

# SHIZRA TARIQ

 tariqo44@umn.edu  shizratariq.github.io  Minnesota, USA  linkedin.com/in/shizratariq

## EDUCATION

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### University of Minnesota

2024 - Present

MS Robotics

Advisors: Suhasa Kodandaramaiah, Nikolaos Papanikolopoulos

Overall GPA: 3.89/4.0

### KFUEIT

2018 - 2022

BS Computer Engineering

Advisor: Muhammad Iqbal

Overall GPA: 3.85/4.0 (**Gold Medalist**)

### Minnesota State University

Fall 2021

Global UGRAD Exchange Program

## RESEARCH EXPERIENCE

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### Biosensing and Biorobotics Laboratory

May 2025 - Present

*Research Assistant*

Minneapolis, MN

- Developed an automated neural probe insertion system using real-time computer vision and closed-loop robotic control to prevent probe damage in mouse-brain experiments.

### Minnesota Robotics Institute

Summer 2024

*Research Assistant*

Minneapolis, MN

- Developed motion-planning strategies for surgical robot for histotripsy using the UR5e with ROS2 and MoveIt2.

### Advance Automation & Robotics Lab

2022

*Machine Learning Intern*

Pakistan

- Implemented SVM-based muscle-signal classification using MATLAB and Python with FMG sensor data for prosthetic arm control.

### OPENAIMP

2021

*Artificial Intelligence Intern*

Remote

- Worked on conversational AI and created chatbots using RASA to improve user interaction.

## HONORS, AWARDS, & SCHOLARSHIPS

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- Selected among top 2% students from Pakistan for **Fulbright** Scholarship Program - (IIE), USA 2023
- Nominated for the **National Youth Award** by the Higher Education Commission, Pakistan. 2022
- Fully Funded Global **UGRAD** Program Awardee by IREX, USA. 2021
- Gold Medalist for the 2018–2022 BS Computer Engineering cohort at KFUEIT. 2022
- 3rd Position in All Pakistan Science Fair for the Bionic Arm Project. 2022
- 1st Position in ESPICE project Competition in Robotics category. 2022
- Awarded Ignite NGIRI Funding for Final Year Project. 2022

- Awarded Merit Scholarship for the 2019–2022 period by the KFUEIT.

2019

## INDUSTRY EXPERIENCE

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### **Quantum-h**

*Technical Project Manager*

2023 - 2024

Remote, UK

- Coordinated the Cross-Functional Agile team for Quality Assurance, client and project management. Engineered scalable database architectures and optimized complex queries, improving data retrieval speed.

### **Abel & Mercer Co.**

*Research Assistant*

2022 - 2023

Remote, UK

- Proposed and implemented AI solutions for business websites and applications to enhance customer interaction. Designed and trained deep learning models using PyTorch for image recognition and segmentation, powering visual AI tools for virtual try-ons.

## TEACHING EXPERIENCE

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### **Carlson School of Management, University of Minnesota**

*Teaching Assistant*

Summer 2025

- Assisted students in MSF 6921: Introduction to Python with hands-on coding exercises, clarifying core Python concepts such as portfolio optimization, Monte Carlo simulation, and trading strategy backtesting. Supported the instructor by grading assignments and providing guidance during class and office hours.

## GRADUATE COURSEWORK

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Artificial Intelligence, Machine Learning Fundamentals, Robotics, Natural Language Processing, Computer Vision, Neural Interfacing, Collaborative & Social Computing, Project Management

## PROJECTS

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### **Computer Assisted Neural Probe Insertion**

- Designed a computer vision pipeline combining object detection, pose estimation, and PnP to achieve accurate 6-DoF probe localization in a feature-poor microscale environment. Developed stereoscopic calibration with ArUco-based reference frames for reliable orientation and insertion depth recovery. Implemented a two-stage probe segmentation and bend-detection method with real-time closed-loop actuator control for precise insertion trajectory.

### **Breast Cancer Detection**

- Developed a mammography-based breast cancer detection system using SVM, KNN, Logistic Regression, Deep Neural Networks, and XGBoost. ([GitHub](#))

### **Super Resolution and Object Detection on Remote Sensing Imagery**

- Used SRGAN (4x super-resolution), improving PSNR/SSIM metrics in aerial object detection with YOLOv7-OBB on the DOTA dataset (8 classes).([GitHub](#))

### **Turtlebot3 RRT Pathfinder**

- Implemented RRT algorithm for autonomous maze navigation through Gazebo real robot simulations, refining motor command accuracy and addressing Lidar inconsistencies. ([GitHub](#))

### **Accurate Subtitle Generation in Videos**

- Integrated Whisper-Timestamped with Large Language models (Gemini-1.5/GPT-4o) and a custom segmentation function, reducing WER/CER by and achieving precise timestamp alignment. ([GitHub](#))

### **EMG based Bionic Arm**

- Engineered an IoT and AI-driven bionic arm using SVM for EMG signal classification, achieving successful gesture recognition, and integrate 3D-printed hardware for prosthetic control.

## SKILLS

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**Programming Languages:** Python, C/C++, C#, JavaScript, MATLAB, SQL

**Tools & Frameworks:** ROS/ROS2, Linux, CUDA, PyTorch, OpenCV, PyBullet, JIRA

## SERVICE & VOLUNTEER

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- Founded and lead a youth-driven community organization executing social awareness and empowerment projects with a large volunteer network (**Youth Revamp**). 2022 - present
- Served as a volunteer **Mentor** for the Robotics Tech Camp at the Minnesota Robotics Institute, guiding students in hands-on robotics activities. 2024–2025
- Peer Reviewer for the **COGS Research Support Grant**, evaluating student research proposals and funding applications. 2025
- Volunteered in organizing the **Midwest Machine Learning Symposium** supporting session coordination and logistics. 2024
- Selected as the first **Microsoft Learn Student Ambassador** from university and Southern Punjab; organized seminars and hands-on workshops on AI, ML, data analytics, and Azure tools. 2020–2022
- Established and presided over university's first student society, organizing tech seminars and hosting an international event with students linked to Google, Microsoft, and LinkedIn (**MLSA-KFUEIT**). 2021
- Designed society branding, managed social media, and led event planning for orientations, debates, celebrations, and campus engagement activities (**XCESS**). 2021
- Oversaw administration, communication, and coordination of organizational activities, including organizing an International **IEEE Conference** at KFUEIT. 2021
- Supported communication and engagement efforts for social initiatives including the Street School Project and Youth Peace Conferences (**MAPS**). 2020