# Engr. Ali Raza

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## ABOUT ME

To obtain a position in an organization that provides an environment to enhance my knowledge and skills. Seeking to leverage the organization's success utilizing my experience, technical expertise, and problem-solving skills.

## WORK EXPERIENCE

### Lecturer

***National University of Technology(NUTECH) Islamabad Pakistan*** [ 21/06/2023 – Current ]

**City:** Islamabad Pakistan

Teach Undergraduate Students and also part of OBE Team for Accreditation. Part of NUTECH Centre for Robotics and Artificial Intelligence Technologies (NUCRAIT).(NUCRAIT) is a platform for applied research to proffer innovative industrial solutions based on Robotics, Artificial Intelligence and emerging technologies while supporting quality education at NUTECH in such a way that it enhances the students experience.

### Lab Engineer

***HITEC University Taxila*** [ 12/09/2022 – 16/06/2023 ]

**City:** Taxila | **Country:** Pakistan

Conduct Labs Undergraduate Students and also part of OBE Team for Accreditation

### Chief Technology Officers

***Startup under NEP-NIC-Cycle2 PITB at UET Taxila*** [ 02/03/2022 – 09/03/2022 ]

**City:** Taxila

U-Go is an incubated startup under NEP-NIC-Cycle2 PITB at UET Taxila. U-Go provides a solution that would take in vocal inputs from the user and run them through a machine learning model to produce tangible and quantifiable values that would then be used to generate recommendations for users regarding their speaking level.

### Research Scholar

***Swarm Robotics Lab, NCRA*** [ 14/11/2020 – 08/09/2022 ]

**City:** Taxila | **Country:** Pakistan

- Computer Vision:
    - Deploying existing solutions on Edge Computing devices (Xavier, Nano)
    - Research: Applied Computer Vision.
    - Human Activity Recognition
- Exhibiting lab projects at different venues

### Internee

***HIT Taxila*** [ 15/07/2019 – 23/08/2019 ]

**City:** Taxila | **Country:** Pakistan

- Advance Army Research and Development Center Taxila
- Functions:
    a. Work on a project (integration of four cameras in 360 degrees in one view with Matlab techniques)
    b. Work on a project(Altium Designer to design tank circuits)

### Science Teacher

***CTI Contract*** [ 31/08/2014 – 31/01/2016 ]

**City:** Taxila | **Country:** Pakistan

Teach Different Courses to the 9th and 10th class standard

- Physics
- Mathematics
- Computer Science

## EDUCATION AND TRAINING

### Master of Science in Computer Engineering

***University of Engineering and Technology, Taxila*** [ 13/11/2020 – 27/01/2023 ]

**City:** Taxila | **Country:** Pakistan

**CGPA:** 3.87/4.00
**Thesis: A Robust Approach for Human Fall Detection using Visual Data**

**Short Description:** Over 1/3 of the senior population over 65 falls each year.
87% of fractures in the elderly are due to falls, and 47% of seniors who fall cannot get up without assistance. We need a vision-based system that detects falls and generates an alarm to save lives and other things.
**Supervisor:** Prof. Dr. Muhammad Haroon Yousaf

### Bachelor of Science in Computer Engineering

***HITEC University Taxila*** [ 14/09/2016 – 12/07/2020 ]

**City:** Taxila | **Country:** Pakistan

**CGPA:** 3.10 / 4.00
**Final Year Project: Target Tracking Implementation on Embedded Platform Using Deep Learning**

**Short Description:** • People have used weapons in warfare, hunting, self-defense, law enforcement, and criminal activity
• Weapons mostly are operated and used by people. As we all know that human life is irreplaceable, therefore our project plays a vital role as it provides safety to the gunman.
• Law enforcement agencies play a vital role in maintaining law & order and peace maintaining process. Weapons mostly are operated and used by people.
• People have used weapons in warfare, hunting, self-defense, law enforcement, and criminal activity
• As we all know that human life is irreplaceable, therefore our project plays a vital role as it provides safety to the gunman. To deploy the system on the military tank or armored vehicle

## DIGITAL SKILLS

### Programming

Python / C++ / MATLAB

### Deep Learning

PyTorch / TensorFlow / Keras / NVIDIA TensorRT / Nvidia's CUDA C/GPU's / ONNX & ONNX Runtime

