

# Zulfiqar Ahamed Khan

CURRICULUM VITAE

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[Google Scholar](#)



[Umeå University](#)

**Overview:** I am a postdoctoral researcher and recent PhD graduate specializing in time series data analysis, computer vision, and IoT programming. I am currently in a postdoctoral position at the Department of Computing Science, Umeå University, Sweden, funded by WASP. During my PhD, I served as Coordinator of the Intelligent Media Laboratory (IMLab), where I led a team of 8 researchers and managed multiple projects. In my current postdoctoral position, I have continued to manage research projects and co-supervise PhD students, while also contributing to publications and team coordination. My research focuses on computer vision and time-analysis. In computer vision, I develop and apply deep learning methods to address challenging perception and understanding problems in complex visual environments.. I also work on active, incremental, and federated learning to develop adaptive and scalable systems, and apply Explainable AI (XAI) for model transparency and interpretability.

## Summary

### Personal

Date of Birth: 15 July 1995

Marital Status: Single

Languages: English, Pashto, Urdu

### Professional

Korean Local Patents: 06

Total Publication: 44

First Author Publication: 14

Total Citation: 2700+

h-index: 22

i<sup>10</sup>-index: 29

## Education

Sep 2019 - Feb 2025

**Joint Master's and Ph.D.**  
Sejong University, Seoul, South Korea  
Department of Software  
Thesis: A Study of Spatiotemporal Feature Analysis using Deep Hybrid Models for Power Forecasting

Sep 2016 - Aug 2018

**M.Sc. Computer Science**  
Islamia College Peshawar, Peshawar, Pakistan  
Department of Computer Science  
Thesis: Towards smart home automation using IoT-enabled edge-computing paradigm ([DIPLab Prototype](#))

Aug 2014 - Aug 2016

**B.Sc. Computer Science**  
University of Malakand, Dir Lower, KPK, Pakistan  
Department of Computer Science

## Awards & Honors

Feb 2025

**Outstanding Researcher Award**  
Sejong University, Seoul, south Korea.

Aug 2024

Recognized among the top 2% of scientists globally, as per the "Updated Science-Wide Author Databases of Standardized Citation Indicators" ([2024](#), [2025](#)).

Sep 2023

**Best Paper Award**  
Next Generation Computing Conference, Best Western Premier Hotel, Jeju, South Korea

Sep 2019

**100% Study Scholarship**  
Sejong University, Seoul, South Korea, for Joint Master's and Ph.D. Degree

Aug 2019

**Winner of Business Plan Competition**  
Office of Research, Innovation and Commercialization (ORIC), Islamia College Peshawar, Peshawar, KPK, Pakistan

