ANUSHA FATIMA ALAM

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A self-motivated, academically bright, intellectually-curious engineering science student with strong collaborative, self-management skills and active participation in extra-curricular activities and abundant software and hardware design experience. Currently seeking internships (Summer '24) in Robotics & AI

EDUCATION

University of Toronto, *BASc in Engineering Science* | Toronto, ON, Canada — Expected June 2027
Dubai International Academy, *High School Diploma* | Dubai, UAE IB DP: 44/45 — Sept. 2009-May 2022

Major: Electrical and Computer Engineering (ECE) with Certificate in Engineering Business
Double Minor: Robotics and Mechatronics | Artificial Intelligence Engineering
Co-op: Enrolled in the Professional Experience Year (PEY) Co-op program – (12-16 Months)
Relevant Courses: Applied Fundamentals of Deep Learning | Digital and Computer Systems | Computer Algorithms and Data Structures | Introduction to Computer Programming | Entrepreneurship and Business for Engineers | Fundamentals of Biomedical Engineering | Calculus I and II | Probability and Statistics
Scholarship: U of T International Engineering Scholar Awardee ($ 100,000)

EXPERIENCE

UTWind, *Software Member (Controls Sub-team)* | Toronto, ON — January 2024 - Present

- Programmed and debugged Raspberry Pico Microcontroller and STM3 Microcontroller for controlling the turbine
- Established seamless communication (using the UART protocol) between the STM3 and Rasp Pico Microcontroller to determine and monitor the wind turbine rotation and shaft speed for operational efficiency and maintenance

U of T EngSoc Council, *First-Year Engineering Science Class Representative* | Toronto, ON — September 2022 - April 2023

- Communicated important announcements to the cohort (of over 300 students) on behalf of the Engineering Society
- Organized social events with the discipline club and attended bi-weekly meetings with the Eng Soc officers/VPs
- Advocated for the academic needs of the class (emailing professors with feedback and course concerns)

GlobalShala, *Cybersecurity (Defensive Hacking) Intern* | Remote Internship — February 2022 - March 2022

- Created a virtual machine tool box, conducted network scans and completed OS hardening and basic encryption
- Implemented hands-on defensive hacking techniques while in a lab environment
- Learnt concepts of "blue teams," different attack vector and concepts of Brute force, denial of services, scans, backdoor attacks and practiced using Linux Commands and command line interface

DIA-EH Chemistry Department, *Database Developer* | Dubai, UAE — July 2019 - October 2019

- Developed a functional relational database for the Chemistry Department to track the distribution of chemicals and consumables, lab apparatus, glassware and vernier equipment for laboratory/practical exercises
- Improved the efficiency of the relational database by implementing encryption, validation rules, embedded hard-code passwords parameter and calculated queries

SKILLS

Programming	Python, Tensorflow, Pytorch, C/C++, HTML, CSS, System Verilog, RISC-V Assembly
Hardware	FPGA Design and Programming, Raspberry Pico, STM3 Microcontroller, Arduino
Tools/Applications	MATLAB, Git, LaTeX, Solidworks, Fusion360, CAD, Visual Studio Code, Microsoft Office Suite
Certifications	MATLAB Onramp Training – (Issued by Mathworks 2022)
Soft Skills	Time Management, Problem-solving, Documentation, Engaging Presentation, Leadership, Effective Oral and Written Communication, Research, Adaptability, Organization, Collaboration
Languages	Native/Bilingual Proficiency: English, Urdu & Hindi | Limited Working Proficiency: Arabic & French

RESEARCH

IB Physics Extended Essay | Dubai, UAE — September 2021 - March 2022

- The effect of relative radius on the relative drag force experience by ball bearing falling through a non- Newtonian fluid, glycerol was determined experimentally and theoretically.

