

# Abdul Rehman Khan

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## Education

### PhD in Biomedical Engineering

Aug. 2024 - Jul. 2028

The Chinese University of Hong Kong

Shatin, Hong Kong

Hong Kong PhD Fellowship Scheme (HKPFS) Awardee pursuing PhD under the supervision of Prof. Raymond K. T. Tong.

### MS in Computer Science

Nov. 2021 - Oct. 2023

Pakistan Institute of Engineering and Applied Sciences

Islamabad, Pakistan

CGPA: 4.00 / 4.00 (Gold Medalist, 1st out of 10 students)

Selected in the Highly Competitive Program in PIEAS

In the research-based thesis, I explored Hybrid CNN-Transformer approaches for medical image segmentation and proposed multiple hybrid architectures, including MaxViT-UNet, and CB-NucleiHVT-UNet, under the supervision of Dr. Asifullah.

### BS in Computer and Information Sciences

Sep. 2017 - Jul. 2021

Pakistan Institute of Engineering and Applied Sciences

Islamabad, Pakistan

CGPA: 3.88 / 4.00 (Gold Medalist, 1st out of 30 students)

In the research-oriented thesis, I employed the idea of Channel Boosting to improve MaskRCNN for Lymphocyte Detection in histopathology images and contributed to numerous publications under Dr. Asifullah's supervision.

## Work Experience

### Research Assistant at the Department of Biomedical Engineering

Mar. 2024 - Jul. 2024

The Chinese University of Hong Kong (CUHK)

Hong Kong

Research Areas: Topological Data Analysis, fMRI Analysis, Neuroscience, Neuroimaging, Deep Learning

## Technical Skills

### Programming

Python, Matlab, Java, C, C++, Javascript, Php

### Python Libraries

PyTorch, Tensorflow, MMSeg, MMDet, MMCls, MMPose, OpenCV, Scikit-Learn

### Software Development

Databases (SQL, Mongo, Firebase), Web Development, Android Development

### Typesetting & Drawing

L<sup>A</sup>T<sub>E</sub>X, Microsoft Office, Draw.io

### GRE (General)

Quantitative (163), Verbal (149), Analytical (3)

### Languages

Urdu (Native), English (TOEFL: 96)

## Publications

Total Citations: 74, Journal Papers: 6, Conference Papers: 1, Preprint: 1

- [1] Khan, A. T\*, Jensen, S. M., **Khan, A. R.**, Li, S. "Plant Disease Detection Model For Edge Computing Devices." *Frontiers in Plant Science*, 14, 1308528, 2023. [\[Link\]](#)
- [2] Rauf, Z., Khan, **Khan, A. R.**, Sohail, A., Khan, A\*. "Lymphocyte detection for cancer analysis using a novel fusion block based channel boosted CNN." *Scientific Reports* 13.1 (2023): 14047., 2023. [\[Link\]](#)
- [3] Khan, A.\*, Rauf, Z., Sohail, A., **Khan, A. R.**, Asif, H, Asif, A., Farooq, U. "A survey of the vision transformers and their CNN-transformer based variants" *Artificial Intelligence Review*, 1-54, 2023. [\[Link\]](#)
- [4] **Khan, A. R.**, Khan, Asif "MaxViT-UNet: Multi-Axis Attention for Medical Image Segmentation." *arXiv:2305.08396*, 2023. [\[Link\]](#)
- [5] Ali, M. Liaqat, **Khan, A. R.**, Khan, A\*. "Channel boosting based detection and segmentation for cancer analysis in histopathological images." *19th International Bhurban Conference on Applied Sciences and Technology (IBCAST)*, IEEE, 2022. [\[Link\]](#)
- [6] Zafar, Muhammad Mohsin, **Khan, A. R.**, Khan, A\*. "Detection of tumour infiltrating lymphocytes in CD3 and CD8 stained histopathological images using a two-phase deep CNN." *Photodiagnosis and Photodynamic Therapy*, 37 (2022): 102676. [\[Link\]](#)