### Computer Vision

Computer Vision / Computer Vision on Edge / Real-Time Image Processing

### Edge Platforms

NVIDIA Jetson Xavier / Jetson Nano / OpenCV AI Kit

### Secondary Skills

Arduino / Raspberry Pi / ESP32 / ROS

## PUBLICATIONS

**Publications**

- **Ali Raza**, Muhammad Haroon Yousaf,Waqar Ahmad, Sergio A. Velastin Velastin "**An Experimental Study of**
- **Pose Estimation-Based Human Fall Detection: From Traditional Machine Learning to Vision**
- **Transformers**" (In Progress)
- **Ali Raza**, Zubair Saeed, Ahmed Husnain Johar, Naveed Khan Baloch and Waqar
- Ahmad "**Automatic Plant Disease Classification and Agriculture Monitoring Robot** (In Progress)
- **Ali Raza,**Zubair Saeed, Misha Urooj "**Autonomous System for Detection And Classification of Melanoma Skin Through Dermoscopic Images**(In Progress)
- Ahmed Husnain Johar, **Ali Raza**, Talha Yousuf, Zubair Saeed, Lala Mustafa Soomro1,
- Umer Asgher, Salman Nazir, Yasar Ayaz" **AI-based HCD IoOT for Maritime Operator's**
- **Vigilance and Cognition**" (In progress)

**Publications**

- 
- **Ali Raza;** Zubair Saeed; Adnan Aslam; Syeda Mehwish Nizami; Kanwal Habib; Ahmad Nazir Malik **Advances, Application and Challenges of Lithography Techniques** Published in 2024 5th
- International Conference on Advancements in Computational Sciences (ICACS)
- **Ali Raza**, Muhammad Haroon Yousaf, Sergio A. Velastin, Serestina Viriri "**Human Fall Detection from Sequences of Skeleton Features using Vision Transformer**" **Published** in 18th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications, Portugal 2023.
- **Ali Raza**, Muhammad Haroon Yousaf, Sergio A. Velastin "**Human Fall Detection using YOLO: A Real-Time and AI-on-the-Edge Perspective" Published** in 12th International Conference on Pattern Recognition Systems (ICPRS), France, June 2022.
- **Ali Raza**, Misha Urooj Khan, Zubair Saeed, Sana Samer, Areeba Mobeen, Aqsa Samer **"Classification of Eye Diseases and Detection of Cataract using Digital Fundus Imaging (DFI) and Inception-V4 Deep Learning Model " Published** in: International Conference on Frontiers of Information Technology (FIT), Islamabad Pakistan 2021.
- Zubair Saeed, **Ali Raza**, Ans Hussain Qureshi, Muhammad Haroon Yousaf **A Generic Multi-Crop Disease Detection and Classification Approach using CNN Published** in Proceedings of 4th International Conference on Robotics and Automation in Industry (ICRAI), Islamabad Pakistan 2021.
- Zubair Saeed, Misha Urooj Khan, **Ali Raza**, Hareem Khan, Javaria Javed, Aqsa Arshad, **Deep learning based Intelligent Emotion Recognition and Classification System Published** in: 6th International Multi-Topic ICT Conference (IMTIC) Jamshoro & Karachi, Pakistan 2021.
- Zubair Saeed, Misha Urooj Khan, **Ali Raza**; Nazish Sajjad, Sana Naz; Ahmad Salal, **"Identification of Leaf Diseases in Potato Crop Using Deep Convolutional Neural Networks (DCNNs)" Published in**:16th International Conference on Emerging Technologies (ICET) Islamabad Pakistan 2021.

