

## Education

- 2015–2019 **Bachelor of Electrical Engineering**,  
*School of Electrical Engineering and Computer Science (SEECs),  
National University of Sciences and Technology (NUST), Islamabad, Pakistan.*
- **CGPA** – 3.96/4.00, **Major CGPA** – 4.00/4.00, **Batch Rank** – 3/170

## Experience

### Work Experience

- June 2019 – **Design Engineer**, *Center for Advanced Research in Engineering (CARE)*, Islamabad, Pakistan.
- Present ○ **Smart Sense Nodes (SSNs)** Designed multiple variants of IoT Sensor Nodes, hardware and firmware, required at the Aircraft Manufacturing Factories (AMF) of Pakistan Aeronautical Complex (PAC), Kamra. Salient features of these nodes are:
- Texas Instruments ARM Cortex-M4F based Simplelink series and Microchip PIC32MX series MCUs.
  - Current sensing in industrial machines to provide:
    - Feedback of job scheduling.
    - Power consumption estimations.
    - Generating machine maintenance interrupts.
  - Class-0 Power Over the Ethernet (PoE) using AG9900 PoE controller.
  - Ethernet communication through on-chip and offloaded Ethernet controllers such as Wiznet W5500.
  - Temperature and humidity sensing for ambient condition monitoring.
- **Power Automation for Digitised Surveillance Control Reporting System (DSCR)** A small TELNET clone was written along with the rest of Embedded socket-based Ethernet communication for status monitoring and routine shutdown management between the Schneider APC UPS systems and Military Radar DSCR Servers.
- February– **Design Engineer (Part-time)**, *Technology Spirits*, Islamabad, Pakistan.
- May 2020 Designed a Brushless DC Motor Electronic Speed Controller (BLDC-ESC) rated for upto 88 Amps of current around the STMicroelectronics STSPIN32F0 controller for an automatic outdoor umbrella project.

### Academic Research

- June – **Visiting Research Intern**, *Microelectronic Systems Design Research Group, Department of*  
September *Electrical and Computer Engineering, Technical University of Kaiserslautern (TUK)*, Kaiserslautern,  
2018 Germany, (DAAD funded project).
- Worked on the problem of forest cover change detection using remote sensing imagery and deep learning.
- Worked with satellite/radar image datasets including Sentinel-1, Sentinel-2, Landsat-8, JAXA ALOS PALSAR forest/non-forest cover maps and MODIS for land cover classification and change detection.
  - Implemented semantic and patch-wise segmentation for multispectral remote sensing and drone imagery; improved the results on European datasets with smaller and faster deep convolutional neural network architectures.
- June 2017 – **Research Intern**, *TUKL lab*, SEECs, NUST, (Supervisors: [Dr. Faisal Shafait](#), [Dr. Muhammad](#)  
May 2019 [Shahzad](#)).
- Applied and analyzed machine learning techniques on document processing and remote sensing tasks.
- **Document Processing**
    - Applied distance transforms and object-detection algorithms for table detection in document images. Extended lab's existing work for camera-captured invoice and receipt images.
    - Worked on logical layout analysis of scientific publications for entity recognition and extraction using Recurrent Neural Networks (RNNs), GloVe vectors and Neural Tensor Networks (NTNs).

- **Remote Sensing** (Senior Year Project: *Forest Cover Change Detection Using Remote Sensing Imagery*)
  - Digitized paper printed land cover maps for districts in Billion Tree Tsunami (BTT) afforestation project in Khyber Pakhtunkhwa (KP) province, Pakistan, using Google Earth Engine.
  - Utilized Landsat-8 data and deep learning for multi-temporal forest cover change analysis and generated detailed statistics, patch-level and pixel-level forest cover maps and cover change maps for BTT districts for 2014-2018 period.

## Research Output

September 2019 *Annus Zulfiqar, Adnan Ul-Hasan, Faisal Shafait. **Logical Layout Analysis using Deep Learning**, Accepted at DICTA, 2019 | [Paper](#) |*

A strategy for logical layout analysis of front pages of medical publications was devised to identify fields of interest such as author names and affiliations. A layout agnostic approach was presented using LSTM architectures and GloVe vectors for word embeddings and our method outperformed the previous best results on this dataset on unseen layouts.

## Relevant Projects

**Cognizant Corridor Lighting** Proposed a modular context-aware corridor lighting system utilizing only logic gates, flip-flops and photo-resistors. A daisy chained array of such modules saved energy and illuminated only the occupied areas by maintaining the number and relative positions of the people in the corridor.

**Accelerated Inverted Pendulum** Presented a solution to the classic inverted pendulum problem in the state-space representation and solved with hardware acceleration on the Xilinx PYNQ FPGA platform and serially communicated with Matlab for visual demonstration of the balanced pendulum.

## Honors and Awards

April 2020 MSEE/MSECE acceptance from Stanford, UCLA, Columbia University, University of Michigan, Duke

Nov 2018 Travel award for EECamp at KAIST, South Korea

Sep 2018 Fully-funded internship offer for one year at DFKI, Kaiserslautern, Germany (Passed due to visa issues)

June 2018 DAAD-funded internship at Microelectronic Systems Design Research Group, Department of Electrical and Computer Engineering, Technical University of Kaiserslautern (TUK), Kaiserslautern, Germany

2015-2019 Recipient of NUST merit scholarship for 7/8 semesters

## Standardized Test Scores

Test **GRE General Test**

Score **330/340**. Verbal 161/170, Quantitative 169/170, Analytical 4.5/6

Percentile Verbal 88th, Quantitative 95th, Analytical 81st

Test **TOEFL iBT**

Score **113/120**. Listening 30/30, Speaking 28/30, Writing 28/30, Reading 27/30