- [7] Khan, A. T.\*, **Khan, A. R.**, Li, S.. “Optimally configured gated recurrent unit using hyperband for the long-term forecasting of photovoltaic plant.” *Renewable Energy Focus*, 39 (2021): 49-58. [\[Link\]](#)
- [8] **Khan, A. R.**, Khan, A. T.\*, Salik, M., Bakhsh, S. “An optimally configured HP-GRU model using hyperband for the control of wall following robot.” *Int. J. Robot. Control Syst*, 1.1 (2021): 66-74. [\[Link\]](#)

## Projects

### Development of Cancer Analysis System Using Histopathology Images and Deep CNN

MS Thesis Project

2023

“After observing the research gap in current CNN-based and Transformer-based techniques for medical image segmentation, I proposed various hybrid CNN-Transformer architectures and obtained publishable results. The proposed techniques surpassed previous state-of-the-art methods on the MoNuSeg18 and MoNuSAC20 challenge datasets. [\[Link\]](#)”

### Human Pose Estimation and Tracking using Deep Learning

Pattern Recognition Lab Project

2023

“Collected a custom dataset for human-pose estimation using web scraping, generated its annotations using the Mediapipe framework, and performed several experiments using the MMPose framework for Human Pose Estimation and Tracking.”

### CIFAR-10 Classification using Deep Learning

Semester Project

2022

“Using PyTorch, I implemented, trained, and tested various state-of-the-art CNN, ViT, and Hybrid models for CIFAR-10 classification. Experimented with the idea of channel-boosting on various architectures and improved debugging skills, crucial for Deep Learning projects.”

### Exploitation of MaskRCNN for Lymphocyte Detection in Histopathology Images

BS Thesis Project

2021

“From a research perspective, I proposed a novel channel-boosted backbone of MaskRCNN for lymphocyte detection in histopathology images. On the development side, a Web-Interface was created to facilitate pathologists in lymphocyte detection. [\[Link\]](#)”

### Blood Cell Classification using Resnet

Semester Project

2020

Performed Blood Cell classification using Resnet in PyTorch on an open-source dataset. [\[Link\]](#)

### Person Detection and Counting in video using TensorFlow

Semester Project

2019

Performed Person Detection and Counting in video frames using MobileNet in TensorFlow Python.

## Awards and Honors

Nov. 2023	<b>Gold Medal:</b> “First Position in MS Computer Science Degree”
Jul. 2021	<b>Gold Medal:</b> “First Position in BS Computer and Information Science Degree”
Jul. 2019	<b>IEEE Region-10 Website Contest:</b> “First Position in IEEE Region-10 Website Contest”
2017 - 2021	<b>Govt. Scholarship:</b> “Achieved four-year scholarship for outstanding academic performance”
2017 - 2021	<b>STEP-PGC Scholarship:</b> “Achieved four-year scholarship for outstanding academic performance”
Jun. 2017	<b>Laptop Award:</b> “Chief Minister Punjab honored me with a Laptop Award for my academic excellence.”
Feb. 2017	<b>National Physics Talent Contest:</b> “Among Top 25 Participants”
Nov. 2016	<b>National Science Talent Contest:</b> “Among Top 50 Participants”

## Volunteer Services

### WEB MASTER

IEEE Student Branch

*PIEAS, Islamabad*

Aug. 2020 - Mar. 2021

Served as a member of the executive team at the IEEE PIEAS student branch. Won 1st position in Region10 Web Contest.

### Volunteer in IEEE PSYWSC'18, IEEE WIE ILS'19 and TedX PIEAS'19

IEEE Student Branch

*PIEAS, Islamabad*

Aug. 2018 - Nov. 2019

Head Web-Team in PSYWSC and TedX AND Member Executive Committee in IEEE WIE ILS.

## References

- Dr. Asifullah Khan (Professor, Academic Supervisor)  
Department of Computer and Information Sciences, PIEAS, Islamabad  
✉ asif@pieas.edu.pk
- Dr. Anila Usman (Dean of Applied Sciences)  
Department of Computer and Information Sciences, PIEAS, Islamabad  
✉ anila@pieas.edu.pk
- Dr. Naeem Akhter (Professor)  
Department of Computer and Information Sciences,  
Pakistan Institute of Engineering and Applied Sciences, Islamabad, Pakistan  
✉ naeemakhter@pieas.edu.pk
- Dr. Abdul Majeed (Professor)  
Department of Computer and Information Sciences, PIEAS, Islamabad  
✉ abdulmajeed@pieas.edu.pk