- Misha Urooj Khan, Zubair Saeed, **Ali Raza**, Zeeshan Abbasi, Syeda Zuriat-e-Zehra Ali, Hareem Khan. 2022. "**Classification of Pulmonary Viruses X-ray and Detection of COVID-19 Based on Invariant of Inception-V 3 Deep Learning Model" Published** in: International Conference on Computing, Electronic and Electrical Engineering (ICE Cube) Quetta, Pakistan 2021.
- Syed Zohaib Hassan Naqvi, Misha Urooj Khan, **Ali Raza**, Zubair Saeed, Zeeshan Abbasi, Syeda Zuriat-e-Zehra Ali,**"Deep Learning Based Intelligent Classification Of Covid-19 & Pneumonia Using Cough Auscultations" Published** in: 6th International Multi-Topic ICT Conference (IMTIC) Jamshoro & Karachi, Pakistan 2021.
- Misha Urooj Khan, Muhammad Abdullah Abbasi, Zubair Saeed; Muneeb Asif, **Ali Raza**, Urooj Urooj **"Deep learning based Intelligent Emotion Recognition and Classification System" Published** in: International Conference on Frontiers of Information Technology (FIT), Islamabad Pakistan 2021.

## RECOMMENDATIONS

Name: **Dr. Muhammad Owais** | Postdoctoral Fellow
**1. Name:** Dr. Muhammad Haroon Yousaf
**Position:** Professor
**Organization:** University of Engineering and Technology, Taxila, Pakistan
**Email:** haroon.yousaf@uettaxila.edu.pk
**Email:** muhammad.owais@ku.ac.ae | **Phone number:** (+971) 23124612

Name: **Dr. Naveed Khan Baloch** | Assistant Professor
University of Engineering and Technology, Taxila, Pakistan

**Email:** naveed.khan@uettaxila.edu.pk | **Phone number:** (+92) 0519047586

Name: **Dr. Waqar Ahmad** | Assistant Professor
University of Engineering and Technology, Taxila, Pakistan
**Email:** waqar.ahmad@uetatxilaedu.pk | **Phone number:** (+92) 3470152993

## PROJECTS

**Optimizing Computer Vision algorithms for Jetson Kits** The main aim is to optimize state-of-the-art computer vision algorithms using TensorRT. These algorithms are then deployed to the application part of UAVs i.e. Jetson Xavier or Jetson Nano. Hence providing drones with the capability to analyze the environment in real-time. We are currently working on the following problems:

- Plant Disease Detection and classification
- Covid19 Detection and classification
- Human Fall Detection

**A Robust Approach for Human Fall Detection using Visual Data** • Over 1/3 of the senior population over 65 falls each year
• 87% of fractures in the elderly are due to falls and 47% of seniors who fall cannot get up without assistance. We need a vision-based system that detects fall and generate an alarm to save the lives and other things

**Target Tracking Implementation on Embedded Platform Using Deep Learning** • People have used weapons in warfare, hunting, self-defense, law enforcement, and criminal activity
• Weapons mostly are operated and used by people. As we all know that human life is irreplaceable, therefore our project plays a vital role as it provides safety to the gunman.

• Law enforcement agencies play a vital role in maintaining law & order and peace maintaining process. Weapons mostly are operated and used by people.
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• As we all know that human life is irreplaceable, therefore our project plays a vital role as it provides safety to the gunman. To deploy the system on the military tank or armored vehicle

**Automatic Plant Disease Classification and Agriculture Monitoring Robot (Funded by Swarm Robotics Lab UET Taxila with collaboration of National University of Science and Technology (NUST))** Write hThis project is funded by Swarm Robotics Lab UET Taxila. Swarm Robotics Lab UET Taxila with collaboration of National University of Science and Technology (NUST) on a project to develop an autonomous Unmanned Ground Vehicle (UGV). The agricultural sector plays a critical role in the economic development of countries like Pakistan, where a significant portion of the Gross Domestic Product (GDP) is derived from it. However, the traditional methods used by farmers to detect plant diseases, such as visual inspection, often lead to low productivity due to their inaccuracies. In this Project, we propose an autonomous Unmanned Ground Vehicle (UGV) that can detect and classify plant diseases, as well as monitor environmental factors such as humidity, air pressure, light intensity, and rain using Internet of Things (IoT) techniques on the ThingSpeak platform. The UGV is equipped with sensors and can traverse the potato field to provide real-time sensory data to a Graphical User Interface (GUI). We also use a cellphone camera to remotely monitor the field. By incorporating robotics, IoT, and deep learning, we achieved an accuracy of 98.88% in detecting and classifying potato leaf diseases, surpassing previous literature. Our system provides a reliable means of improving agricultural productivity in Pakistan by enabling accurate and timely disease detection and monitoring of environmental factorsere the description...

