment for entertainment, home, ... (7k+ employees)

Achievements
- ◇ Designed & improved product-level **Deep Learning** models such as **Speech Enhancement** (SE) and **Source Separation** (on-device)**,** using CNN-RNN-based encoder-decoders (U-Net-like, DCCRN, TCN, …). Performed data analysis, feature extraction, and developed an **objective evaluation pipeline**.
- ◇ Explored **Model Compression** (Knowledge Distillation (KD), Quantization, Pruning) and implemented a general purpose **KD framework**
- ◇ Developed a **novel KD method** for SE models, particularly good in adverse conditions: publication **under review for ICASSP 2024**
- ◇ Collaborated with ML Engineers in 2+ projects and **improved our codebase** (new model capabilities, enhanced training script, Tensorboard plugins, ...)

Computer Vision Engineer
Multimedia Signal Processing Group, EPFL ⧉

05/2022 - 08/2022   *Fixed-term contract - Lausanne, Switzerland*
Swiss University, laboratory specialised in multimedia signal processing (~10 members)

Achievements
- ◇ Evaluated existing **Semantic Segmentation** (CNN) and **Super-Resolution** (GAN) methods with latency and hardware constraints
- ◇ Deployed models in a real-time TV studio pipeline (Norway, UK, ...) - Code, Publication, Reports - project validated by the European Commission

Machine Learning Intern
Logitech ⧉

08/2021 - 03/2022   *Internship - Lausanne, Switzerland*
Swiss company, multinational manufacturer of computer peripherals and software (8k+ employees)

Achievements
- ◇ Developed real-time **Deep Learning Target Source Separation** models: **1/** footstep extractor for gaming **2/** sound type manipulator (41 classes)
- ◇ Developed an **end-to-end pipeline**: data ingestion-processing-augmentation, models (CNN, RNN), evaluation, hyper-parameter tuning, prototyping
- ◇ Demonstrated **prototypes** to the entire R&D department, UX Designers, Product Managers. Wrote and defended my Master's Thesis

◈ EDUCATION

BSc & MSc in Computer and Communication Sciences
Swiss Federal Institute of Technology Lausanne (EPFL)

2015 - 2022   *Lausanne, Switzerland*
Software Engineering, Machine Learning, Signal Processing (GPA 5.1/6)

- ◇ Master Diploma supplement Machine Learning, Deep Learning, Image Processing, Audio and Speech Processing, Biomedical Signal Processing, Advanced Algorithms, Advanced Probabilities, TCP/IP, Mobile Networks, Information Security & Privacy, Modern Digital Communication, ...
- ◇ Master's Thesis: "Personalised Audio Enhancement" with Logitech's CTO office and Martin Vetterli's laboratory LCAV (EPFL)
- ◇ Semester Project at LCAV: Percussion Sample Classifier - Data Engineering, Feature Extraction, Time-Frequency Analysis, Random Forest, CNN
- ◇ More projects: Twitter Sentiment Classification, Multi-Channel Noise Reduction, Direction Of Arrival Estimation, JUCE VST Plugin (C++ app), ...
- ◇ Activities: Master students representative, Event Manager -> Sponsoring Manager -> President of the Computer Science Student Association

◈ CERTIFICATES

Coursera - TensorFlow Advanced Techniques (2023) ⬈
Custom Layers, Custom Loss Functions, Custom and Distributed Training, Advanced Computer Vision, Generative Deep Learning (4 courses - 80 hours in total)

Coursera - TensorFlow Developer Specialization (2022) ⬈
Convolutional Neural Networks, Natural Language Processing, Sequences, Time Series prediction (4 courses - 80 hours in total)

Coursera - Deep Learning Specialization (2022) ⬈
Neural Networks, Deep Learning, Hyper-parameter tuning, Regularization, Optimization, Convolutional Neural Networks, Sequence models (5 courses - 120 hours in total)

◈ PERSONAL PROJECTS

French Intent Classification for Chatbot ⬈
◇ Intent classification for French language using pre-trained embeddings + Log. Reg. classifier. Data prep, training, evaluation, CLI (Pandas, Hugging Face)

Spoteezer ⬈
◇ Spotify-Deezer music link converter to help share music no matter the platform (Flask, HTML, CSS). Try it now!

◈ REFERENCES

Dr. Mikolaj Kegler - Audio ML Scientist @ Bose
"[...] can very quickly get a solid grasp of new concepts and clearly explain the key ideas to his coworkers. [...] performed an in-depth analysis of existing solutions, identified their limitations, and built on top of them to design significantly more powerful methods."

Reference letter : upon request

Dr. Milos Cernak - Principal Engineer @ Logitech
"[...] hard worker, systematic and logical [...] produces reproducible and well-documented code [...] cares deeply about the whole chain of turning users experience into products"

Reference letter : upon request

◈ VOLUNTEERING & STUDENT JOBS

CLIC Executive Committee
Computer Science Student Association ⬈
2018 - 2021
Roles
◇ **President** (20 - 21) - Management (12 members + 5 commissions, CHF 90k+ annual budget), decision-making, internal/external representation
◇ **Sponsoring** (19 - 20) - Canvassing, contract negotiations (brought CHF 5k+), contact with sponsors (big/small Swiss/international companies)
◇ **Events** (18 - 19) - Organisation of 10+ events, logistics & inventories, team supervision (15+ staff members)

Social Network Content Creator & Manager
EPFL IC School
2020 - 2022
Achievements
◇ Managed the EPFL Computer Science School social networks (Instagram, Twitter, Linkedin, Facebook)
◇ Launched and improved recurring concepts (IC Takeover, IC Connects, News, ...)

Student Assistant
Discrete Mathematics course
2018 - 2020
Achievements
◇ Support for students during the course "Advanced Information, Computation, Communication I"

◈ LANGUAGES

French
Native

English
Full Professional Proficiency (C2)

Spanish
Elementary Proficiency (A2)

◈ HOBBIES

Music Production - played piano for 10y, produce electronic music for 5 years now (Ableton Live, FL Studio, Cubase)

AI/tech advances - stay up-to-date by reading articles, listening to podcasts, watching videos, and attending conferences

Self-improvement - read and learn about personal growth and try my best to apply recurring rules in life and work

Travelling - Lived in Europe and West Africa, family across all continents, love discovering new places and new cultures