Dec 2019

**100% Study Scholarship**  
Islamia College Peshawar, Pakistan for M.Sc. Degree

# Research Experience

May 2025 – Present	<p><b>Postdoctoral Researcher (WASP)</b></p> <p>Department of Computing Science, Umeå University, Sweden.</p> <ul style="list-style-type: none"><li>• Researching and implementing open-set recognition methods</li><li>• Designing and implementing Vision Transformer architectures using Spiking Neural Networks for energy-efficient and accurate visual processing.</li><li>• Developing federated learning pipelines for privacy-preserving computer vision on edge devices.</li><li>• Developing efficient algorithms for real-time fire detection.</li><li>• Guiding students in idea development, algorithm implementation, and research paper review.</li></ul>
March 2025 – April 2025	<p><b>Postdoctoral Researcher</b></p> <p>BrainAI Lab, Kyungpook National University, Daegu, South Korea.</p> <ul style="list-style-type: none"><li>• Developed deep learning models for short-term energy forecasting and smart-grid optimization.</li></ul>
July 2024 – March 2025	<p><b>IMLab Coordinator</b></p> <p>Sejong University, Seoul, South Korea</p> <ul style="list-style-type: none"><li>• Leading and directing a dynamic research group of 8 members specializing in cutting-edge fields such as Energy Informatics, Computer Vision, and Signal Processing.</li><li>• Providing partial supervision to Master and Ph.D. candidates, including managing Professor projects and ensuring compliance with project requirements.</li><li>• Actively engaging with students, offering guidance and support in generating ideas, implementing projects, and processing research articles.</li><li>• Demonstrating leadership in composing and crafting multi-year project proposals submitted to the National Research Foundation of Korea (NRF).</li><li>• Facilitating collaboration and knowledge exchange within the research group to foster a creative and innovative environment.</li><li>• Contributing to the advancement of the laboratory research agenda through strategic planning and effective project management.</li></ul>
Sep 2019 – June 2024	<p><b>Research Assistant</b></p> <p>Intelligent Media Laboratory, Sejong University, Seoul, South Korea</p> <ul style="list-style-type: none"><li>• Conducted research and development for multiple projects, fostering innovation and knowledge growth in the laboratory.</li><li>• Collaborated with senior lab members to ensure smooth execution of project implementations and handled complex tasks.</li><li>• Actively participated in hands-on project implementation, translating research concepts into practical outcomes.</li></ul>
Mar 2017 – Aug 2019	<p><b>Research Assistant</b></p> <p>Digital Image Processing Laboratory, Islamia College Peshawar</p> <ul style="list-style-type: none"><li>• Oversaw research projects for bachelor students, focusing on Energy Informatics, Smart Home Solutions, Resource-Constrained Programming, and IoT.</li><li>• Crafted project proposals to secure funding and resources for the laboratory's ongoing initiatives.</li><li>• Actively participated in events and workshops to enhance knowledge exchange and stay updated on the latest advancements in the field.</li></ul>
Sep 2019 – Present	<p><b>Research Collaborations</b></p> <ul style="list-style-type: none"><li>• Actively collaborating with research teams from diverse countries, including Saudi Arabia, Portugal, UK, Spain, Brazil, and Pakistan, fostering international partnerships.</li></ul>

- 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 2019, 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 projects 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.

May 2025– Present	<b>Wallenberg AI, Autonomous Systems and Software Program</b> The Research project is funded by the Knut and Alice Wallenberg Foundation through WASP
Mar 2025– Apr 2025	<b>Brain-Inspired AI Application</b> (No. RS-2023-00209794) National Research Foundation of Korea (NRF) (No. RS-2025- 02218631) Institute of Information and Communications Technology Planning and Evaluation
Oct 2019– Feb 2021	<b>Software central university support project</b> (1711073386) National Research Foundation of Korea (NRF)
Oct 2019– Dec 2023	<b>Development of ensemble methods-based XAI energy platform for effective energy consumption pattern and factor analysis</b> (2019M3F2A10731792320682075910203) National Research Foundation of Korea (NRF)
Oct 2019– Feb 2022	<b>Multi-view video data analysis technology for smart city based intelligent surveillance system</b> (2019R1A2B5B010700671320682075910103) National Research Foundation of Korea (NRF)
Mar 2023– Feb 2025	<b>Anomaly behaviour recognition for accident prevention in the connected vision environment</b> (2023R1A2C10057881220682075910102) National Research Foundation of Korea (NRF)
Jan 2024– April 2024	<b>Development of advanced algorithms for battery health prediction</b> (2020R1A6A1A03038540) National Research Foundation of Korea (NRF)
April 2024– Dec 2024	<b>Development and demonstration of AI policy simulation platform technology to solve social problems in depopulated areas</b> (RS-2024-0033958320682075910001) Institute of Information & communications Technology Planning (IITP)
Sep 2024– Feb 2025	<b>Data hub for solid electrolyte materials based on syncrolab data cloud</b> (RS-2024-00446825) National Research Foundation of Korea (NRF)

## Journal Publications

### 2026

1. 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
2. Adnan Hussain, Waseem Ullah, Noman Khan, **Zulfiqar Ahmad Khan**, Hikmat Yar, and Sung Wook Baik, “[Class-incremental learning network for real-time anomaly recognition in surveillance environments](#),” Pattern Recognition

