

AYMAN ALAMIR

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EDUCATION

PhD	University of Houston, Biomedical Engineering	December 2024
MSc	Northwestern University, Biomedical Engineering	December 2014
BSc	King Fahd University of Petr. & Min. (KFUPM), Electrical Engineering	June 2010

HONORS AND AWARDS

- Men of Distinction Award** 2023
Our Pediatric Lower-Extremity Gait System (P-LEGS) project in collaboration with Children's Memorial Hermann Hospital, TIRR Memorial Hermann and McGovern Medical School at UTHealth won the Men of Distinction Award
- Student of the Month** 2012
I was awarded the Student of the Month Award by the Intensive English Program at West Virginia University in December 2012.
- 1st Place in the IEEE-KFUPM Contest** 2010
Our capstone project on cancerous volumes modeling won the 1st place in the IEEE-KFUPM Contest in the Spring Semester of 2010.

RESEARCH EXPERIENCE

- University of Houston, Houston, Texas** January 2021 to December 2024
PhD Research, Laboratory for Non-Invasive Brain-Machine Interface Systems & BRAIN Center
- Worked on an upper-limb orthosis rehabilitation system (NeuroExo) for stroke survivors. Focused mainly on developing the interface for interaction between the frontend and backend of the system.
 - Worked on a pediatric lower-limb exoskeleton system (P-LEGS). Focused primarily on designing and developing the control and communication system of the device. Applied a PID, Finite-State Machine, and a non-invasive Brain-Computer Interface for the different levels of control hierarchy. Collected and processed gait and electromyography (EMG) data for the system trajectories and electroencephalography (EEG) signals for movement prediction. Implemented machine-learning and deep learning algorithms for signal classification.

Northwestern University, Chicago, Illinois

April 2014 to June 2014

MS Projects, Miller Lab. of Limb Motor Control

- Worked on a bi-directional brain-computer-interface project. Composed a report titled: "On Altering the Preferred Directions of Neurons on the Primary Somatosensory Cortex".
- Trained in lab procedures such as neurons data acquisition using a Cerebus data acquisition system, data analysis using MATLAB and Plexon, monkeys transport and chairing, using reward systems, and disposal of biohazards.

Research Institute at KFUPM, Dhahran, Saudi Arabia

Summer 2009

Summer Intern, IT & Communications Department

- Worked on an unmanned vehicle project called USAD-1. Duties included: replacing a PC and a PIC microcontroller with a Rabbit microcontroller supporting Ethernet and writing the codes required to do so, and interfacing the new system with the parts of the old system.

TEACHING AND PROFESSIONAL EXPERIENCE

University of Houston, Houston, Texas

January 2021 to Present

Research Assistant, Electrical & Computer Engineering Department

- Conducted research on
 - Rehabilitation systems for stroke survivors and children with motor disabilities
 - Brain-computer interfaces using electroencephalography (EEG)
 - Machine-learning and deep learning algorithms for EEG signal classification
 - Digital signal processing for fall detection using EEG
- Led a team for designing and implementing the P-LEGS project
- Mentored summer interns (Research Experience for Undergraduates Program, 2021-2023)

Jazan University, Jazan, Saudi Arabia

June 2015 to Present

Lecturer, Electrical Engineering Department

- Taught the following courses: Fundamentals of Electrical Engineering, Electric Circuits I, and MATLAB.
- Created the course and lab syllabus of the Electric Circuits I (the first instructor teaching and supervising this course for an affiliated community college).
- Comprehensively updated the course syllabus of MATLAB (changed the textbook and references, added many essential topics and developed the teaching and assessment methods).
- Coordinated the lab part of the Fundamentals of Electrical Engineering course and developed its lab syllabus.
- Work as a member of the following department committees: Timetable Committee, Survey Committee, and Social Service Committee.
- Work as a member of the college Recruitment and Scholarship Committee.