**Real-time Plotting of PTZ Camera Footprint (based on FoV) on Geo-referenced Map/Imagery (Funded by Swarm Robotics Lab UET Taxila with collaboration of National Engineering and Scientific Commission (NESCOM))** This project is funded by Swarm Robotics Lab UET Taxila. Swarm Robotics Lab UET Taxila with collaboration of National Engineering and Scientific Commission (NESCOM)on a project to develop a Real-time Plotting of PTZ Camera Footprint (based on FoV) on Geo-referenced Map/Imagery The demand for Pan Tilt Zoom (PTZ) cameras has been increasing across various domains. Law enforcement agencies require smart and efficient camera solutions for surveillance purposes. As a result, we proposed a Real time Plotting of PTZ Camera Footprint based on Field of View (FoV) on a Geo-referenced Map/Imagery for the National Engineering and Scientific Commission (NESCOM). Initially, we plotted Google Maps using the Google Maps API, which was then integrated into web programming to display the map. To plot the camera's current field of view, we connected it to a computer to obtain its longitude and latitude. Using this data, the current field of view is plotted on the map. The plot on the map changes dynamically when the camera's FOV changes. This technology has not yet been deployed and is a significant contribution to security and surveillance. This project aims to enhance the existing GIS-based Security and Surveillance Systems deployed at various sites by supporting security staff in identifying blind spots optimally and automatically in real-time.

**Visionary Wear** Develop SMART GLASSES for blind individuals to identify objects, estimate distances, and create depth maps, fostering greater independence and safety in navigation.Enhanced mobility and safety for blind users, promoting independence and social inclusion through real-time object recognition, distance estimation, and spatial awareness feedback.

**Bionic-Leg** The objective of the "Bionic Leg Project" is to develop a wearable assistive device for individuals with paralysis affecting their lower limbs. By utilizing sensor technology to interpret signals from unaffected limbs, such as the other leg or hand, the bionic leg aims to provide mobility assistance and enhance the quality of life

for paralyzed individuals here the description .Bionic Leg Project" seeks to develop an innovative assistive device that harnesses sensor technology to provide mobility assistance for paralyzed individuals

## VOLUNTEERING

**Trainer: Workshop on Robotics and Computer Vision, Swarm Robotics Lab** Training graduates, under-grads and professionals with the conceptual as well as practical knowledge of Robot Vision on various platforms like miniature robot, UAVs, Jetson Xavier, OAK-D.

**Trainer:3 Week Worshop on Computer Vision,Machine Learning and its appplication on edge Devices**

**Trainer:Cross Lab Training on Swarm Robotics Lab RCV**

## COURSES

[ 15/10/2020 – 21/11/2020 ]
**Machine Learning course**

Coursera, Stanford University

[ 07/03/2022 – 06/09/2022 ]
**Artificial Intelligence(Robotics)**

PM's Youth Skill Development Program
HITEC University Taxila.

## ACHIEVEMENTS

**Selected as Funded Project Target Tracking Implementation On Embedded Platform Using Deep Learning**

**Selected a HEC MS Fully Funded Scholarship In Swam Robotics Lab UET Taxila**

**PHASE 1 FINALIST OPEN CV COMPETITION '21: Miniature Robot**

**Selected as incubate under NEP-NIC PITB at UET Taxila: Edulytics**

**Rising Pakistan Startup Drive 2 Finalist: Edulytics**

**National Idea Bank Phase 1 Finalist: Edulytics**

**Selected as incubate under NEP-NIC-Cycle2 PITB at UET Taxila: U-Go**

**National Idea Bank Phase 3 Finalist**

**OpenCV-AI Competition Winner 2023**

## FUNDED PROJECTS

**A Robust Approach for Human Fall Detection using Visual Data(Swarm Robotics Lab)**

**Target Tracking Implementation on Embedded Platform Using Deep Learning(Industry**

**Real Time Potting of PTZ Camera on Geo Reference Map Imagery(Industry)**

**U-GO(Swarm Robotics Lab )**

**Visionary Wear**