

## Muhammad Akhtar Munir

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### Summary

I am a Postdoctoral Researcher in Computer Vision at MBZUAI in Abu Dhabi. My research spans areas like Domain Generalization, Uncertainty Estimation, Model Calibration, and Vision-Language Models (VLMs). Currently, I am focused on tackling challenges in Model Calibration, enhancing the accuracy of Weather Modeling, and improving Remote Sensing analysis through VLMs.

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### Experience

#### Research Associate/Postdoctoral

*Jul 2023 – Present*

Mohamed Bin Zayed University of Artificial Intelligence (MBZUAI), Abu Dhabi, UAE  
Department of Computer Vision

#### Research Assistant/Intern

*Aug 2022 – Jun 2023*

Mohamed Bin Zayed University of Artificial Intelligence (MBZUAI), Abu Dhabi, UAE  
Department of Computer Vision

#### Researcher

*Jan 2022 – Jul 2022*

Information Technology University (ITU) of Punjab, Lahore, Pakistan  
Under Google Research Scholar Award

#### Fellowship

*Sep 2017 – Aug 2021*

Information Technology University (ITU) of Punjab, Lahore, Pakistan  
Intelligent Machines Lab

#### Lab Engineer

*Nov 2013 – Aug 2017*

School of Electrical Engineering and Computer Science (SEECS), NUST, Islamabad, Pakistan  
Department of Computing

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### Publications (Selected)

1. Muhamad Sohail Danish\*, **Muhammad Akhtar Munir\***, Syed Roshaan Ali Shah, Kartik Kuckreja, Fahad Shahbaz Khan, Paolo Fraccaro, Alexandre Lacoste, and Salman Khan. *GEOBench-VLM: Benchmarking Vision-Language Models for Geospatial Tasks*. IEEE/CVF International Conference on Computer Vision (ICCV 2025). **\*Equally contributing first authors.**
2. Ashshak Sharifdeen, **Muhammad Akhtar Munir**, Sanoojan Baliah, Salman Khan, Muhammad Haris Khan. *O-TPT: Orthogonality Constraints for Calibrating Test-time Prompt Tuning in Vision-Language Models*. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2025). **Highlight Paper**

3. Sagar Soni, Akshay Dudhane, Hiyam Debary, Mustansar Fiaz, **Muhammad Akhtar Munir**, Muhammad Sohail Danish, Paolo Fraccaro, Campbell Watson, Levente Klein, Fahad Khan, Salman Khan. *EarthDial: Turning Multi-sensory Earth Observations to Interactive Dialogues*. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2025).
4. **Muhammad Akhtar Munir**, Fahad Khan, and Salman Khan. *Efficient Localized Adaptation of Neural Weather Forecasting: A Case Study in the MENA Region*. Workshop on Tackling Climate Change with Machine Learning (CCAI-NeurIPS 2024).
5. Sohail Danish, Muhammad Haris Khan, **Muhammad Akhtar Munir**, M. Saquib Sarfraz, and Mohsen Ali. *Improving Single Domain-Generalized Object Detection: A Focus on Diversification and Alignment*. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2024).
6. **Muhammad Akhtar Munir**, Salman Khan, Muhammad Haris Khan, Mohsen Ali, and Fahad Khan. *Cal-DETR: Calibrated Detection Transformer*. Conference on Neural Information Processing Systems (NeurIPS 2023).
7. **Muhammad Akhtar Munir**, Muhammad Haris Khan, M. Saquib Sarfraz, and Mohsen Ali. *Domain Adaptive Object Detection via Balancing between Self-Training and Adversarial Learning*. IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
8. **Muhammad Akhtar Munir**, Muhammad Haris Khan, Salman Khan, and Fahad Khan. *Bridging Precision and Confidence: A Train-Time Loss for Calibrating Object Detection*. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2023).
9. **Muhammad Akhtar Munir**, Muhammad Haris Khan, M. Saquib Sarfraz, and Mohsen Ali. *Towards Improving Calibration in Object Detection Under Domain Shift*. Conference on Neural Information Processing Systems (NeurIPS 2022).
10. **Muhammad Akhtar Munir**, Muhammad Haris Khan, M. Saquib Sarfraz, and Mohsen Ali. *SSAL: Synergizing between Self-Training and Adversarial Learning for Domain Adaptive Object Detection*. Conference on Neural Information Processing Systems (NeurIPS 2021).

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## Education

### Doctor of Philosophy in Computer Science

Sep 2017 – Dec 2024

Information Technology University, Lahore

Thesis: Domain Adaptation for Object Detection

### Master of Science in Computer Science

Feb 2015 – Jun 2017

COMSATS Institute of Information Technology, Islamabad

Thesis: Ischemic Stroke Lesion Segmentation in MR Sequences Using MLP and SVM

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## Programming Languages & Tools

- **Programming Languages:** Python, C/C++, MATLAB
- **Deep Learning Frameworks:** PyTorch, Keras

- **Tools:** ArcGIS, Linux, VS Code, MS Office,  $\text{\LaTeX}$

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## Services & Honors

- **Reviewer:** CVPR 2023-25, ICLR 2024-25, ICCV 2023-2025, NeurIPS 2023-25, TPAMI
- **Awards:** NeurIPS 2022 & 2023 Scholar Award, CVPR 2023 DEI Award  
**Outstanding Reviewer:** Recognized as Outstanding Reviewer for CVPR 2025
- **Scholarship:** PhD Fellowship (4 years) from Information Technology University, Lahore
- **Summer School:** EEML Summer School, (Virtual) Budapest, Hungary, 2021

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## References

- **Dr. Salman Khan**  
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- **Dr. Muhammad Haris Khan**  
Assistant Professor  
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- **Dr. Fahad Khan**  
Full Professor  
Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), Abu Dhabi, UAE  
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- **Dr. Mohsen Ali**  
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