## 2025

3. Zulfiqar Ahmad Khan, Fath U Min Ullah, Hikmat Yar, Waseem Ullah, Sung Wook Baik "[Optimized Cross Module Attention Network and Database for Fire Detection](#)", Pattern Recognition
4. Hikmat Yar, Fath U Min Ullah, Zulfiqar Ahmad Khan, Min Je Kim, Sung Wook Baik "[EFNet-CSM: EfficientNet with a Modified Attention Mechanism for Effective Fire Detection](#)" Knowledge-Based Systems
5. Adnan Hussain, Noman Khan, Zulfiqar Ahmad Khan, Hikmat Yar, Min Je Kim, Sung Wook Baik, "[Edge-assisted framework for instant anomaly detection and cloud-based anomaly recognition in smart surveillance](#)" Engineering Applications of Artificial Intelligence
6. 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
7. Muhammad Munsif, Altaf Hussain, Zulfiqar Ahmad Khan, Min Je Kim, and Sung Wook Baik, "[Hierarchical attention-based framework for enhanced prediction and optimization of organic and inorganic material synthesis](#)," Advanced Engineering Informatics
8. Taimoor Khan, Zulfiqar Ahmad Khan, and Chang Choi, "[Enhancing real-time fire detection: An effective multi-attention network and a fire benchmark](#)," Neural Computing and Applications

## 2024

9. Zulfiqar Ahmad Khan, Shabbir Ahmad Khan, Tanveer Hussain, Sung Wook Baik, "[DSPM: Dual sequence prediction model for efficient energy management in micro-grid](#)," *Applied Energy*
10. Hikmat Yar, Zulfiqar Ahmad Khan, Tanveer Hussain, Sung Wook Baik, "[A modified vision transformer architecture with scratch learning capabilities for effective fire detection](#)," Expert Systems with Applications
11. 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
12. Hikmat Yar, Zulfiqar Ahmad Khan, Imad Rida, Waseem Ullah, Min Je Kim, Sung Wook Baik, "[An efficient deep learning architecture for effective fire detection in smart surveillance](#)," Image and Vision Computing
13. Habib Khan, Tanveer Hussain, Samee Ullah Khan, Zulfiqar Ahmad Khan, Sung Wook Baik, "[Deep multi-scale pyramidal features network for supervised video summarization](#)," Expert Systems with Applications

## 2023

14. Zulfiqar Ahmad Khan, Tanveer Hussain, Waseem Ullah, Sung Wook Baik, "[A Trapezoid Attention Mechanism for Power Generation and Consumption Forecasting](#)," IEEE Transactions on Industrial Informatics
15. Zulfiqar Ahmad Khan, Tanveer Hussain, Sung Wook Baik, "[Dual stream network with attention mechanism for photovoltaic power forecasting](#)," Applied Energy
16. Zulfiqar Ahmad Khan, Tanveer Hussain, Amin Ullah, Waseem Ullah, Javier Del Ser, Khan Muhammad, Muhammad Sajjad, Sung Wook Baik, "[Modelling Electricity Consumption During the COVID19 Pandemic: Datasets, Models, Results and a Research Agenda](#)," Energy and Buildings
17. Taimoor Khan, Zulfiqar Ahmad Khan, Chang Choi, "[Enhancing real-time fire detection: an effective multi-attention network and a fire benchmark](#)," Neural Computing and Applications
18. Hikmat Yar, Waseem Ullah, Zulfiqar Ahmad Khan, Sung Wook Baik, "[An Effective Attention-based CNN Model for Fire Detection in Adverse Weather Conditions](#)," ISPRS Journal of Photogrammetry and Remote Sensing
19. Hikmat Yar, Zulfiqar Ahmad Khan, Fath U Min Ullah, Waseem Ullah, Sung Wook Baik, "[A modified YOLOv5 architecture for efficient fire detection in smart cities](#)," Expert Systems with Applications
20. Waseem Ullah, Fath U Min Ullah, Zulfiqar Ahmad Khan, Sung Wook Baik, "[Sequential Attention Mechanism for Weakly Supervised Video Anomaly Detection](#)," Expert Systems with Applications

