

Ibrahim O. Jimoh

Artificial Intelligence & Robotics

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RESEARCH INTERESTS

Machine learning, deep learning, reinforcement learning, robot and autonomous systems learning and perception, social robotics, natural language processing.

EDUCATION

MSc, Engineering Artificial Intelligence

Jul 2023 – May 2025

Carnegie Mellon University (CMU)

Pittsburgh, USA

Specializations: Machine Learning, Deep Learning, NLP, Robotics

Capstone: Building an LLM Based Investment Advisor System using a Retrieval Augmented Generation (RAG) Architecture

Relevant Courses: Applied Stochastic Processes, Machine Learning for Engineers, Introduction to Deep Learning, Cognitive Robotics, Data Inference and Applied Machine Learning, AI System Design, Principles and Applications of AI, AI/ML Operations (AI/MLOPs), Humanoid Robotics and Cognition, Research Methods.

BEng, Computer Engineering

Sep 2015 – Sept 2021

Federal University of Technology (FUT)

Minna, Nigeria

Specialization: Software and Hardware Engineering

Thesis: Development of a Drowsiness Detection System for Road Accident Reduction and Control using Computer Vision Technique

RESEARCH EXPERIENCE

Research Associate

Jun 2025 – Present

AI Robotics Laboratory, Culturally Sensitive Social Robotics

CMU

- Developing a cultural knowledge base to be structured into a cultural ontology to guide robot interactions in a culturally attuned manner.
- Developing a robot localization software module to estimate a pepper robot's absolute position by triangulation and trilateration using visual landmarks in a known environment to guide its interaction and navigation.

Research Assistant

Jun 2024 – May 2025

AI Robotics Laboratory, Culturally Sensitive Social Robotics

CMU

- Investigated culturally sensitive robot behaviors through ethnographic research and identifying interaction patterns that are socially and culturally acceptable in Africa as a case study.
- Developed and implemented a Behavior Tree Domain Specific Language (DSL) for use case scenarios interaction of a robot with humans.
- Developed a software module for robot localization to determine its pose in a Cartesian world frame of reference by a combination of relative and absolute position estimation. Relative position estimation is achieved through odometry and the robot inertial measurement unit, while absolute position estimation is achieved by triangulation using ArUco markers as landmarks. We also investigated the use of Scale Invariant Feature Transform (SIFT) and YOLO for the development of functionality for the landmark recognition.

Research Assistant

Jan 2021 – Sep 2021

Computer Engineering Laboratory, Computer Vision Driver Assistant and Detection System for Road Safety

FUT

- Investigated the use of computer vision algorithms for developing system to better enhance vehicular road safety.
- Carried out survey and acquired statistics on vehicular road accident reports.
- Developed an in-vehicle installable system for detecting vehicle-driver drowsiness while driving with capabilities to trigger a sound alarm and send distress signal containing driver and vehicle information to nearest road safety authority. The system uses a Histogram of Oriented Gradient (HOG) facial predictor algorithm and eye aspect ratio for eye monitoring.

TEACHING EXPERIENCE

Teaching Assistant, for Robotics Principles and Practice (18799-L), CMU College of Engineering

Fall 2025

WORK EXPERIENCE

Software Engineer Intern

Jan 2023 – Jun 2023

Optimus Bank

Lagos, Nigeria

- Led as a project lead, coordinated project timelines, ensured deliverables were met, and fostered collaboration between development and business units.
- Served in a scrum master capacity, facilitating daily stand-ups, sprint planning, and retrospectives, resulting in improvement in team productivity and task completion rates.
- Designed and developed APIs for customer support virtual assistant, enabling seamless integration with the bank's existing infrastructure and improving service efficiency.
- Maintained data security and adhered to industry compliance standards, ensuring 100% regulatory compliance with banking security protocols.

