Elizabeth A.Ondula

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EDUCATION

Ph.D. Student of Computer Science   2018—present
University of Southern California, Los Angeles, CA
Faculty Advisor: Bhaskar Krishnamachari

B.Eng in Electrical and Electronics Engineering   2010-2015
Technical University of Kenya, Nairobi, Kenya
Thesis: PID controller for autonomous hover for a quadcopter

EXPERIENCE

Graduate Research Assistant
University of Southern California

Autonomous Networks Research Group   Fall 2021 - Summer 2023
Exploring and studying the integration of stochastic epidemic models with reinforcement learning to address epidemic uncertainties.

Networked Systems Lab   Fall 2019 - Spring 2020
I explored Reinforcement Learning methods for implementing planning, scheduling, and design tools to aid in agroecosystem design. **Faculty Advisor:** Barath Raghavan

Research Scientist Intern   May 2021-Aug 2021
IBM Research, Yorktown Heights, NY (Remote)
During this internship, I applied parallel and distributed training concepts to analog AI hardware-aware training, aiming to speed up the training of deep neural network architectures.

Research Software Engineer   July 2017-July 2018
IBM Research, Nairobi, Kenya
I explored the application of a blockchain-based access control system for buildings through the Cognitive Door project. I also designed and developed the UI/UX features for a digital health wallet, enabling care continuity and conducting user studies, including interviews and focused groups.

Research Software Engineer   Aug 2015-Oct 2016
IBM Research, Nairobi, Kenya
In this role, I led IoT and computing projects that aimed to develop a cost-effective Intelligent Transportation System (ITS) for Nairobi City County. I also took the lead in developing and deploying water sensors into tanks, performed statistical analysis on the data, and created a conversational agent to communicate water consumption details back to end users.

Software Developer Intern   May 2015-July 2015
IBM Research, Nairobi, Kenya
During my internship, I designed and developed a user interface for a financial investment mobile application. I also conducted user studies, such as interviews and surveys, to analyze investment options among different demographics in Nairobi.

Head of Product Development   Nov 2016—Jun 2017
Brave Venture Labs, Nairobi, Kenya I managed the design, development, and process definition of a recruiting system that leverages artificial intelligence techniques for job matching.

Co-Lead Hardware Research   2014-Mar 2015
iHub, Nairobi I co-curated and co-designed a curriculum for the 'Kids Hacker Camp' and facilitated workshops for hardware and robotics enthusiasts in Nairobi.

PATENTS

Weldemariam, K., Kozloski, J.R., Gordon, M.S., Vukovic, M. and **Ondula, E**., International Business Machines Corp, 2021. Automated task management on a blockchain based on predictive and analytical analysis. U.S. Patent 11,196,551.

Fleming, K.K., **Ondula, E.A.**, Samuel, L. and Weldemariam, K.S., International Business Machines Corp, 2020. Predicting crop productivity via intervention planning on small-scale farms. U.S. Patent 10,772,269.

Fleming, K., Wambua, M., Kotin, T., **Ondula, E.** and Weldemariam, K., International Business Machines Corp, 2019. System and method for creating and managing intelligent water points in resource constrained regions. U.S. Patent 10,319,051.

Weldemariam, K., **Ondula, E.**, Bore, N.K. and Kwatra, S., International Business Machines Corp, 2020. Simplifying electronic communication based on dynamically structured contact entries. U.S. Patent Application 16/197,492.

Wambugu, —.W., **Ondula, E.**, Ogega, V., Nyota, T., Kwatra, S. and Weldemariam, K., International Business Machines Corp, 2020. Maintaining voice conversation continuity. U.S. Patent Application 16/132,023.

PUBLICATIONS

Ondula, E.A. Navigating Uncertainties in Epidemic Contexts with Reinforcement Learning. Accepted for AAAI 2024 Doctoral Consortium.

Ondula, E.A. and Krishnamachari, B., 2022, June. Using Reinforcement Learning for Operating Educational Campuses Safely during a Pandemic (Student Abstract). In Proceedings of the AAAI Conference on Artificial Intelligence (Vol. 36, No. 11, pp. 13025-13026).

