Roger Wienaah

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EDUCATION

Oregon State University (OSU), Corvallis, Oregon Sept 2024 - Present
Program: MS/PhD in Robotics with AI Minor Expected June 2029
PhD Thesis Topic: Dynamic Overlapping Coalition Formation for Multiple Robot Systems
Advisor: Prof. Julie A. Adams
Relevant Coursework: Mobile Robots, Learning-based Robot Control, Multiple Robot Systems, Sequential Decision Making in Robotics, Linear Multivariable Control Systems, Multi-Agent Systems, Causal Inference for AI

University of Energy and Natural Resources (UENR), Ghana Sept 2018 - Oct 2022
Program: Bachelor of Science in Electrical and Electronic Engineering
Awards: Valedictorian, School of Engineering, and Department of Computer and Electrical Engineering

SKILLS

Programming: Python, C++, MATLAB
Core Expertise: Multi-robot systems, Robot Control and Kinematics, Distributed Optimization, Reinforcement Learning, Deep Learning, Embedded Systems, Algorithm Design
Frameworks: ROS 2, Nav2, PyTorch
Simulation & Tools: Gazebo, RViz, HoloOcean, PyBullet, Unreal Engine, MATLAB/Simulink, Git, Linux
Hardware: BlueBoat, Kinova Arm, Pioneer Robot, TurtleBots, PiCar, ArmPi

RESEARCH EXPERIENCE

Graduate Research Assistant Sept 2024 - Present
HMT Lab, Oregon State University (OSU) – Supervisor: Prof. Julie A. Adams

- Implemented a team-orienteering coverage planner with uncertain rewards in ROS 2 for coordinated depth search and contour tracking using sonar and acoustic communication
- Built a high-fidelity Fern Ridge Lake environment in Unreal Engine for multi-robot simulation in HoloOcean
- Simulated up to 50 uncrewed surface vessels and conducted field tests on the real lake with three BlueBoat robots
- Developed a distributed hedonic game-based algorithm for dynamic resource allocation in multi-robot systems
- Co-authored a manuscript on coupling dependencies in multi-robot systems (in preparation for IEEE T-RO)

PROJECTS

Multi-Robot Search Path Planning with ROS 2 Nav2

- Implemented a MILP-based multi-robot search planner (MESPP) for two robots capturing a moving target
- Integrated MESPP with Nav2 for waypoint navigation and simulated coordinated search behavior in Stage and RViz
- Reduced average target capture time by 49% (140s to 72s) compared to exhaustive search in three environments

Friction-Aware Reinforcement Learning for Robot Arm Manipulation

- Trained Truncated Quantile Critics policies for pick-and-place manipulation with a simulated Franka Panda robot
- Compared friction-aware inputs, joint control, and curriculum learning for robust grasping under varying friction
- Improved low-friction grasping success by up to 20 pts using curriculum learning, with only 8% additional training

Auction-Based Multi-Robot Task Allocation and Path Planning

- Implemented a dynamic auction-based task allocation algorithm for multi-robot coordination and planning
- Integrated RRT, RRT*, RRT-Connect and RRT*-Connect for collision-free planning and cost-based task assignment
- Evaluated performance with up to 5 robots and 9 dynamic tasks, comparing task completion time and path costs

Quadcopter Load Suspension

- Modeled a Crazyflie quadrotor with a cable-suspended payload in PyBullet
- Developed and tuned a cascaded PID controller to reduce payload oscillations and improve flight stability
- Evaluated controller performance against an uncontrolled baseline, demonstrating reduced positional drift

WORK EXPERIENCE

Graduate Teaching Assistant
Department of Mechanical, Industrial, and Manufacturing Engineering, OSU Sept 2024 - Present
Courses: System Dynamics and Control (ME320), Computational Methods for Engineers (ME203)

- Delivered lectures on control systems, MATLAB, and Python programming to 190+ undergraduate students
- Facilitated programming labs and guided students on coding challenges, debugging and control systems assignments

Data Analyst, Vivo Energy Ghana – Retail Department Oct 2022 - Aug 2024

- Built Excel and Power BI dashboards to track sales performance across 230+ retail stations
- Automated data cleaning, reporting and dashboard updates with Power Query and Excel VBA
- Collaborated with 14 territory managers to analyze sales performance and support operational decisions

Software Intern, GrassRoots Hub, Sunyani Oct 2021 - Nov 2021

- Developed a Django/PostgreSQL web app to streamline recruitment for Ghana Tech Lab's coding training program

Hardware Intern, Makerspace Lab, Kumasi Hive June 2021 - July 2021

- Built a semi-autonomous fishpond water-quality monitoring system to improve fish farming
- Developed a Flutter mobile application to visualize sensor data, water quality and device location
- Designed printed circuit board components for IoT products

HONORS & COMPETITIONS

- **MathWorks MATLAB Minidrone Competition**, EMEA, Oct 2022: Finalist, Top 9 of 330+ teams
- **IMechE Speak Out for Engineering Presentation Competition,** Aug 2022: Ghana Heat Winner
- **Ocean Challenge4Africa Hackathon,** April 2022: Built a Naive Bayes plastic debris classifier, Top 14 of 44 teams
- **Schneider Electric Go Green Competition**, MEA, April 2022: AI-powered smart home, Top 10 of 40+ teams

LEADERSHIP EXPERIENCE

President, UENR Robotics Club, University of Energy and Natural Resources Aug 2021 - Oct 2022

- Led a team to win the 2022 National Energy Innovation Competition and secure top positions in other competitions
- Managed a team of over 50 students to learn and equip themselves with skills in robotics and IoT
- Organized a tech exhibition (URC TECHFEST'22) to promote robotics to 95+ high school students in Sunyani

General Secretary, Ghana Institution of Engineers, UENR Student Chapter May 2020 - Aug 2021

- Managed all correspondence of the Ghana Institution of Engineers, UENR Student Chapter
- Organized a skills fair to equip over 200 students with in-demand tech skills

VOLUNTEER ACTIVITIES

- Mentor, Black in AI Emerging Leaders in AI Grad prep program Sept 2026 - Present
- Python Tutor, Ghana Institution of Engineers skills fair, UENR July 2021 - Aug 2021
- Robotics educator, Stem4Africa Project, Sankofa Mentorship Hub-Synergies Institute Ghana Jan 2021 - Aug 2022