## 2022

21. **Zulfiqar Ahmad Khan**, Tanveer Hussain, Fath U Min Ullah, Suneet Kumar Gupta, Mi Young Lee, Sung Wook Baik, "[Randomly initialized CNN with densely connected stacked autoencoder for efficient fire detection](#)," Engineering Applications of Artificial Intelligence
22. **Zulfiqar Ahmad Khan**, Tanveer Hussain, Ijaz Ul Haq, Fath U Min Ullah, Sung Wook Baik, "[Towards efficient and effective renewable energy prediction via deep learning](#)," Energy Reports
23. **Zulfiqar Ahmad Khan**, Amin Ullah, Ijaz Ul Haq, Mohamed Hamdy, Gerardo Maria Mauro, Khan Muhammad, Mohammad Hijji, Sung Wook Baik, "[Efficient short-term electricity load forecasting for effective energy management](#)," Sustainable Energy Technologies and Assessments
24. **Zulfiqar Ahmad Khan**, Tanveer Hussain, Sung Wook Baik, "[Boosting energy harvesting via deep learning-based renewable power generation prediction](#)," Journal of King Saud University-Science
25. Waseem Ullah, Tanveer Hussain, **Zulfiqar Ahmad Khan**, Umair Haroon, Sung Wook Baik, "[Intelligent dual stream CNN and echo state network for anomaly detection](#)," Knowledge-Based Systems
26. Altaf Hussain, **Zulfiqar Ahmad Khan**, Tanveer Hussain, Fath U Min Ullah, Seungmin Rho, Sung Wook Baik, "[A hybrid deep learning-based network for photovoltaic power forecasting](#)," Complexity
27. Hikmat Yar, Tanveer Hussain, Mohit Agarwal, **Zulfiqar Ahmad Khan**, Suneet Kumar Gupta, Sung Wook Baik, "[Optimized dual fire attention network and medium-scale fire classification benchmark](#)," IEEE Transactions on Image Processing
28. Khan Muhammad, Hayat Ullah, **Zulfiqar Ahmad Khan**, Abdul Khader Jilani Saudagar, Abdullah AlTameem, Mohammed AlKhathami, Muhammad Badruddin Khan, Mozaherul Hoque Abul Hasanat, Khalid Mahmood Malik, Mohammad Hijji, Muhammad Sajjad, "[WEENet: an intelligent system for diagnosing COVID-19 and lung cancer in IoMT environments](#)," Frontiers in oncology

## 2021

29. Samee Ullah Khan, Ijaz Ul Haq, **Zulfiqar Ahmad Khan**, Noman Khan, Mi Young Lee, Sung Wook Baik, "[Atrous convolutions and residual GRU based architecture for matching power demand with supply](#)," MDPI Sensors
30. Hikmat Yar, Ali Shariq Imran, **Zulfiqar Ahmad Khan**, Muhammad Sajjad, Zenun Kastrati, "[Towards smart home automation using IoT-enabled edge-computing paradigm](#)," MDPI Sensors
31. Waseem Ullah, Amin Ullah, Tanveer Hussain, **Zulfiqar Ahmad Khan**, Sung Wook Baik, "[An efficient anomaly recognition framework using an attention residual LSTM in surveillance videos](#)," MDPI Sensors

## 2020

32. **Zulfiqar Ahmad Khan**, Amin Ullah, Waseem Ullah, Seungmin Rho, Miyoung Lee, Sung Wook Baik, "[Electrical energy prediction in residential buildings for short-term horizons using hybrid deep learning strategy](#)," Applied Sciences
33. **Zulfiqar Ahmad Khan**, Tanveer Hussain, Amin Ullah, Seungmin Rho, Miyoung Lee, Sung Wook Baik, "[Towards efficient electricity forecasting in residential and commercial buildings: A novel hybrid CNN with a LSTM-AE based framework](#)," MDPI Sensors
34. Muhammad Sajjad, **Zulfiqar Ahmad Khan**, Amin Ullah, Tanveer Hussain, Waseem Ullah, Mi Young Lee, Sung Wook Baik, "[A novel CNN-GRU-based hybrid approach for short-term residential load forecasting](#)," IEEE Access

