Adnan Hussain

CURRICULUM VITAE

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Overview: I am a recent PhD graduate specializing in computer vision, pattern recognition, and multimedia data analysis, with a strong background in deep learning and intelligent systems. As Coordinator of the Intelligent Media Laboratory (IMLab), I led a research group of 7 members and oversaw a variety of interdisciplinary projects.

My research primarily focuses on video anomaly detection and recognition using advanced deep learning models, and extends to other areas such as person reidentification, object detection, population projection, battery health prediction, and others. I have applied advanced deep learning techniques, including active learning, and incremental learning, to build adaptive and scalable solutions. Additionally, I integrate Explainable AI (XAI) approaches to ensure transparency and interpretability in AI models.

Summary

Personal

Date of Birth: 01 January 1995
Marital Status: Single
Languages: English, Pashto, Urdu

Professional

Total Journal Publication:	11	Book Chapter/Local Journal	03
First Author Publication:	07	Total Citation:	400+
Total Conference Publication:	09	h-index:	09

Education

September 2023 – August 2026
Ph.D.
Sejong University, Seoul, South Korea
Department of Software and Convergence Engineering for Intelligent Drones
Thesis: A Study of Advanced Deep Learning Models for Video Anomaly Detection and Recognition.

September 2019 – June 2021
Master of Science in Computer Science
Islamia College Peshawar, Peshawar, Pakistan
Department of Computer Science
Thesis: A Comprehensive Study on Deep Active Learning Based Wild Animal Classification Method for Camera Traps.

September 2014 – August 2018
Bachelor of Science in Computer Science
Islamia College Peshawar, Peshawar, Pakistan
Department of Computer Science

Awards & Honors

August 2026
Outstanding Researcher Award
Sejong University, Seoul, South Korea

March 2025
BK21 Scholarship from the National Research Foundation of Korea
Sejong University, Seoul, South Korea, Ph.D. Degree

September 2023
100% Study Scholarship
Sejong University, Seoul, South Korea, Ph.D. Degree

April 2019
Laptop Award under the Prime Minister's Laptop Scheme for Outstanding Students
Higher Education Commission of Pakistan

Research Experience

November 2025 – Present

IMLab Coordinator
Sejong University, Seoul, South Korea

- Leading and directing a dynamic research group of 7 members specializing in cutting-edge fields such as Person Re-Identification, Medical Image Analysis, Computer Vision, and Signal Processing.
- Providing partial supervision to Master's and Ph.D. candidates, including managing Professor projects and ensuring compliance with project requirements.
- Actively engaging with students, offering guidance and support in generating ideas, implementing projects, and processing research articles.
- Facilitating collaboration and knowledge exchange within the research group to foster a creative and innovative environment.
- Contributing to the advancement of the laboratory research agenda through strategic planning and effective project management.

September 2023– Present

Research Assistant
Intelligent Media Laboratory, Sejong University, Seoul, South Korea

- Conducted research and development for multiple projects, fostering innovation and knowledge growth in the laboratory.
- Collaborated with senior lab members to ensure smooth execution of project implementations and handled complex tasks.
- Actively participated in hands-on project implementation, translating research concepts into practical outcomes.

September 2019– August 2023

Research Assistant
Digital Image Processing Laboratory, Islamia College Peshawar

- Oversaw research projects for bachelor students, focusing on Panorama Image Generation, Wild Animal Classification, and Medical Image Analysis.
- Crafted project proposals to secure funding and resources for the laboratory's ongoing initiatives.
- Actively participated in events and workshops to enhance knowledge exchange and stay updated on the latest advancements in the field.

September 2023– Present

Research Collaborations
- Actively collaborating with research teams from diverse countries, including Saudi Arabia, Sweden, Norway, and Pakistan, fostering international partnerships.
- Participating in collaborative publications and joint presentations at international Journals.
- Expanding the network of research collaborations by establishing connections with institutions and researchers worldwide.

