KALEAB BELAY

+33605619536◇ Paris, France
belete.kaleab@gmail.com ◇ website ◇ linkedin ◇ github

EXPERIENCE

Research Engineer Sep 2024 - present
Paris Brain Institute *Paris, France*

- Trained Variational Autoencoders on neural time-series to discover computation motifs in the brain
- Discovered distinct computational mechanisms thought to underlie optimal arousal state
- Formalized findings with nonlinear dynamical systems and mean field analyses

Machine Learning Engineer Intern Jun 2023 - Dec 2023
Vortexa *Dubai, UAE*

- Systematically identified and reduced bias in prediction of cargo arrival times by 20%
- Ingested real-time AIS, weather, and port-congestion feeds; engineered features (dwell/berth time, route embeddings)
- Productionized training and evaluation pipelines in MLflow

EDUCATION

Master of Science in Machine Learning, MBZUAI 2022-2024
GPA, 3.82
Bachelor of Science in Software Engineering, Addis Ababa Institute of Technology 2016 - 2021
GPA, 3.58

SKILLS

Languages	Python, C++, SQL
ML	Pytorch, generative-modeling, DeepSpeed, MLFlow
Robotics	ROS, SLAM

PUBLICATIONS

- K. Belay, M. Pals, J. Barbosa, N. Karalis. "Modeling neuromodulator-driven cortical dynamics with low-rank RNNs" In review, *Computational and Systems Neuroscience (COSYNE)*, 2025.
- K. Belay. "Gradient and magnitude based pruning for sparse deep neural networks" *Proceedings of the AAAI conference on artificial intelligence*, 2022.

THESIS

- K. Belay, D. Song, H. Siegelmann. "Navigating the Unknown: Towards biologically-inspired Simultaneous Localization and Mapping".

PROJECTS

Optimized Training of LLaVa Trained a large Vision Language Model on a single A100 GPU node using model parallel distributed training, gradient quantization.

A comparative study of Kalman Filters and RNNs for robot state estimation Built a project that evaluated state-space models like Kalman Filters along with RNNs on estimating the ground position of robots in challenging simulation environments.

EXTRA-CURRICULAR ACTIVITIES

- Amateur chess player (rated 1700 on chess.com)
- Long distance running
- Beginner violin player

AWARDS AND PRESENTATIONS

- First place in the Ethiopian Collegiate Programming Contest (EtCPC) 2021. Qualified for the regional finals of ACPC.
- Poster presentation at the *International Conference on the Mathematics of Neuroscience and AI*, May 2025
- Poster presentation at the *Paris Circuit Dynamics* workshop, December 2024