HARDWARE DESIGN EXPERIENCE

Digital and Computer Systems Course Labs (Fall 2023) | Toronto, ON, Canada — Sept. 2023 - December 2023

- Designed and implemented modules for digital systems (Switches, Lights, Multiplexers, HEX Decoders, Latches, Flip-flops, Registers, Counters, and Finite State Machines) using System Verilog
- Developed and maintained the design, simulation, and test process
- Developed Do Files on ModelSim to examine wave forms and behaviour of the combinational and sequential circuits
- Performed verification and validation with test cases on FPGA DE1-SoC Board
- Made Subroutines for Stacks, I/O Devices, and interrupts using RISCV-Assembly

Praxis III Prototyping Bootcamp (Winter 2024) | Toronto, ON, Canada January 2024 - April 2024

- Developed an integrated IoT/Mechatronics system to design a greenhouse light system
- Constructed an electrical subsystem using Raspberry Pico microcontroller, RGB LEDs, resistors and pushbutton
- Built a finite state machine & state diagram to determine the current/next state of LEDs after pressing pushbottons
- Programmed the Raspberry Pico Microcontroller to control the RGB LEDs state response
- Designed a 3D printed case/enclosure for the electrical circuit using CAD modelling and Fusion360

HACKATHONS

Hack the Globe 2024 (by Global Sparks) | Toronto, Ontario, Canada March 2024

- Led the development of an efficient booking system tailored to accommodate the expected increase in medical school graduates and to allow patients to easily get connected to a family doctor.
- Implemented and integrated a MAP API to create a user-friendly navigation system within the software.
- Designed a technical prototype of booking system using HTML and CSS to allow users to find sample clinics and make appointment requests.
- Oversaw the design and functionality aspects of the solution to ensure seamless user experience

PROJECTS

Personal Website Ongoing

- Designed and developed a personal website to showcase my academic journey, professional experiences, and projects.
- Utilized HTML, and CSS to create a responsive and visually appealing design.
- Focused on creating an intuitive navigation structure and interactive elements to enhance user engagement.
- Deployed the website using GitHub Pages, ensuring reliable and accessible hosting.

Image Colorizer Jan 2024 - Present

- Developed a DC-GAN architecture in Pytorch to colorize black and white archaeological images (taken from the MIT Places365 dataset) from a CIELAB to a RGB color space. The model architecture consists of an adversarial training of a generator (to produce realistic colorized image in RGB color space) and a discriminator (to distinguish between real and generated RGB images).
- Performed quantitative and qualitative analysis on the performance of the adversarially-trained GAN relative to the baseline model (consisting of simple CNN autoencoder), the (non-adversarially) pre-trained generator using MSELoss and BSELoss functions.

Praxis III Project | Multiprobe Sensor Jan 2024 - Present

- Directed the design and implementation of the sensor's structural subsystem, ensuring durability, portability, and user-friendliness and overlooked the development of a microcontroller-based system to process sensor data, control display outputs, and manage GPS functionality.
- Integrated a capacitive soil sensor to measure moisture levels and a GPS module for precise location tracking of data points and designed a user-friendly interface featuring an LCD alphanumeric display for real-time moisture readings and a 35-panel LED display to indicate moisture acceptability.

Autocomplete NLP Dec 2022 - April 2023

- Developed an Autocomplete NLP that returns the top terms in a $\sim 100,000$ element text file using C in < 0.05 ms. Processed the file by sorting terms in lexicographic ordering and utilizing a modified binary search algorithm to extract matching terms, resorting the matching terms by weight and extracting the top result.

Seam Carving Jan 2023 - Jan 2024

- Implemented a content-aware image resizing algorithm in C to remove the least important image seams while preserving important features by computing the dual-gradient energy and recovering seam paths
- Utilized dynamic programming for efficient path computation to identify optimal seams for image processing

CIV-Bridge Project October 2022 - November 2023

- Designed and constructed a Matboard Box Girder Bridge that could withstand a minimum vertical load of 400 N using one 32" x 40" x 0.05" panel of Matboard and two tubes of LePage heavy duty contact cement.
- Programmed a script in Python to determine the optimal geometry and dimensions of the bridge and graph shear force and bending moment diagrams to support a dynamic failure load of 710 N.

Honours and Awards

2022-2027 U of T International Engineering Scholar Awardee (renewable scholarship for all 4 years)
May 2022 Awardee of the Class of 2022 Special Recognition Trophy
May 2022 DP Class of 2022 Salutatorian (for achieving a DP Score: 44/45 Points $\sim$ Top 1.68% worldwide)
June 2020 MYP Class of 2020 Valedictorian (for achieving an MYP Score: 54/56 Points $\sim$ Top 0.4% worldwide)
June 2019 Student of the Year (Grade 10)