Ali Hassan **Khan**

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Education

NUST(National University of Science and Technology) *Islamabad, Pakistan*

M.S. in Electrical Engineering (AI&Autonomous System) *Oct 2020 - Dec 2022 (Expected)*

- GPA: 3.79/4.0

FAST-NUCES(National University of Computer and Emerging Sciences) *Islamabad, Pakistan*

B.S. in Electrical Engineering (Electronics) *Aug 2015 - Jul 2019*

- GPA: 3.45/4.0

Skills

Back-end	Basic: REST API
Programming	Matlab, Python, C/C++, Assembly Language (8051&AVR Microcontrollers), JAVA, LaTeX
Libraries	Tensorflow, PyTorch, Keras,OpenCV, Transformers, Pandas, Scikit-learn, OpenAI Gym, NumPy, CVXPy, CVXPYLayer
Software and Tools	Latex, Matlab, Android Studio, ROS//ROS2
Languages	English, Urdu, Punjabi

Experience

TUKL Deep Learning Lab., NCAI *Islamabad, Pakistan*

Machine Learning Development Internship *Jul 2021 - Oct 2021*

- Developed and tested algorithm with different transformer models, including GPT, XLNet, BERT and BART, using PyTorch to generate Extractive and Abstractive summary of input Legal text, achieving near state-of-the-art accuracy.
- Improved the performance of models using hyper-parameter and model parameters fine tuning.
- Done comparative analysis between different models.
- Identified different factors that affects our Evaluation scores (e.g. ROUGE).

Niocraft BV., Ltd. *Amsterdam, The Netherlands*

Machine Learning Engineer (Freelance Contractor) *Jul 2019 - Sep 2020*

- Process and extract features from medical signals and images.
- Develop, simulate, test, and improved Algorithms, Android Apps Machine Learning and Deep Learning models to detect diseases and predict health indicators.
- Deployed Medical Imaging based Deep Learning models in Android Apps using Android Studio, Google Cloud and Firebase.

Relevant Coursework

Going On	Online: Reinforcement Learning and Optimal Control (Prof. Demitri Bertsekas, ASU), Reinforcement Learning (DeepMinds, UCL), Dynamic Optimization
Completed	Online: Generative Adversarial Networks (GANs), DeepLearning.AI TensorFlow Developer, Machine Learning Engineering for Production (MLOps), TensorFlow: Data and Deployment Specialization
Completed	Graduate: Machine Learning, Deep Learning, Stochastic Systems, Convex Optimization, Mobile Robotics, Computer Vision
Programming	Undergraduate: Introduction to Computing, Programming Fundamentals, Data Structures and Algorithms, Micro-Processor Interfacing and Programming
Others	Undergraduate: Applied Calculus, Differential Equations, Linear Algebra, Numerical Methods, Probability and Random Processes, Complex Variables and Transforms, Signal and Systems, Analogue and Digital Communication, Digital Signal Processing, Feedback Control Systems, Digital Control Systems

Research Experience and Projects

Deep Reinforcement Learning for HVAC Control *SEECS, NUST*

Research *2021*

- Performed literature review on the existing methods of HAVC Control using model-free and model based Policy.
- Implemented the state-of-the-art Deep RL algorithms (e.g. Q-Learning, REINFORCE, PPO, A2C) to control HVAC System.

Integration of Domain Knowledge into Deep Learning Architectures *SEECS, NUST*

Research *Jan. 2020*

- Surveyed different techniques for injection of domain specific knowledge via constrains into Deep Neural Network to ease the learning process.
- Implemented different Deep Neural Network architectures with Convex Optimization problems as layers to enforce expert knowledge via constraints.
- Analyzed the efficiency of Convex Optimization Layers.

Improve the performance of Faster RCNN on Maize Plant Detection using Hybrid Dilated Convolution *SEECS, NUST*

Course Project: *Jul. 2020*

- Collected images of Maize Plants from fields.
- Utilized different state-of-the-art One Step (e.g. Fast RCNN and Faster RCNN) and two step (YOLOv5) Object Detection architectures for maize plant detection.
- Improved the performance of Faster RCNN by using Hybrid Dilated Convolution.

Semi-Autonomous Weed Sprayer Robot *NUCES, CFD Campus*

Undergraduate Final Year Project: *Aug 2018*

- Designed an agriculture four wheel robot to spray unwanted weeds from a field.
- Used a set of different Image processing techniques to detect plants and Deep Learning models to classify plants into weed and potato.
- Used 2D CNC machine to move sprayer nozzle at the location of weed and spray it precisely.

Awards & Achievements

Domestic

2019 **FYP Funding Awardee,** Awarded by Ignite National Technology Fund under NGIRI *FAST NUCES*

2019 **National Championship,** FYP selected by Ignite to compete for the National Championship *FAST NUCES*

2015-2019 **Academic Semester Excellence Award,** Four Medals (1 Gold, 1 Silver, 2 Bronze) *FAST NUCES*

2015-2019 **Dean List,** Appeared 4 times on the Dean List of FAST NUCES CFD during undergraduate *FAST NUCES*

Program Committees

2019 **Teacher Assistant,** Micro-Processor Interfacing and Programming *NUCES*