IT Engineer Intern

ProtoGY Global Services Limited

Jan 2022 – Dec 2022

Ibadan, Nigeria

- Managed the company's meter software, including updates, maintenance, and utility performances.
- Enhanced production and time efficiency by more than 60% by developing a Python-based entry application software for product inventory.
- Resolved software and hardware related issues encountered by meters in the pipeline systems.
- Recognized as the most efficient and best performing intern in the company during this period.

Hardware and Software Technician

Canaanland Technologies

May 2016 – May 2019

Ilorin, Nigeria

- Maintained, troubleshooted, and fixed computer systems and devices for corporate and individual clients.
- Provided technical support and software solutions for clients.
- Acquired a lot of knowledge about customer relations during the time spent in this role.

PUBLICATIONS & PRESENTATIONS

A. Akinade, D. Barros, E. Birhan, M. Danso, Y. Haile, **I. Jimoh**, C. Osano, P. Ranchod, M. Richard, B. Rosman, B. Shimelis, T. Tefferi, and D. Vernon, "Culturally Sensitive Social Robotics for Africa," *chapter in Cultural Robotics Book: Diversified Sustainable Practices*, Springer Nature [Under Review '25]

Abstract **I. Jimoh**, H. Equbay, C. Osano, T. Tefferi, and D. Vernon, "Behavior Trees for Culturally Sensitive Social Robots: African Culture Case Study," *Robotics in Africa Forum at IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

Poster A. Akinade, D. Barros, M. Danso, Y. Haile, E. Birhan, B. Shimelis, C. Osano, P. Ranchod, M. Richard, B. Rosman, **I. Jimoh**, T. Tefferi, and D. Vernon, "Culturally Sensitive Social Robotics for Africa," *Cultural Robotics: Diversified Sustainable Practices, Workshop at IEEE/ACM Human Robot Interaction (HRI) Conference*, 2025.

Y. Underdue Murph, A. Avoka, **I. Jimoh**, and F. Rurangwa, "Breaking Mental Health Silence: Men from Different Cultures and Generations," *Case Studies in International Education*, Vol. 5 No. 2, Dec. 2024.

TECHNICAL SKILLS

Programming — Python, C++, C#, Java, JavaScript **AI & Machine Learning** — Pandas, NumPy, Scikit-Learn, PyTorch, TensorFlow, OpenAI API, RAG, LangChain **Robotics** — ROS, Gazebo, OpenAI Gym **Cloud Technology** — AWS, GCP, Docker, Kubernetes **Analytics Tools** — Power BI, MS Excel, SQL **Web Technologies** — HTML, CSS, Bootstrap, PHP **Web Frameworks** — Django, .NET **Developer Tools** — Git, GitHub, Linux, Ubuntu, Unity3D, LaTeX **Databases** — MySQL **Embedded Systems** — Arduino Programming, Raspberry Pi **Soft Skills** — Leadership, Communication and Presentation, Collaboration, Integrity

CONFERENCES & WORKSHOPS

IEEE/ACM Human Robot Interaction (HRI) Conference themed *Robots for a Sustainable World* Poster presentation of "Culturally Sensitive Social Robotics for Africa," in Cultural Robotics: Diversified Sustainable Practices Workshop, Melbourne, Australia, 2025.

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Abstract presentation of "Behavior Trees for Culturally Sensitive Social Robots," in Robotics in Africa Forum Workshop, Abu Dhabi, UAE, 2024.

Touch Sensing and Processing Summer (TSPSS) Workshop in Robotics Lectures and hands-on on robot tactile sensing and manipulation by experts in industry (Meta AI, TouchLab) and academia (Stanford, TU Dresden) in Dresden, Germany, 2024.

HONORS & AWARDS

HRI Conference Grant Award, ACM SIGAI

2025

Grant awarded to attend and present research work at the Human Robot Interaction conference in Melbourne, Australia, 2025.

Master's Degree Scholarship, Mastercard Foundation

2023

Awarded the highly competitive Mastercard Foundation master degree scholarship.

