

Abdul Wahab

+1 647-836-5634 • wahab1@ualberta.ca
mirzaabdulwahab1612.github.io • LinkedIn

Education

- University of Alberta [↗](#) **Edmonton, Alberta**
 - M.Sc-thesis Computer Science advised by Dr. Martha White [↗](#) 2021–Present
- National University of Sciences and Technology [↗](#) **H-12 Islamabad**
 - QS ranking (Computer Science) : 143 , Asian Ranking: 76 2016–2020
 - Bachelors of Computer Science , CGPA: 3.96 / 4.00 , Summa Cum Laude

Publications

A. Wahab, M. A. Tahir, N. Iqbal, A. Ul-Hasan, F. Shafait and S. M. Raza Kazmi, "A Novel Technique for Short-Term Load Forecasting Using Sequential Models and Feature Engineering," in IEEE Access, vol. 9, pp. 96221-96232, 2021, doi: 10.1109/ACCESS.2021.3093481. [Paper [↗](#)] [Code]

Ahmad, A., Wahab, A., Slyne, F., Zeb, S., Khan, R. A., & Ruffini, M. Capacity sharing approaches in multi-tenant, multi-service PONs for low-latency fronthaul applications based on cooperative-DBA. 2020 Optical Fiber Communications Conference and Exhibition (OFC) (pp. 1-3). IEEE. [Paper [↗](#)] [Poster]

Research Experience


- RLAI [↗](#) **Edmonton, Canada**
 - Graduate Research Assistant advised by Dr. Martha White [↗](#) September 2021 -
 - Effective Exploration with Sample Efficient Architectures in Reinforcement Learning**
Python | C++ | Pytorch
In this work, we aim to combine theoretically backed exploration approaches with sample-efficient architectures.
 - Understanding the Role of the Representation in Offline-Online Reinforcement Learning**
Python | Pytorch
In this project, we use Two-timescale networks (TTN) in the Offline-Online setting, in which an agent is trained on offline data, and is then allowed to update the representation and the policy networks online. We empirically show that TTN is well suited for the Offline-Online setting as the online updates are more stable and the model converges relatively faster. We also study, analyze and compare different representation learning approaches like sparsity (FTA), input transformations (sparse, random, random-sparse), augmentation, and self-supervised contrastive losses in different combinations, to identify the best combination of these representation learning approaches.
- Augmented Vision Lab (DFKI) [↗](#) **Kaiserslautern, Germany**
 - Research Intern [↗](#) June 2019 - August 2019
I was selected for summer research internship program in 2019 at the Augmented Vision lab, under the supervision of Prof. Dr. Didier Stricker [↗](#) and Dr. Gerd Reis [↗](#).
 - Line-Scan Camera Input Processing with ConvLSTM architectures.**
Python | Keras | TensorFlow
In this work, we explored the advantages of using a line-scan camera in industrial applications, where the point of observation is a single plane, for monitoring, classification, and segmentation of moving objects. A ConvLSTM based architecture was proposed, which extracts temporal correlation from the sequence of line-scans to compensate for the loss of spatial information in the individual line-scan (single row of pixels). The methodology evaluated on road crack segmentation datasets beats the current benchmark on four public datasets. The methodology was also evaluated on a novel dataset collected on the roads of Islamabad, Pakistan.

NUST SEECS, Islamabad

TUKL R&D Center

Research Assistant

2018 - 2020

I have worked as a research assistant at TUKL-Lab under supervision of Dr. Faisal Shafait . A few notable research projects I have contributed to:

Short Term Energy Load Forecasting

Python | Keras | TensorFlow

In this work, we compare and contrast individual household energy consumption patterns with aggregated consumption trends and propose a multi-level deep sequential architecture based on bi-directional sequential layers and feature fusion for accurate energy load forecasting. The proposed methodology outperforms the current benchmark on two public energy load consumption datasets.

TCP's RTO prediction using sequence modeling for controlling congestion, and lower latency.

