ALI HASSAN

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Re-locatable

Core Skills

Machine Learning & AI
Deep Learning
Reinforcement Learning
Supervised & Unsupervised Learning
Computer Vision
Natural Language Processing
Generative Adversarial Networks
Transfer Learning
Explainable AI
Model Optimization

Programming Languages & Tools
Python, MATLAB
Java, C/C++
TensorFlow, PyTorch
Keras, Scikit-learn
Apache Spark
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Git, GitHub, GitLab

Data Management & Analytics
Big Data Processing
Data Mining
Data Cleaning & Preprocessing
SQL & NoSQL Databases
Data Visualization (e.g., Matplotlib)
Cloud Computing (AWS, GCP, Azure)
Distributed Systems

IT Skills
Linux/UNIX, Raspbian OS
Web Development (Node.js, Angular)
RESTful APIs, GraphQL
Version Control (Git, GitHub, GitLab)

Languages
English (Fluent)
Urdu (Native)
Hindi (Conversational)

Education

Florida A & M University(3.6/4.0) Tallahassee, FL
PhD Electrical Engineering Expected Graduation: Summer 2025
Research Area: *Clinical Depression Detection With Artificial Intelligence Using Speech*

Florida A & M University(3.6/4.0) Tallahassee, FL
M.S. Electrical Engineering 2021-2024

Information Technology University (3.45/4.0) Lahore, Pakistan
Bachelor of Electrical Engineering 2014-2018

Professional Experience

FAMU-FSU College of Engineering Tallahassee, US

The FAMU-FSU College of Engineering is the joint college of engineering of Florida A&M University and Florida State University

Research Assistant, SPADAL Jan 2021 - Present

- **STEM Day 2025 Facilitator:** Volunteered as a STEM Day facilitator at FAMU-FSU College of Engineering, presenting interactive demonstrations on wave-particle duality and engaging K -12 students in hands-on physics experiments.

- **NGREP Scholar:** Developed a speech depression recognition (SDR) model using transformer networks and generative adversarial networks (GANs); achieved an RMSE of 3.783 on the E-DAIC dataset, representing a 10% improvement over the previous state-of-the-art model.

- **Graduate Mentor:** Designed and implemented machine learning pipelines optimized using Bayesian techniques for epilepsy seizure detection; achieved precision of 93% and recall of 90% using balanced ensemble classifiers on real-world EEG datasets.

- **ECE Research Mentoring Program (Summer, Fall 2023):** Implemented advanced techniques such as Support Vector Machines, Random Forests, and Convolutional Neural Networks; secured high F1-scores of 0.996296 for the positive class and 0.923077 for the negative class.

- Developed a two-step audio-based fake depression detection system integrating SpecRNet and CNN-GRU architecture; achieved 95.27% accuracy on an enhanced DAIC-WOZ dataset.

- Designed and deployed an EEG-based Brain-Computer Interface using the Muse headband, achieving 92.7% classification accuracy for command recognition and an MSE of 0.0114 for speed prediction in real-time applications.

- Taught a range of courses like Electromagnetics Lab, Digital Logic Design Lab, Introduction to EE using lab tools like VNA, QUARTUS Altera hardware and software tools, etc.

- Developed a face mask detection CNN model; achieved an accuracy of 98% on the FER2013 dataset.

AFINITI SOFTWARE SOLUTIONS — Lahore, Pakistan

A multinational data and software company focused on developing intelligent solutions for use in call centers

Team Lead (Data Science, Signal Processing & Android Developer) August 2019 – Dec 2021

- Engineered an IoT-enabled Vessel Monitoring System integrating GPS and VHF technologies with BPSK-500 modulation; established a network for 25,000 vessels using time- and frequency-division multiplexing, achieving precise tracking within 50 meters over a 300 km range and reducing operational costs by 80%.

- Developed and deployed a Hidden Markovian-based pattern recognition model using privately collected data received at the base station; achieved a **95%** accuracy rate in vessel detection and tracking.