## Peer Review Articles

1. **Zulfiqar Ahmad Khan**, Obaidullah CZaland, Monwar Bhuyan, "FedSHIELD: Adversarial HoneyPot-Guided Client Screening Framework for Robust Federated Learning" ([IJCAI26](#))
2. **Zulfiqar Ahmad Khan**, Obaidullah Zaland, Monwar Bhuyan, "SFFormer: Saliency Aware Gated Factorized Attention for Spiking Neural Networks" ([ICME26](#))
3. **Zulfiqar Ahmad Khan**, Fath U Min Ullah, Monwar Bhuyan, "Reinforcing Diversity: RL-Guided Experts for Open-Set Recognition" ([KDD26](#))
4. Md Tanvir Islam, Doheun Cha, **Zulfiqar Ahmad Khan**, Sangtae Ahn, "FRGFormer: A Firing Rate-Guided Attention Transformer for Spiking Neural Networks" (Preparing for NeurIPS)

5. **Zulfiqar Ahmad Khan**, Monowar Bhuyan, “FLARE-Net: A Federated Spiking Vision Transformer for Resource-Constrained Fire Detection” (IEEE TIP, Submitted 202)
6. Muhammad Fayaz, **Zulfiqar Ahmad Khan**, Hyeonjoon Moon , “GeoSpikeFormer: A Neuromorphic Transformer and Comprehensive Benchmark for Large-Scale Land Cover Mapping” (IEEE TIP, Submitted 202).
7. **Zulfiqar Ahmad Khan** and Sung Wook Baik “Incremental Learning Enhanced Dual-Stream Deep Attention Network for Power Forecasting” (Major Revision Submitted, Journal Applied Energy)
8. Hikmat Yar, **Zulfiqar Ahmad Khan**, Waseem Ullah, Samee Ullah Khan, Habib Khan, Min Je Kim, Sung Wook Baik “AVRNet: A Unified Deep Supervised Network for Effective Animal Voice Recognition” (Submitted to Information Processing and Management)
9. Hikmat Yar, **Zulfiqar Ahmad Khan**, Waseem Ullah, Min Je Kim, Sung Wook Baik “Attention Enhanced YOLOV8 Architecture and a Benchmark for Fire Detection in Smart Surveillance and Remote Sensing” (Submitted to Remote Sensing of Environment)
10. Waseem Ullah, Fath U Min Ullah, **Zulfiqar Ahmad Khan**, and Sung Wook Baik, Min Je Kim, Sung Wook Baik “Ensemble Feature learning with Spatiotemporal Share Attention Memory for Anomaly Detection”. (Submitted to IEEE Transactions on Cybernetics)
11. Waseem Ullah, **Zulfiqar Ahmad Khan**, Hikmat Yar and Sung Wook Baik “A Dual Stream Attention Network for real world Anomalies Recognition ” (Submitted to IEEE Transactions on Circuits and Systems for Video Technology)
12. Waseem Ullah, **Zulfiqar Ahmad Khan**, Hikmat Yar and Sung Wook Baik “Anomaly Recognition and Localization in Surveillance System ” (Submitted to Engineering Applications of Artificial Intelligence)
13. Hikmat Yar, **Zulfiqar Ahmad Khan**, Waseem Ullah, Min Je Kim, Sung Wook Baik, “Deep Learning-Enhanced Driver Behavior Assessment with Spatial Awareness for Safe Transportation” (Submitted to Advanced Engineering Informatics)
14. Hikmat Yar, Adnan Hussain, **Zulfiqar Ahmad Khan**, Min Je Kim, and Sung Wook Baik, “Hybrid Network with Additive Attention and Explainable AI for Accurate Population Forecasting”
15. Altaf Hussain, Muhammad Munsif, **Zulfiqar Ahmad Khan**, Min je Kim, and Sung Wook Baik “A Structure-Agnostic Transformer Framework for Enhanced Materials Discovery in Engineering Informatics” (Submitted to Journal of Materials Science & Technology)