Python | Keras | TensorFlow | NS2 | Wireshark

TCP's Re-transmission Time-Out (RTO) delay is the time a host waits before retransmitting a packet. Accurate prediction of RTO is crucial for controlling TCP's congestion window and for maintaining lower latency. In this work, we propose an LSTM based architecture that inputs a sequence of past packet information such as Round Trip Time (RTT), RTO, size of the congestion window, etc., to predict the RTO for the next transmitted packet. The model was trained to effectively reduce the difference between the RTO and RTT to return the optimal value for RTO.

Academic Experience

Teaching Assistant

CMPUT-174 Foundations of Computation I

UoAlberta

Marianne Morris

Winter'2022

CMPUT-101 Introduction to Computing

UoAlberta

Dr. Janelle Harms

Fall'2021

CS-471 Machine Learning

NUST SEECS, Islamabad

Dr. Faisal Shafait

Spring'2020

EE-353 Computer Networks

NUST SEECS, Islamabad

Dr. Arsalan Ahmad

Fall'2019 & Spring'2019

CS-250 Data Structures & Algorithms

NUST SEECS, Islamabad

Dr. Faisal Shafait

Fall'2018

CS-235 Computer Organization and Assembly Language

NUST SEECS, Islamabad

Mr. Taufeeq-ur-Rehman

Fall'2018

Work Experience


Veeve.io

Islamabad, Pakistan

Machine Learning and Computer Vision Engineer

July 2020-July 2021

Python | C++ | Keras | Tensorflow | OpenCV

I developed machine learning and vision-based solutions for different modules of a smart shopping cart at Veeve.io . I have worked on Cart State Tracking, Hand Motion Analysis, Trajectory Analysis, Gesture Prediction, Shrinkage Control, and Barcode through Vision modules.

VisionX Technologies LLC

CIE NUST, Islamabad

Research Intern

July 2018-August 2018

During my internship at VisionX , I worked on:

Large Scale Visual Recognition

Python | Keras | TensorFlow

My research was oriented towards solving the problem of intra-class variations and class-imbalance for training. A dynamic model switching mechanism based on location along with hierarchical classification was proposed and developed for the problem.

System Analysis & Verification Lab

NUST SEECS, Islamabad

Part-time Research Intern

July 2018-August 2018

During my internship I worked under supervision of Dr. Osman Hasan [↗](#) on a:

White Box Testing Tool **C++**

I worked on the development of a white box testing tool kit for C++ projects. The tool provides three types of tests:
1. Dead Code Testing. 2. Assertion Based Testing. 3. Exception Testing.

Awards & Accolades

2020 President's Gold Medal, awarded for graduating with the highest distinction.

2020 Offered PhD Computer Science position at Dartmouth College. [Fully Funded] [Passed]

2019 Offered PhD position at Augmented Vision Lab (TUK/DFKI). [Fully Funded] [Passed]

2019 Selected for summer research internship at Augmented Vision lab (DFKI), funded by DAAD (2900€).

2019 Second Position in UG Star Researcher Competition held in SEECS, NUST.

2016- Dean's list for high achievers and Merit based Scholarship (all semesters).

Skills

- **Skills:** Reinforcement Learning, Machine Learning, Deep Learning, Sequence Modeling, Computer Vision.
- **Programming Languages:** Python, C++. I use Python and C++ for my research work and deployment.
- **Frameworks & Libraries:** Pytorch, Tensorflow, and Keras for Reinforcement Learning, Machine Learning and Deep Learning projects. OpenCV is my go to library for classical vision related tasks.

MOOCs

Other than my regular semester courses on Machine Learning, Artificial Intelligence and Computer Vision, I have taken the following courses online.

- **Reinforcement Learning** **Coursera**
by Martha & Adam White
- **Computer Vision**
by Mubarak Shah
- **Machine Learning** [↗](#) **Coursera**
by Andrew Ng
- **Deep Learning Specialization** [↗](#) **Coursera**
by Andrew Ng
 - Neural Networks and Deep Learning
 - Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization
 - Structuring Machine Learning Projects
 - Convolutional Neural Networks
 - Sequence Models
- **CS231n: Convolutional Neural Networks for Visual Recognition**
by Fei-Fei Li & Andrej Karpathy