Participated Projects

Since September 2023, I have been actively involved in several key research projects funded by the National Research Foundation of Korea (NRF), where my contributions have covered a variety of critical tasks. These include project management, implementation of advanced algorithms and methodologies, drafting and publishing research articles, and developing patents based on innovative findings. Additionally, I have been responsible for preparing comprehensive yearly reports, ensuring that project progress is accurately documented and communicated to stakeholders.

March 2023– September 2026

Anomaly behaviour recognition for accident prevention in the connected vision environment
(2023R1A2C1005788122068207591O102) National Research Foundation of Korea (NRF)

January 2024– April 2024

Development of advanced algorithms for battery health prediction
(2020R1A6A1A03038540) National Research Foundation of Korea (NRF)

April 2024–
August 2025

Development and demonstration of AI policy simulation platform technology to solve social problems in depopulated areas
(RS-2024-00339583206820759100001) Institute of Information & communications Technology Planning (IITP)

Journal Publications

2026

1. **Adnan Hussain**, Waseem Ullah, Noman Khan, Zulfiqar Ahmad Khan, Hikmat Yar, Sung Wook Baik, "Class Incremental Learning Network for Real-Time Anomaly Recognition in Surveillance Environments", Pattern Recognition, vol. 170, p 112064, IF: 7.5, Q1, Top: 7%

2. Hikmat Yar, Zulfiqar Ahmad Khan, **Adnan Hussain**, Sang Il Yoon, Seoa Kim, Jungwook Choi, Chan Mi Jeon, Huisu Jeung, Kyungjung Kwon, Sung Wook Baik, "A novel deep learning framework for battery performance prediction over the operational lifespan", Journal of Energy Storage, vol. 143, p 119359, 2026. IF: 9.8, Q1, Top: 14%

3. **Adnan Hussain**, Kaleem Ullah, Muhammad Afaq, Muhmmad Munsif, Altaf Hussain, and Sung Wook Baik, "Quality over Quantity: A Data-Centric Survey of Annotation Errors in Object Detection Datasets" (Accepted, Artificial Intelligence Review, 2026. IF: 13.9 Q1, Top: 3.4%)

4. Hikmat Yar, **Adnan Hussain**, Zulfiqar Ahmad Khan, Min Je Kim, and Sung Wook Baik, "Deep Hybrid Network with Additive Attention for Accurate Population Forecasting" (Accepted, Soft Computing, 2026. IF: 3.1 Q3, Top: 39%)

2025

1. **Adnan Hussain**, Noman Khan, Zulfiqar Ahmad Khan, Hikmat Yar, Sung Wook Baik, "Edge-assisted framework for instant anomaly detection and cloud-based anomaly recognition in smart surveillance", Engineering Applications of Artificial Intelligence, vol. 160, p. 111936, 2025. IF: 8, Q1, Top: 2.79%

2. **Adnan Hussain**, Hikmat Yar, Noman Khan, Zulfiqar Ahmad Khan, Min Je Kim, Sung Wook Baik "Dual stream deep attention networks for annual population projection", Pattern Analysis and Applications, vol. 28, no. 2, p. 71, 2025. IF: 3.7, Q2, Top: 33.5%

2024

1. **Adnan Hussain**, Waseem Ullah, Noman Khan, Zulfiqar Ahmad Khan, Min Je Kim, Sung Wook Baik, "TDS-Net: Transformer Enhanced Dual-Stream Network for Video Anomaly Detection", Expert Systems with Applications, vol. 252, p.124846, 2024. IF: 8.5, Q1, Top: 5.6%

2. Sareer Ul Amin, Sher Taj, **Adnan Hussain**, Sanghyun Seo, "An automated chest X-ray analysis for COVID-19, tuberculosis, and pneumonia employing ensemble learning approach", Biomedical Signal Processing and Control, vol. 87, p.105408, 2024. IF: 4.9, Q1, Top: 25%

2023

1. **Adnan Hussain**, Sareer Ul Amin, Hunjoo Lee, Asma Khan, Noreen Fayyaz Khan, Sanghyun Seo, "An automated chest X-ray image analysis for covid-19 and pneumonia diagnosis using deep ensemble strategy", *IEEE Access*, vol. 11, p. 97207-97220, 2023. IF: 3.6 Q2, Top: 35%.

