Elisha A. KOMOLAFE

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Research Interests

Rehabilitation Robots, Reinforcement Learning, Robot Design and Control, Brain-Computer-Interface

Education

Obafemi Awolowo University (O.A.U.), Ile-Ife, Nigeria 2016 – 2022
Bsc. Electronic and Electrical Engineering. — GPA 3.97/5.00
Relevant Coursework: Control Systems Engineering I & II, Introduction to Modern Control, Intelligent Control and Instrumentation Engineering.

- **Dissertation Topic: "Design and development of a small scale bilateral rehabilitation robot for stroke rehabilitation and a low-cost force-torque sensor".** Supervised by Dr. K.P. Ayodele

Neurological Association of South Africa, EEG Online May 2020 – Nov 2020
Diploma in Clinical Electroencephalography (EEG)
Relevant Coursework: Principles of Electroencephalography

Neuromatch Academy – Computational Neuroscience Course July 2020
Online Summer School

Neuromatch Academy – Deep Learning Course July 2022
Online Summer School

IBRO-SIMONS Computational Neuroscience Imbizo Aug 2022 – Sep 2022
Cape Town, South Africa

BCI & Neurotechnology Spring School 17 – 26 April 2023
Online Spring school

Research Experience

Biosignal Processing, Instrumentation and Control Lab Dec 2017 – Present
Undergraduate Research Assistant to Dr. K.P. Ayodele

- **Weather Wan Research Project** Control scheme for a remote weather station. Completed the initial design of the timing diagram and flowchart for the wireless weather station.
- **EMG controlled hand orthosis** Volunteered during the usability testing phase.
- **Autofocusing microscope.** Led the collaboration effort between the group and microbiology for the project, implemented an image capturing program in python.
- **PULSR Research Project** served as a research assistant to explore the use of reinforcement learning for trajectory generation and assisted with the development of the novel force sensor and data acquisition using LabVIEW.

Gilead Biomedical Engineering Sep 2019 – Jan 2020
Research Assistant to Dr. K.P. Ayodele
Projects:

- **Applications of Reinforcement Learning for Robotic control in a virtual environment.** researched in using reinforcement learning to train robots in the CoppeliaSim environment, worked on training the NAOqi robot in walking and the Uarm robot in picking a cylinder.
- **Repair of a faulty wheelchair car lift** Served as the Lead to diagnose the cause of the fault and fully repair the wheelchair lift.

Applied Artificial Intelligence and Robotics Research Lab Dec 2019 – Present
Research Assistant to Dr. K.P. Ayodele

- **Transfer Learning for a novel multi axis force sensor.** Developed a new architecture for the novel multi axis force sensor made up load cells, and attempted to use transfer learning to improve measurements.
- **Bilateral rehabilitation robots review.** Performed Literature reviews on existing unilateral and bilateral rehabilitation robots, used the findings to develop the design parameters for my thesis work.

Summer school project July 2020
Neuromatch Academy Computational Neuroscience Course
Title: Decoding of the Visual Cortex using Kay-Gallant Dataset. Decoding seen images from brain activation data using edge Detection and machine learning techniques.

Summer school project July 2020
Neuromatch Academy Deep Learning Course
Title: Multi Agent Reinforcement Learning in Gambling and the effect on Group fMRI readings. To utilize reinforcement learning to create a multi-agent simulation from single-person fMRI data.

Summer school project Aug 2022 – Sep 2022
IBRO-SIMONS Computational Neuroscience Imbizo
- **Mini project: "Exploring generic decoding of seen objects using visual features."** Using linear regression to decode seen images from brain activity in different regions.
- **Project: "Learning to walk in a simulation."** Trained a Actor2Critic agent to learn how to walk in the Bipedal Walker v-3 in Open Ai gym.

Conferences

(NFNR) Sub-Saharan Regional Conference Dec 2018
Theme: Neurorehabilitation in Africa: Challenges and New Horizons

Faculty of Technology Conference 2019 Sep 2019
Theme: Diversification of Developing Economies: imperatives for sustainable environment and technological innovations.

(NSNS) Annual Scientific Conference March 2022
Theme: Multidisciplinary Care and Collaboration in the Neurological sciences

Publications

Komolafe, E.A., Ayodele, K.P., Sanusi A.A, Ogunbona, P.O. (2022). A review on the structure and control techniques used in bilateral rehabilitation robots for stroke rehabilitation. *(In Preparation)*

Ayodele, K.P., Omolayo, I., Jubril, A.M., Obreba, P., Ajayi, Komolafe, M.A., Olaogun, M.O.B., **Komolafe, E.A.** (2022) Parallelogram Arm Robot with Load Cells Integrated into Two Links for End Effector Force Estimation. *(In Preparation)*

Presentations

Ayodele, K.P, Komolafe, M.A., Olugbon, F.J., **Komolafe, E.A.** (2019). A Myoelectric Robotic Orthosis For Hand Neuro-rehabilitation of Stroke Patients in resource-poor settings. Oral presentation at NFNR 2018.

PULSR V2.0 Oral presentation at the O.A.U. College of Health Sciences Research Fair 2021 on the PULSR second version.

Professional Societies and Activities

WFNR (World Federation of Neurorehabilitation) July 2022 – Present
Young WFNR Member
- **Special Interest Group Member** Young WFNR & Robotics

ICORR (International Consortium for Rehabilitation Robotics) Aug 2022– Present
Member

Black in AI Nov 2022 – Present

Work Experience

Faculty of Technology Conference OAUTekConf2019 Sep 2019
Assistant Technician

- **Performed projection for abstract presentation sessions and Implemented teleconferencing for remote participants.**
- **Teamed up with the technical team to deliver audio-visual support during the conference.**

Teaching Assistant Nov – Dec, 2021
Marked and Graded Laboratory reports of ∼200 year II engineering students for EEE 291.
EEE 291 – Fundamentals of Electronic and Electrical Engineering Laboratory I

Awards and Honors

Simons Trust Imbizo Follow Up Grant (STIFUG) [$387] 2022

Software, Programming, Languages and certificates

Software LaTeX, Rhino 3D, Matlab, Corel Draw, k40D, Diagrams.Net, V-REP

Programming Languages Python, C

Languages English, Yoruba

Certificates Cisco IT Essentials, CCNA Routing and Switching: Introduction to Networks, BR4IN.IO BCI Hackathon participation.