Jazan University, Jazan, Saudi Arabia

December 2015 to November 2016

Acting Dean, College of Applied Industrial Technology

- Oversaw and supervised the then newly established college's academics and administrative operations.
- Administered and contributed to the strategic plan of the college.
- Headed the committees responsible for creating the college's regulations and policies, obtaining the national accreditation, recruiting staff, and coordinating the facilities and labs.
- Worked closely with the industrial sector (such as ARAMCO) and signed a partnership agreement with GCC Electrical Testing Laboratory Company to secure jobs for some of the college's outstanding students while they were still studying.
- Headed the College Council.
- Worked as a member of the University Council and Advisory Board.
- Worked as a member of the University Preparatory Year Committee.

Jazan University, Jazan, Saudi Arabia

October 2010 to May 2012

Teaching Assistant, Electrical Engineering Department

- Taught the following lab courses: Fundamentals of Electrical Engineering, Electronics, Digital Design, Signal Processing, MATLAB, Numerical Methods and Microprocessors.
- Created the lab syllabi of the Signal Processing and Microprocessors courses (the first instructor teaching and supervising those labs in the then new department)
- Developed the lab syllabi of the Electronics and Digital Design courses.

SELECT PROFESSIONAL TRAINING

Curriculum Learning Outcomes

Creative Leadership, Kuala Lumpur, Malaysia, August 1st – August 3rd, 2016

Description: Curriculum design by writing degree level and course level learning outcomes, creating engaging learning activities, and using learning outcomes to design assessment tasks. Learning outcomes and curriculum mapping and the use of technology in education to improve learning outcomes.

Academic Leadership and Management

Jazan University, Jazan, Saudi Arabia, March 21st, 2016

Description: leadership and management in the academic environment, challenges in the academy, and how to overcome them.

Developing Energy Efficiency Courses for Saudi Universities

KACST, Riyadh, Saudi Arabia, September 7th, 2015

Description: Raising awareness among university faculty and administrators on the importance of energy efficiency and the need to offer dedicated courses and preparing for starting such courses.

SELECT TRAINING, SHORT COURSES, CONFERENCES, AND WORKSHOPS

InterfaceRice Conference

Rice University, Houston, Texas, April 30th – May 1st, 2024

Description: Topics on Neuroengineering, Neurotechnology, Neuroscience, and Neurosurgery.

BRAIN Center Annual Meetings

Houston, Texas, 2021-2024

Description: Attended and presented posters on my research on exoskeletons and rehabilitation engineering.

Executive Management for Startups

Monsha'at, Riyadh, Saudi Arabia, July 15th – July 19th, 2018

Description: A mini-MBA for startup founders and managers.

Full-Stack Web Development Bootcamp

Next Academy, Kuala Lumpur, Malaysia, June 21st – August 30th, 2017

Description: Web development using Ruby, Ruby on Rails, HTML, CSS, JavaScript, SQL, and Sinatra.

IEEE Signal Processing in Medicine and Biology Symposium

Temple University, Philadelphia, PA, December 13th, 2014

Intensive English Program

Georgia Institute of Technology, Atlanta, Ga, March 11th – May 3rd, 2013

Intensive English Program

West Virginia University, Morgantown, WV, August 20th – December 7th, 2012

Dealing with Industrial Electronics

TVTC, Jazan, Saudi Arabia (5-day Workshop), 2011

Biomedical Engineering and Instrumentation

KFUPM, Dhahran, Saudi Arabia (2-day Workshop), 2009

Introduction to LEGO NXT Robots

KFUPM, Dhahran, Saudi Arabia (2-day Workshop), 2009

Electronics: The Easy Way

KFUPM, Dhahran, Saudi Arabia (2-day Workshop), 2008

How to Invent: Step by Step

KFUPM, Dhahran, Saudi Arabia (2-day Workshop), 2007

International Computer Driving License (ICDL) Certificate, January 29th, 2006**Design and Maintenance of Household Electric Installations**

TVTC, Jazan, Saudi Arabia (8-week course), 2003

PROFESSIONAL SOCIETIES

The Brain-Computer Interface (BCI) Society, 2024-Present

BRAIN Center, 2021-Present

IEEE, 2006-2010

Saudi Scientific Club, 2005-Present

SELECT COMMUNITY SERVICE

How to Select Your College Major

Presenter, 1st High School, Abu Arish, Saudi Arabia, 2016

Description: A workshop I presented to my town high school students on how to choose your specialty after high school.

