Abdul Rehman Khan

abdulrehmankhan27061998@gmail.com | abdul2706.github.io/portfolio | abdul2706 | abdulrehman2706

Education

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

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

Volunteer Services

WEB MASTER *PIEAS, Islamabad*
IEEE Student Branch 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 *PIEAS, Islamabad*
IEEE Student Branch 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
  abdulmajiid@pieas.edu.pk