- Researched and developed speech enhancement and noise suppression algorithms in **MATLAB** translated to Java in **Android Studio**, resulting in a **30 dB** improvement in SNR.

A-1 Labs — Lahore, Pakistan

Service providers with a focus on IoT, Cloud, Embedded, and Web/Mobile Apps

Data Science Developer (Machine Learning & IoT) March 2019 – June 2019

- Designed and implemented a web application for real-time IoT sensor data visualization and analysis; incorporated machine learning models to enhance monitoring efficiency by 20%.

- Refined predictive models through hyperparameter optimization and feature engineering, achieving a 15% decrease in error rates.

- Automated the deployment of Arduino-based sensor devices in a pharmaceutical factory; increased operational efficiency by 25% through streamlined installation processes.

Academic Experience

Dot-and-Boxes AI-based game — Tallahassee, US

Developed an AI-based Android app for the classic pencil-and-paper game, Dots, and Boxes, facilitating human-robot interaction and enhancing the gaming experience

- Implemented advanced game mechanics using Object-Oriented Programming (OOP), resulting in a highly engaging and interactive gaming experience that increased user session times by 10%.
- Designed and developed a computer opponent using Reinforcement Learning techniques, such as Deep Q-Networks (DQN) and Monte Carlo Tree Search (MCTS), providing a challenging gameplay experience that increased player retention by 20%.
- Utilized the alpha-beta pruning algorithm to optimize the AI opponent's decision-making process, reducing decision-making time by 25% and improving overall gameplay responsiveness.

Major Projects

Mask ON

This is a system to detect face mask as well as the temperature of the body

- Designed an algorithm using Convolutional Neural Networks and Tensorflow, OpenCV, and OpenVINO libraries for real-time detection of masks on faces of multiple people simultaneously in video frames with an accuracy of 93% on the training set and 98% on the test set
- Developed software to detect the overall temperature of the body using FLIR cameras in video frames
- Developed a prototype using Orange PI and FLIR camera to provide a security solution and attendance system; compared to available such solutions, we reduced the cost from $2900 to $300
- Won first prize in Hackathon 2022 competition organized by INTEL in FAMU-FSU College of Engineering

Extra-curricular & Volunteer Experience

ART & TECH FESTIVAL — Peshawar, Pakistan

- Volunteer: Presented and spoke about our project (Teaching Tree) to visitors of the event organized by the World Bank(2015)

3rd & 4th Robotic Expo — Lahore, Pakistan

- Verbal Communication: Presented our project (Teaching Tree & Skittle Separating Machine) to judges and audience at the Expo (2015)

INTEL HACKATHON 2022 & 2024 — Tallahassee, United States

- Verbal Communication: Presented our project (MaskON), a Face Mask Detection CNN, to judges and visitors of the event (2022).
- Won first prize for presenting the event's best practical and marketable solution in INTEL HACKATHON 2022 & 2024.

Publications

1. *Internet of Things-Enabled Vessel Monitoring System for Enhanced Maritime Safety and Tracking at Sea*, SoutheastCon 2024.
   IEEE Xplore Link

2. *A Comprehensive Analysis of Speech Depression Recognition Systems*, SoutheastCon 2024.
   IEEE Xplore Link

3. *Investigating Threat of Deepfake Voice Manipulation on Psychological Security*, IEEE Universal Village 2024.
   (In Process) – PDF available upon request.

4. *EEG-Based Brain-Computer Interface for Actuating Car Commands Using the MUSE Headband*, SoutheastCon 2025.
   (In Process) – PDF available upon request.

Honors and Awards

INTEL HACKATHON WINNER 2022, 2024 — **Tallahassee, USA**

DEAN'S HONOR LIST AWARD — **Lahore, Pakistan**

PEEF SCHOLARSHIP — **Lahore, Pakistan**

PM LAPTOP SCHEME — **Lahore, Pakistan**