

BEZAWIT ABEBAW TEKEBA

Machine Learning Research Engineer | Technical Team Lead

Adelaide, Australia | bezawitt9@gmail.com | [LinkedIn](#) | [GitHub](#)

PROFESSIONAL SUMMARY

Machine Learning Research Engineer and Technical Team Lead with 2+ years developing and benchmarking biologically-plausible neural architectures, predictive coding as an alternative learning substrate to backpropagation, in PyTorch and JAX. Strong background in experimental research and ML systems development. Currently pursuing a Master's in Artificial Intelligence and Machine Learning at Adelaide University.

TECHNICAL SKILLS

- **Programming:** Python, JavaScript, PHP, SQL
- **ML & AI:** PyTorch, JAX, Scikit-learn, NumPy, Pandas, Transformers, LLMs, Predictive Coding, Neural Generative Coding, Recommendation Systems
- **ML Engineering & Tools:** Multi-GPU/Distributed Training, Hyperparameter Optimization, Git, GitHub, Docker, Linux, CUDA, Jupyter, Google Colab, Optuna
- **Leadership:** Team leadership, project planning, task coordination, technical documentation, code review, progress reporting, cross-functional collaboration

PROFESSIONAL EXPERIENCE

SingularityNET

Machine Learning Research Engineer | Technical Team Lead | Jul 2024 - Jul 2026

- Researched biologically inspired learning approaches, including predictive coding and Neural Generative Coding (NGC), and reproduced published experiments using NGC-Learn and PyTorch.
- Developed a modular Predictive Coding Transformer with local PC inference and Hebbian weight updates across all Transformer components, layer-specific energy functions, and top-down/lateral connections.
- Built comprehensive benchmarking and evaluation pipelines comparing Predictive Coding and standard backpropagation-based Transformers using perplexity, cross-entropy, energy, training/inference time, and controlled architectural and inference-step experiments.
- Reduced test perplexity from 56.65 to 7.12 on a character-level language model through architectural, initialization, inference, and hyperparameter improvements, with experiments evaluated across 5 random seeds.
- Implemented multi-GPU training for PC models, addressing parameter synchronization issues caused by local weight updates
- Contributed to a JAX-based predictive coding library by developing reusable PC-Transformer modules, including RoPE, multi-head attention, MLPs, residual

connections, GELU/Softmax activations, configurable initialization and tokenization, and language-model training pipelines.

- Developed automated two-phase hyperparameter optimization pipelines using energy-based stability pruning for architecture search followed by Bayesian optimization for continuous hyperparameter refinement, improving training stability and model performance.

iCog Labs

Machine Learning Intern | Apr 2024 - Jun 2024

- Developed a personalized hybrid recommendation system combining collaborative filtering and content-based approaches, incorporating explicit and implicit user feedback.
- Researched and evaluated generative AI and text-to-image models, including Stable Diffusion and PixArt, comparing model capabilities, inference pipelines, and output quality.
- Engineered and trained a custom GPT architecture for Amharic NLP, implementing multi-head attention, character-level tokenization, training, evaluation, and autoregressive text generation.

Vintage Technologies

Software Engineer Intern | Aug 2022 - Oct 2022

- Developed a full-stack task management platform using Laravel, MVC, Bootstrap, HTML, CSS, and JavaScript, supporting task assignment, deadline tracking, project management, and team collaboration.
- Implemented an admin dashboard with role-based access control, project timeline visualization, user management, and automated task/deadline notifications.

SELECTED PROJECTS

FabricPC - JAX Predictive Coding Library | [Github](#)

- Open-source JAX/Flax predictive coding library; contributed the reusable PC-Transformer module set (RoPE, multi-head attention, MLPs, residual connections, GELU/Softmax) and language-model training pipelines.

Predictive Coding Transformer | [Github](#)

- Research codebase for a modular PC-Transformer with local inference and Hebbian updates.

Neural Generative Coding Benchmarking Study | [Github](#)

- Reproduced and benchmarked Neural Generative Coding models against backpropagation-based models using PyTorch and NGC-Learn, evaluating accuracy, MSE, BCE, NLL, log-likelihood, and training/inference time.

Amharic Language Modeling for Low-Resource Languages | [Github](#)

- Engineered and trained a custom GPT architecture for Amharic NLP, implementing multi-head attention, character-level tokenization, training, evaluation, and autoregressive text generation.

LLM-Based Case Study Data Extraction - Upwork Client | [Github](#)

- Developed an LLM-powered pipeline to extract structured information from 324 technical PDF case studies, generating analysis-ready datasets for a real client.

EDUCATION

Master of Artificial Intelligence and Machine Learning

Adelaide University | Adelaide, Australia | February 2026 - Present

Bachelor of Science in Computer Science

University of Gondar | Gondar, Ethiopia | October 2019 - October 2023

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

- **Neuromatch Academy - Deep Learning Summer School (2024)** - Intensive program with hands-on project implementing Wav2Vec model for speech accent recognition. [\[Certificate\]](#)
- **European Summer School on Information Retrieval - University of Amsterdam (2024)** - Deep learning, large language models, and generative information retrieval. [\[Certificate\]](#)
- **Oxford Machine Learning (2024)** - Representation learning and generative AI specialization. [\[Certificate\]](#)
- **Deep Learning Specialization - Coursera** - Neural network optimization, CNNs, RNNs, sequence models, and hyperparameter tuning. [\[Certificate\]](#)
- **Machine Learning Specialization - Coursera** - Supervised/unsupervised learning, recommender systems, and reinforcement learning.