2. Sareer Ul Amin, **Adnan Hussain**, Bumsoo Kim, Sanghyun Seo, "Deep learning based active learning technique for data annotation and improve the overall performance of classification models", Expert Systems with Applications, vol. 228, p.120391, 2023. IF: 8.5, Q1, Top: 5.6%

3. **Adnan Hussain**, Sareer Ul Amin, Muhammad Fayaz, Sanghyun Seo, "An Efficient and Robust Hand Gesture Recognition System of Sign Language Employing Finetuned Inception-V3 and Efficientnet-B0 Network", Computer Systems Science & Engineering, vol. 46, 2023. IF: 2.2, Q2, Top: 43%

Peer Review Journal Articles

1. **Adnan Hussain,** Zulfiqar Ahmad Khan, Hikmat Yar, and Sung Wook Baik, "AIoT-Enabled Dual-Phase Framework for Industrial Anomaly Detection and Recognition", (Submitted to IEEE Internet of Things Journal)

2. **Adnan Hussain,** and Sung Wook Baik, "VMAE-Time: A Temporal Masked Autoencoding Framework for Self-Supervised Video Anomaly Detection" (Submitted to IEEE Transactions on Multimedia)

3. **Adnan Hussain,** Kaleem Ullah, and Sung Wook Baik, "A Cross-Modal Fusion Framework for Enhanced Multimodal Anomaly Detection in Surveillance Environments", (Submitted to Information Fusion)

4. Muhammad Munsif, Waqas Ahmad, Amjid Ali, Mohib Ullah, **Adnan Hussain**, and Sung Wook Baik, "Multi Camera Connected Vision System with Multi View Analytics: A Comprehensive Survey" (Submitted to IEEE Transactions on Big Data)

5. Hikmat Yar, Zulfiqar Ahmad Khan, **Adnan Hussain**, Sung Wook Baik, "A Modified MobileViT with Graph Convolution and Coordinate Attention for Efficient Fire Detection" (Submitted to IEEE Transactions on Multimedia)

Book Chapter/Local Journal

1. **Adnan Hussain,** Bilal Ahmad, Muhammad Imad, "Obstacle Recognition for Visually Impaired People Based on Convolutional Neural Network" Book: Machine Intelligence for Internet of Medical Things: Applications and Future Trends. Vol.16 (2023.05), pp.194-209.

2. Muhammad Imad, **Adnan Hussain**, Muhammad Abul Hassan, Zainab Butt, Najm Ul Sahar, "IoT based machine learning and deep learning platform for COVID-19 prevention and control: A systematic review", Book: AI and IoT for Sustainable Development in Emerging Countries: Challenges and Opportunities. (2022.01), pp. 523-536.

3. **Adnan Hussain**, Muhammad Imad, Asma Khan, Burhan Ullah, "Multi-class classification for the identification of COVID-19 in X-ray images using customized efficient neural network", Book: AI and IoT for Sustainable Development in Emerging Countries: Challenges and Opportunities. (2022.01), pp. 473-486.

Conferences

1. **Adnan Hussain**, Muhammad Afaq, Aizaz Ali Shah, Safi Ullah, Muhammad Munsif, Amjid Ali, Maleerat Maliyaem, Sung Wook Baik, "Quality of Localization: Bounding Box Precision in MS-COCO vs. MJ-COCO" The 11th International Conference on Next Generation Computing 2025, Duy Tan University, Da Nang, Vietnam.

