

Summary

- Introduced multiple efficient and high-performing deep learning models spanning NLP and computer vision.
- Demonstrated both theoretical and practical aspects of machine learning algorithms in production and research.
- Passionate about research and engineering of robust & efficient AI systems that solve real-world problems.

Work Experience

Software Engineer - [Bisrate Gabriel International School](#)

Sept 2021 - Present

- Lead a development team that is building a school management system that serves over 6,000 students
- Built deep learning-based computer vision receipt analyzer and replaced the slow manual procedure
- Design & implement the architecture, security system, business logic, and front-end integration
- Tech Stack: C#, ReactJs, NextJs, React Native, PostgreSQL, GitHub Actions, Docker, PyTorch, Sci-kit Learn

Researcher & Lecturer - [Addis Ababa University](#)

Sept 2016 - Present

- Teach courses - *Introduction to Artificial Intelligence, Algorithms and Data Structure, Web Programming*
- Led a team that built an Activity Planning, Monitoring, and Reporting System to manage over 500 of the university's offices and eliminated the tedious and error-prone paper-based reporting system
- Built a timetable scheduler using a genetic algorithm to schedule more than 50 courses across our school
- Developed a student-course analyzing tool using Probabilistic Graph Modeling, leading to a complete transformation of the curriculum.
- Supervised a team that designed and constructed a wheeled robot, capable of item retrieval and placement
- Tech Stack: C#, Python, C++, ROS, ROS Viz, Gazebo, ReactJs, Docker, MaskRCNN

Founder - [Sefere App](#)

Sept 2021 - May 2022

- Founded a startup that created web and mobile apps to increase the visibility of small businesses - [Play Store](#)
- Developed the frontend (mobile & web) and backend
- Implemented self-improving content-based feed recommendation using neural network, word embeddings, and KNN
- Tech Stack: ASP.Net Core, Kotlin, Java, SQL Server, TypeScript, ReactJs, Pytorch, Scikit-Learn

RoboCup Developer - [Addis Ababa University](#)

Apr 2017 - Sept 2018

- Built a ROS-based control system for a three-player RoboCup team and won the championship
- Implemented the game strategy & SLAM based on fused sensory inputs
- Tech Stack: C++, Python, ROS, Gazebo, ROS Viz, OpenCV, Computer Vision, SciPy, Matplotlib

Research Experience & Publications

RL based layer skipping Vision Transformer - [GitHub](#)

Apr 2022 - July 2023

- Developed a transformer network that employs a reinforcement learning (RL) agent to learn to skip irrelevant layers during processing an input, resulting in a 40% increase in throughput compared to the vanilla ViT
- **Publication:** *DynamicViT: Making Vision Transformer faster through layer skipping* In: [Vision Transformers: Theory and Applications Workshop at NeurIPS \(Nov 2022\)](#)
- **Publication:** *Dynamic Transformer Network* In: [Workshop on Dynamic Neural Networks at ICML \(July 2022\)](#)

DistillEmb: Distilling word-embeddings via contrastive learning - [GitHub](#)

Jun 2021 - May 2023

- Compressed word embeddings into a CNN to address out-of-vocabulary issues, conserve memory, and facilitate cross-lingual transfer, resulting in a 7% improvement in F1 accuracy and 1400% less memory usage, as well as out-of-the-box low resource cross-lingual transfer capabilities.
- **Publication:** *DistillEmb: Distilling Word Embeddings via Contrastive Learning* In: [Transfer Learning for NLP Workshop at NeurIP \(Nov 2022\)](#)

Boosting image retrieval with accurately labeled small data - [GitHub](#)

Sept 2021 - Jan 2022

- Explored the utilization of a detailed labeled dataset to enhance the feature set in an image retrieval task, enabling a small, shallow network to surpass the performance of a more complex, larger model

Morphological generation for Wolayita using CNN based Seq2Seq model

Apr 2018 - Sept 2019

- Constructed a CNN-based encoder-decoder morphological analyzer for the Wolayita language utilizing fewer parameters than LSTM-based models.
- **Publication:** *A translation-based approach to morphology learning for low-resource languages* In: [Proceedings of The Fourth Widening Natural Language Processing Workshop \(July 2020\)](#)

Morphology-rich alphasyllabary embeddings - [GitHub](#)

Apr 2018 - Jun 2019

- Examined the relationship between language morphology and corresponding word embeddings, proposing a technique to enhance the syntactic features of embeddings.
- **Publication:** *Morphology-rich Alphasyllabary Embeddings* In: [Proceedings of the 12th Language Resources and Evaluation Conference \(May 2020\)](#)

Skills

- **Soft skills:** Problem-solving, Teamwork, Communication skills, Attention to detail, Curiosity & Adaptability
- **Major ML Areas:** Deep Learning, Information Retrieval, Image Retrieval, Computer Vision, Language Models, Sequence Modeling, Reinforcement Learning, Image Processing, Prompt Engineering, Robotics, NLP, Boosting, Bayesian Optimization, ML Debugging, Feature Engineering, Data Cleaning & Pre-processing
- **Programming Languages:** Python, C/C++, Java, C#, Kotlin, JavaScript, TypeScript
- **ML Frameworks:** PyTorch, TensorFlow, Keras, TensorFlow.js, Lightning, Sci-kit Learn, Pandas, Gensim, VectorDB, MLFlow, AutoML, SciPy, ONNX, OpenCV, NLTK, SpaCy
- **ML Tools:** TensorBoard, Weight & Biases, Matplotlib, Seaborn, Bokeh, Google Cloud Platform (GCP), ROS, Gazebo
- **Mathematics:** Linear Algebra, Optimization, Statistics, Calculus, Probability
- **Application Frameworks:** Angular, ReactJs, AspNet Core, NodeJs, Django, Flask, FastAPI, Android, ReactNative
- **Databases:** MySQL, MS SQL Server, MongoDB, PostgreSQL, Redis, NoSQL
- **Software Engineering:** Git, Docker, Github Action, CI/CD, MLOps, DevOps, GraphQL, REST, GraphQL, gRPC, Testing, OOP, Architecture Design, Distributed & Parallel Computing

Education

M.Sc. in Artificial Intelligence - Graduated with Excellence

2023

Addis Ababa University

- Thesis - Reinforcement Learning Based Layer Skipping Vision Transformer for Efficient Inference

B.Sc. in Software Engineering - Graduated with Distinction

2016

Addis Ababa University

- Capstone Project - AI-Based Traffic Congestion Management System

Leadership and Volunteer Activities

- ICCV Student Volunteer Oct 2023
 - International Conference on Computer Vision (ICCV) 2023 - Paris, France
- ICLR Student Volunteer May 2022
 - International Conference on Learning Representation (ICLR) 2023 - Kigali, Rwanda
- Program Chair Jan 2022
 - Deep Learning IndabaX ASTU Conference - Adama, Ethiopia
- Ambassador of Ethiopia, Zindi Africa - Addis Ababa, Ethiopia Oct 2021
- General Co-Chair Oct 2019
 - AI in Ethiopia Conference - Addis Ababa, Ethiopia
- Tutorial and Workshop Chair May 2019
 - Deep Learning IndabaX WSU Conference - Wolaita Sodo, Ethiopia