Let's Invent!

Presenter, Eastern Elementary School, Abu Arish, Saudi Arabia, 2016

Description: A workshop I presented to the school students on inventions, great inventors, and how we think like inventors.

The Salvation Army Fuqua Boys & Girls Club

Volunteer, Atlanta, GA, Spring 2013

Description: Helped the club members do their homework, entertained them, and presented different cultures to them.

Naqsh Reading Club

Cofounder, Abu Arish, Saudi Arabia, 2013

Description: Cofounded a local reading club that has been running so far. Its readings span a wide range of topics including science.

LANGUAGES

Arabic: Native Language

English: Proficient

COMPUTER SKILLS

Programming: C, Assembly, Python, MATLAB, Ruby, HTML, CSS, JavaScript, SQL.

Applications: PSpice, Multisim, Plexon, EAGLE, Logic Works, Simulink, LabView and Cassy Lab, App Inventor, Photoshop.

SELECT PROJECTS

Neuroimaging Modalities Employed in Brain-Computer Interfaces

Introduction to Medical Imaging Project Report - MSc, Fall 2014

Description: This paper discusses brain computer interfaces (BCIs) and some of the neuroimaging modalities used to acquire data needed to drive them.

Arabic Text Recognition

Digital Image Processing Project - MSc, Spring 2013

Description: The aim of this project was to build a program that can recognize typed Arabic writing from an image using template matching techniques. Two algorithms were developed for this project as the following: a recognition algorithm that can recognize isolated individual characters and a segmentation algorithm to extract individual characters from a given passage. Both algorithms were implemented using MATLAB. I contributed to every part of this project.

Estimating Force of Whisker for Small Deflection at Contact

Sensory Acquisition Project - MSc, Winter 2013

Description: Whisker morphology was generated using PuppetMaster (a MATLAB software) and then the whisker contact forces were estimated using software Elastica3D (a MATLAB software). The force and moment results are displayed for each whisker as arranged in the whisker pad. Computing the forces and moments at the base of the whiskers could lead to a better understanding of how rats utilize sensory cues to explore the world. I contributed mostly to the visualization part.

Arabic Text Classifier

Machine Learning Project - MSc, Winter 2013

Description: The purpose of this project is to automatically classify Arabic texts into different genres. The model, built using some training data, can classify a given text into one of 16 predefined categories (supervised machine learning). Different categories such as world news, religion, science, economics, and recipes are predefined.

Tumor Volumes Modeling

Capstone Project - BSc, Spring 2009

Description: A MATLAB code that reads a sequence of 2D CT scans and automatically recognizes tumors in them. It then renders these tumors into 3D realizations modeling tumor volumes for efficient treatment. I contributed mostly to the 3D realization part.

SELECT PUBLICATIONS

González-España, J. J., Craik, A., Ramirez, C., Alamir, A., & Contreras-Vidal, J. L. (2023, October). Optimization of electrode configuration for the removal of eye artifacts with adaptive noise cancellation. In 2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC) (pp. 3259-3264). IEEE.

Gonzalez-Espana, J., Craik, C., Alamir, A., Feng, J., & Contreras-Vidal, J. L. (2023, July). Neuroexo: A low cost non invasive brain computer interface for upper-limb stroke neurorehabilitation at home. In Proceedings of the 10th International Brain-Computer Interface Meeting 2023.

Craik, A., González-España, J. J., Alamir, A., Edquilang, D., Wong, S., Sánchez Rodríguez, L., & Contreras-Vidal, J. L. (2023). Design and Validation of a Low-Cost Mobile EEG-Based Brain–Computer Interface. *Sensors*, 23(13), 5930.