2. Safi Ullah, **Adnan Hussain**, Kaleem Ullah, Muhammad Munsif, Amjid Ali, Aizaz Ali Shah, Muhammad Afaq, Sung Wook Baik, "MiGA-Net: A Graph Neural Network with Additive Attention for Modeling Domestic and International Migration Flows" The 11th International Conference on Next Generation Computing 2025, Duy Tan University, Da Nang, Vietnam.

3. Muhammad Afaq, Kaleem Ullah, **Adnan Hussain**, Amjid Ali, Safi Ullah, Aizaz Ali Shah, Muhammad Munsif, Sung Wook Baik, "A GNN-Based Framework for Modeling City-to-City Population Movement in China" The 11th International Conference on Next Generation Computing 2025, Duy Tan University, Da Nang, Vietnam.

4. Waqas Ahmad, Mohib Ullah, Muhammad Munsif, **Adnan Hussain**, Kaleem Ullah, Amjid Ali, Sung Wook Baik, "Synthetic Dataset for Single-View Object Detection and Model Benchmarking" The 11th International Conference on Next Generation Computing 2025, Duy Tan University, Da Nang, Vietnam.

5. Muhammad Afaq, **Adnan Hussain**, Hikmat Yar, Muhammad Munsif, Min Je Kim, Sung Wook Baik, "Analyzing City-Level Population Movement in China with Graph Neural Networks" Korea Next Generation Computing Society Spring Conference 2025.

6. Amjid Ali, Hikmat Yar, **Adnan Hussain**, Altaf Hussain, Min Je Kim, Sung Wook Baik, "Semi-Supervised Learning for Audio-Visual Anomaly Recognition" Korea Next Generation Computing Society Spring Conference 2025.

7. Hikmat Yar, **Adnan Hussain**, Zulfiqar Ahmad Khan, and Sung Wook Baik "Feature importance analysis for population projection" The 10th International Conference on Next Generation Computing 2024, Holy Angel University, Angeles City, Philippines.

8. Altaf Hussain, Noman Khan, Muhammad Munsif, **Adnan Hussain**, Min Je Kim, Sang Il Yoon, Sung Wook Baik, "Surveillance Abnormal Activity Recognition Using Residual Deep Bidirectional LSTM Network" Korea Next Generation Computing Society Spring Conference 2024.

9. Noman Khan, Waseem Ullah, Zulfiqar Ahmad Khan, **Adnan Hussain**, Min Je Kim, Sang Il Yoon, Sung Wook Baik, "Comparative Analysis of Solar Power Generation Forecasting Models for Identical Latitude Countries Data" The 9th International Conference on Next Generation Computing 2023, Duy Tan University, Da Nang, Vietnam.

Technical Skills

- Programming Languages: Python.
- Deep Learning Frameworks: TensorFlow, Keras, PyTorch, etc.
- Computer Vision Tools: OpenCV, Scikit-image, Pillow, etc.
- Data Analysis & Visualization: Pandas, NumPy, Matplotlib, Seaborn, etc.
- Version Control: Git, GitHub
- Development Environments: Spyder, Geany, Jupiter Notebook, VS Code, etc.
- Machine Learning Algorithms: Supervised and unsupervised learning, active learning, incremental learning, etc.

- Statistical Analysis: Time series data analysis, regression models, data refinement methods, etc.
- Simulation Software: MATLAB Simulink
- Document Processing: LaTeX, Microsoft Office

Member of Reviewer Board in Multiple Publishers (15+ reviews)

- IEEE Transactions on Consumer Electronics
- IEEE Transactions on Audio, Speech and Language Processing
- Engineering Applications of Artificial Intelligence
- Expert System with Applications
- Pattern Recognition
- Cluster Computing
- Pattern Analysis and Applications
- International Journal of Multimedia Information Retrieval
- PLOS ONE
- Scientific Report and others

References

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- Professor and Director of Intelligent Media Laboratory (IMLab)
- Department of Software, Sejong University, Seoul, South Korea
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