Yug D Oswal

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Education

VIT Vellore — Vellore, Tamil Nadu, India

Bachelor of Technology in Computer Science and Engineering, ***CGPA: 9.46*** — *Sep. 2022 - Jun. 2026*

Research

Computationally Efficient Quadratic Neural Networks

Mathew Mithra Noel, Venkataraman MN, ***Yug D Oswal*** — *arXiv, 2023-2025*

- Solved the computational bottleneck faced by higher order ANNs, allowing higher expressiveness at reduced costs.
- Designed reduced parameter RP-QNNs with $O(n^2)$ computational complexity, equivalent to regular ANNs.
- Developed vectorized forward/backward pass algorithms for (RP-)QNNs, enhancing computational efficiency.

Cone-Class of Activations: More Learning, Less Neurons

Mathew Mithra Noel, ***Yug D Oswal*** — *arXiv, 2025*

- Learning hyperstrips, not hyperplanes, and enabling exponentially smaller yet performant foundational models.
- Achieved $\geq 4.6\%$ Top-1 accuracy increase on ImageNet while reducing parameters by 46.4% in VGG19.

Loss Switching, Novel Classification and Regression Losses

Mathew Mithra Noel, Arindam Banerjee,* ***Yug D Oswal****, Geraldine Bessie, Venkataraman MN* — *arXiv, 2024*

- Proposed novel losses with a scheduling algorithm, surpassing Cross-Entropy, Huber, and others on 7 benchmarks.
- Presented regression losses robust to noise and distribution shifts, improving RMSE by $\geq 1.4\%$ in 4 benchmarks.
- Developed classification losses and scheduling accelerate convergence, achieving $\geq 3\%$ accuracy gain on ImageNet.

Experience

AI/ML Engineer — Jul. 2024 – Oct. 2024

Bharat Dynamics Limited - Ministry of Defence, India — *Hyderabad, India*

- Procured and curated a dataset for UAV detection using MATLAB scripts and the Computer Vision Toolbox.
- Researched and hypertuned SOTA object detection models, techniques, and training strategies to build a robust UAV Detection and Tracking service, tested in 4 environments, for field scenarios.
- Engineered unique edge and web migratable model deployments on isolated systems following defence policies.

Machine Learning Engineer — Feb. 2024 – Jul. 2024

WebTiga (renamed Synergetics.AI) - a MIT Startup — *Bangalore, India*

- Developed classical ML POCs for clients in the insurance domain and an audio-based car damage classifier.
- Led the ML lifecycle, from data curation, model training, to API creation and deployment, for all pipelines of a humanoid speech-capable autonomous agent serving de-addiction therapy.
- Engineered, dockerized, and deployed agentic workflows, guardrails, context-aware chat history, and RAG pipelines for fine-tuned LLMs, with real-time integration into client-used services, reducing latency by 53%.

Project Lead — Jun. 2023 – Aug. 2023

University of Auckland & Signal Corporation Limited — *Auckland & Wellington, New Zealand*

- Led an international team, coordinating members, clients, and stakeholders to ensure seamless project execution.
- Resolved 5 real-world issues to enhance Signal Corporation's real-time threat prediction system.
- Developed a pipeline involving incremental clustering, Named Entity Recognition (NLP), and geocoding.

Projects

Rekindle | *Tensorflow (keras), pandas, Python, FastAPI, PostgreSQL, Ngroks, Git* — May 2023 – May 2023

- A service to aid Alzheimer's and Dementia disease patients. Featured in Intel's Developer Spotlight.
- Trained custom encoder-decoder NLP models with novel loss functions and distributed strategies, surpassing performance on the Google GoEmotions benchmark, and securing 2nd place in the Intel (BOLT) Hackathon.

Technical Skills

Technical: C, C++, Python, SQL, Git, Tensorflow, Keras, Java, JavaScript, Node.js (Express), Flutter (Dart), Firebase, MongoDB, Redis, Docker, Scikit-learn, Numpy, Pandas, Seaborn, Matplotlib, Statsmodels, R, HTML, CSS
Certifications: Machine Learning Specialization, Deep Learning Specialization, DeepLearning.AI Tensorflow Developer Professional Certificate, EDA and Data Visualization (Scaler), Advanced Techniques in Tensorflow