

EBASA TEMESGEN

Ph.D. candidate in Computer Science

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SUMMARY

Fourth-year Ph.D. candidate in Computer Science with a background in Electrical Engineering and Robotics. My research spans whole-body locomotion-manipulation, computer vision and planning, and machine learning.

SKILLS

Programming Languages: C, C++, Python, MATLAB, Java

Frameworks/Tools: TensorFlow, PyTorch, NumPy ROS, ROS2, Git, Linux, Gazebo, Solidworks, CAD, Siemens NX,

Areas of Expertise: Robotics, Machine Learning, Computer Vision, Embedded systems

EDUCATION

Ph.D. in Computer Science

University of Minnesota

May 2027 (Expected)

Minneapolis, Minnesota

M.S. in Computer Science

University of Minnesota

May 2025

Minneapolis, Minnesota

B.S. in Electrical and Computer Engineering

Addis Ababa University

May 2020

Addis Ababa, Ethiopia

PUBLICATIONS

GOOGLE SCHOLAR

N. Saffaryazdi, Y. Goonasekera, N. Daniel Hailemariam, E. Temesgen, S. Nanayakkara, E. Broadbent, M. Billingham. *Emotion Recognition in Conversations Using Brain and Physiological Signals*. In *Proceedings of the ACM International Conference on Intelligent User Interfaces (IUI)*, 2022.

A. Sylvester, E. Temesgen, N. Etori, M. Gini. *Autonomy and Dignity for Elderly Using Socially Assistive Technologies*. In *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2023.

S. Boelter, E. Temesgen, B. J. Glass, M. Gini. *Understanding Drill Data for Autonomous Application*. In *International Workshop on Autonomous Agents and Multi-Agent Systems for Space Applications (MASSpace)*, 2024.

E. Temesgen, S. Boelter, M. Gini. *Hierarchical and Heterogeneous MARL for Coordinated Multi-Robot Box-Pushing Environment*. In *AAAI 2025 Workshop on Cooperative Multi-Agent Systems Decision-making and Learning (CMASDL)*, 2025.

S. Boelter, E. Temesgen, B. J. Glass, M. Gini. *Model-Free Subsurface Anomaly Detection using Subspace Analysis Techniques for Sparse Telemetry for Extraterrestrial Drilling Robots*. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, 2026.

RESEARCH EXPERIENCE

Robotic Autonomy, Vision and Reinforcement Learning

2022-2026

- Currently developing Whole-Body Locomotion-Manipulation policies for a quadruped-manipulator (Spot arm), training RL controllers in simulation to coordinate locomotion and end-effector motion for manipulation tasks (e.g., reaching/pushing), with constraint-based safety and task success metrics
- Competed in the 2025 *Farm Robotics Challenge*, leading the *University of Minnesota team (FarmGuard)* to first place in the *Excellence in Small Farms Technology Award* with an autonomous drone system for deer detection and deterrence on small farms, using PX4, RTK, vision-based navigation, and sensor fusion.
- Working on a multi-agent system with Hierarchical Multi Agent Reinforcement Learning (MARL) to enhance collaborative decision-making and task allocation in dynamic environments
- Conducted research on Kinovo Gen3 7DoF robots for histotripsy research, focusing on robotic arm precision, buoyancy compensation, with ROS 2

- Applied ORB-SLAM 3-based navigation for the Boston Dynamics Spot robot for real-time mapping and trajectory planning in indoor environments
- **Tools Used:** *pytorch, Ros 2, Ros 1, Spot Robot, Turtlebots3, Kinova Robot, Stereo Camera, SLAM, sensor fusion, pose regression*

Drill Fault Detection and Autonomy

2023-2024

- Worked with a team at **NASA Ames Research Center** to analyze and understand drill data for fault detection and mitigation to enhance mission-critical operations in extreme environments
- Mentored and advised masters student on on project planning and development of software for drill fault detection using time-frequency and percussive frequency features
- **Tools Used:** *NumPy, Python, C, C++*

Federated Learning

2023-2024

- Developed a distributed system for federated learning to predict traffic flow, achieving a 10% reduction in prediction error over existing state of the art baselines
- Designed and optimized APIs for scalable communication between clients in a federated learning framework, ensuring robust data pipelines and efficient integration of ML models
- **Tools Used:** *pytorch, Flwr.ai, Wandbi, Performance Measurement System (PeMS) Data Source, Graph Clustering*

PROFESSIONAL EXPERIENCE

Milwaukee Tool

May 2025 – Aug 2025

Machine Learning Engineering Intern – Advanced Engineering Technologies (AET)

Brookfield, WI

- Contributed to machine learning and robotics projects within the Advanced Engineering Technologies team, supporting the development of intelligent systems for next-generation power tools and automation solutions.

NASA L'SPACE Proposal and Writing Evaluation Experience

Jan 2025 – May 2025

Principal Investigator - Mission Concept Development and Technical Writing

Minneapolis, MN

- Participated in a NASA-led proposal writing and evaluation program, contributing to the development of a mission concept and technical documentation while applying NASA's proposal standards and review processes.

NASA L'Space Mission Concept Academy

Sep 2024 – Jan 2025

Command and Data Handling (CDH) Engineer – Lunar Exploration Mission

Minneapolis, MN

- Led the development of the Command and Data Handling subsystem for a robotic space mission, collaborating with NASA mentors and teammates through the mission lifecycle up to the Preliminary Design Review, and performed trade studies to ensure subsystem architecture met mass, power, cost, and schedule constraints while maintaining cross-system compatibility.

Safaricom

May 2022 – Aug 2022

Lead QA - Sales and Distribution (S&D) and PreTups System Integration

Addis Ababa, Ethiopia

- Led QA efforts and managed a development team to integrate S&D and Nokia PreTups systems with ERP, CRM, and E-Top Up platforms, streamlining operations and training 100+ users to ensure successful deployment and adoption

University of Auckland, Empathic Computing Lab

Apr 2021 – Dec 2021

Research Intern

Auckland, New Zealand

- Applied deep learning models for emotion recognition using physiological data (PPG, EEG), and implemented a real-time deep learning model using PyTorch for emotion recognition, improving model prediction accuracy by 15% over the baseline
- Contributed to the development of APIs and database integration for time-series data analysis, ensuring seamless data pipelines for ML model training and deployment

University of Michigan

Jul 2019 – Aug 2020

Undergraduate Research Assistant

Ann Arbor, Michigan

- Conducted performance analysis of Reinforcement Learning algorithms, identifying bottlenecks in execution time, memory usage, and CPU efficiency across multiple frameworks and architectures.