Fleming, K., Kouassi, A., **Ondula, E.** and Waweru, P., 2016. Toward farmer decision profiles to improve food security in Kenya. IBM Journal of Research and Development, 60(5/6), pp.6-1.

Fleming, K., Waweru, P., Wambua, M., **Ondula, E.** and Samuel, L., 2016. Toward quantified small-scale farms in Africa. IEEE Internet Computing, 20(3), pp.63-67.

Zeni, M., **Ondula, E.**, Mbitiru, R., Nyambura, A., Samuel, L., Fleming, K. and Weldemariam, K., 2015, December. Low-power low-cost wireless sensors for real-time plant stress detection. In Proceedings of the 2015 Annual Symposium on Computing for Development (pp. 51-59)

PROJECTS

SafeCampus
Development of a single and multi-agent epidemic simulation environment for Campus Settings.
Technologies: Pytorch, Gynmansium, Tianshou.

Sentimental Agents
Large Language Model (LLM)-based Multi-agent framework for advisory decisions.
Technologies: GPT, Langchain, Llama Index.

GNNExplore
Training a Graph Convolution Neural Networks with Reinforcement Learning for Robot Exploration tasks.
Technologies: Pytorch, Gymnasium .

TEACHING

Graduate Teaching Assistant
University of Southern California
Courses: Introduction to Robotics (Present), Introduction to Programming (Spring 2022), and Database Systems (Summer and Fall 2020).

Invited Guest Lecturer
Strathmore University   2016
Course: Machine to Machine Communications

MENTORSHIP

I mentor students and individuals passionate about integrating Science, Technology, Engineering, Arts, and Math into their learning or projects. I've offered guidance in various capacities, including roles at the Viterbi Summer Institute and the Women in Engineering program at USC. Additionally, I've been involved in mentoring initiatives such as the Viterbi Mentorship Program, IBM Bluehack in Jamaica, and, in Kenya, at Tech Avenue at TUK, Foondi Workshops, and Women Who Mentor and Innovate in Africa, which is now known as Women in Tech KE

SERVICE AND LEADERSHIP

Program Committee member, AAAI workshop AI for Education   Oct 2023
Distributed Ledgers Technologies and Artificial Intelligence Taskforce Member at Ministry of Information, Communication and the Digital Economy in Kenya. **Artifact Evaluation Committee Member**, SuperComputing 2021   Jan 2021 - present
Artifact Evaluation Board Member, Journal of Systems Research   Feb 2023—present
Director of Civic Engagement, Black Graduate Student Network at USC   July 2023, July 2020
Organizing Committee, Ph.D. Women and Gender Minorities Computing Club   Fall 2021

AWARDS AND FELLOWSHIPS

Grace Hopper Celebration Travel Grant   Fall 2019
OSDI '18 Diversity Grant   Fall 2018
Annenberg Fellowship, University of Southern California   Fall 2018
Outstanding Alumni Technical University of Kenya   Sep 2018
IBM Managers Choice Award   2015 and 2016
The 100: Tech Community Appreciation Awards   2015
Best IoT and Mobile-related Application for Services Professionals   2014

TALKS AND PANELS

Invited Panelist   Nov 2023
Mt. San Antonio College
Topic: Women of Color in STEM

Invited Speaker
STEM Bytes Seminar at USC
Topics: Using Reinforcement Learning for Operating Educational Campuses Safely during a Pandemic, "Self-Programmable" Reinforcement Learning Agents: Keeping up with bot followers and followings, Computational Agroecology

Invited Speaker
African Leadership University
Topics: Applications of IoT in Emerging Markets and Internet of Things - A use case for addressing intermittent water supply in Nairobi

SKILLS

Research and Analysis: Reinforcement Learning, Training Deep Learning Models (PyTorch), Mathematical Modeling, Algorithm Design and Analysis, Numerical Analysis
Programming and Development: Python, JavaScript, Rust, C++, HTML/CSS
Software Engineering: Agile Development, Design Thinking, Test Driven Development, CI/CD
Tools and Platforms: Cloud Computing, Weights & Biases (wandb), Data Visualization