Recognition Best School Representative, International Mathematics Olympiad (IMO)

2015

Recognized by my school for exemplary performance in the competition.

SELECTED PROJECTS

Deep Reinforcement Learning-Based Mobile Robot Navigation in Social Spaces

Sep 2024 – Dec 2024

Developed a deep reinforcement learning-based framework for mobile robot navigation in social spaces that jointly models both human-robot and human-human interactions. Implemented an architecture model adept at capturing long-range dependencies for modeling complex interactions in dynamic crowds from a baseline model architecture that uses a self-attention mechanism.

LLM-Based Investment Advisor using Retrieval-Augmented Generation (RAG)

Sep 2024 – Dec 2024

Developed a scalable LLM-powered investment advisory platform that democratizes financial advising, including risk profiling, asset allocation,

portfolio forecasting, and personalized recommendations.

Deepfake Voice Detection for Fraud Prevention

Jun 2024 – Aug 2024

Developed and trained a deep convolutional neural network model to distinguish real and fake voice recordings.

Synchronizing Multimodal Behaviors and The Eva Robot Head

Sep 2023 – Dec 2023

Built a responsive and expressive humanoid robot head using Unity, VR headset, and 3D printing with Fusion 360 and Ultimaker cura. Implemented facial expression recognition and mimicking using neural network models. Enhanced open-source Python code for robot head control.

LEADERSHIP, COMMUNITY SERVICE & EXTRACURRICULAR

AI Safety Collab, AI Alignment Facilitator

Aug 2025 – Present

European Network for AI Safety

- Leading weekly discussion groups for international participants, ensuring clarity and engagement across diverse technical backgrounds.
- Translating complex AI safety concepts into accessible insights through guided discussions and exercises.
- Fostering collaborative learning and peer exchange on alignment strategies and governance.
- Gathering and synthesizing participant feedback to enhance facilitation quality and program impact.
- Contributing to the international AI Safety Collab initiative, fostering global collaboration in AI safety education.

Afrisnet Graduate Committee, Communications Officer

Jun 2024 – Present

Afrisnet

- International community of African graduate and postdoctoral scholars promoting academic success.
- Organizing and communicating career and professional development workshops.
- Facilitated information sessions on research fellowships and job opportunities.

IEEE Student Branch, Interim Chair, Vice Chair

May 2024 – May 2025

CMU

- Coordinated the activities of the branch on campus.
- Organized and participated in the IEEEExtreme 18.0 coding competition challenge.
- Drafted the student branch's annual plan report including activities and funding applications and opportunities.

Research Club, Community Engagement Manager

Dec 2023 – Dec 2024

CMU

- Brought together the campus research community and advocated for research engagements.
- Engaged with faculty and students and established faculty-student research collaboration.
- Organized workshops, panel sessions, and research talks from faculty and invited external guests.

Solid Africa, Volunteer

Dec 2023 – Dec 2023

- A non-profit organization that provides aid to the most vulnerable hospital patients in Africa.
- Made donations, visitation, and was actively involved in the distribution of relief materials and logistics process of reaching out to patients in Rwanda.

Google Developers Group, Member

2020 – Present

- Actively participated in meetups, workshops, and coding sessions, while contributing to hands-on projects, hackathons, and collaborative development initiatives.
- Regularly engaged in GDG local events to expand technical expertise, build community connections, and stay current with emerging technologies.

PROFESSIONAL AFFILIATIONS

Member, Association of Computing Machinery (ACM)

Graduate Member, Institute of Electrical and Electronics Engineers (IEEE)

Graduate Member, IEEE Robotics and Automation Society (IEEE-RAS)

Graduate Member, Nigeria Society of Engineers (NSE)

PERSONAL INTEREST

I am an avid ping-pong player, especially fascinated by the hand-eye coordination and reflexes involved in playing it. 'When it is ping-pong time, it is me time :)'