## Conferences

1. Yinuo Zhang, **Zulfiqar Ahmad Khan**, Monowar Bhuyan, “TinySEED: A Lightweight Transformer Architecture with Channel-Attention for DDoS Detection” ([SAC26 Accepted](#))
2. Obaidullah Zaland, **Zulfiqar Ahmad Khan**, and Monowar Bhuyan “Catastrophic Forgetting Resilient One-Shot Incremental Federated Learning” ([ICBDA26 Accepted](#))
3. Fath U Min Ullah, **Zulfiqar Ahmad Khan**, Sung Wook Baik, Estefania Talavera, Saeed Anwar, Khan Muhammad, “[Dual Deep Learning Network for Abnormal Action Detection](#)” 2024 IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS).
4. **Zulfiqar Ahmad Khan**, Waseem Ullah, Hikmat Yar, Noman Khan, Min Je Kim and Sung Wook Baik “[Dataset Standardization for Effective Solar Power Forecasting: A Comprehensive Analysis](#)” The 9th International Conference on Next Generation Computing (ICNGC 2023) Danang, Vietnam.
5. Noman Khan, Waseem Ullah, **Zulfiqar Ahmad Khan**, Adnan Hussain, Min Je Kim, Sang Il Yoon and Sung Wook Baik, “[Comparative Analysis of Solar Power Generation Forecasting Models for Identical Latitude Countries Data](#)”. The 9th International Conference on Next Generation Computing (ICNGC 2023) Danang, Vietnam.
6. **Zulfiqar Ahmad Khan**, Noman Khan, Su Min Lee, Sang Il Yoon, Mi Young Lee and Sung Wook Baik, “[Solar Power Prediction using Dual Stream CNN-LSTM Architecture](#)” Korea Next Generation Computing Society Spring Conference 2022.
7. Habib Khan, **Zulfiqar Ahmad Khan**, Waseem Ullah, Min Jee Kim, Mi Young Lee, Sung Wook Baik, “[Efficient vehicle detection in aerial scenes](#)” Korea Next Generation Computing Society Spring Conference 2022.
8. Muhammad Munsif, Habib Khan, **Zulfiqar Ahmad Khan**, Altaf Hussain, Fath U Min Ullah, Mi Young Lee and Sung Wook Baik, “[PV-ANet: Attention-Based Network for Short-term Photovoltaic Power Forecasting](#)” The 8th International Conference on Next Generation Computing 2022.

7. Su Min Lee, Min Je Kim, Samee Ullah Khan, **Zulfiqar Ahmad Khan**, Noman Khan, Mi Young Lee and Sung Wook Baik, “[Deep Learning framework for intelligent surveillance video analytics](#)” The 7th International Conference on Next Generation Computing 2021.
8. Altaf Hussain , Samee Ullah Khan , Fath U Min Ullah , **Zulfiqar Ahmad Khan** , Mi Young Lee , Sung Wook Baik, “[Disasters Scenes Classification Based on Unmanned Aerial Vehicles Using Lightweight CNN](#)” The 7th International Conference on Next Generation Computing 2021.
9. Hikmat Yar , Tanveer Hussain , **Zulfiqar Ahmad Khan**, Lee Mi -young , Baek Sung-wook, “[Fire detection through effective vision transformers](#)” Korean Society for Next Generation Computing Journal Vol.17 No.5 2021.10 pp.21-30.
10. **Zulfiqar Ahmad Khan**, Waseem Ullah, Amin Ullah, Seungmin Rho, Mi Young Lee, Sung Wook Baik, “[An Adaptive Filtering Technique for Segmentation of Tuberculosis in Microscopic Images](#)” NLPIR 2020: 2020 4th International Conference on Natural Language Processing and Information Retrieval.

## Patents

1. Sung-Wook Baik, RHO, Seung-Min, LEE, Mi-Young, **Zulfiqar Ahmad Khan**, Tanveer Hussain, and Amin Ullah, “Power consumption prediction system of residential and commercial building using hybrid convolution neural network and method thereof” **Registration No:** 1025005480000 (Korean Patent)
2. Sung-Wook Baik, LEE, Mi-Young, Waseem Ullah, Tanveer Hussain, and **Zulfiqar Ahmad Khan**, “Anomaly recognition method and system based on LSTM” **Registration No:** 1026012330000
3. Sung-Wook Baik, LEE, Mi-Young, **Zulfiqar Ahmad Khan**, Tanveer Hussain, Kim Minje, “Method for predicting renewable energy consumption and production based on deep learning and apparatus thereof” **Application No:** 1020220061428 (Submitted)
4. Sung-Wook Baik, LEE, Mi-Young, Altaf Hussain, **Zulfiqar Ahmad Khan**, Fath U Min Ullah, Kim Minje, and Lee Sumin “Method for predicting renewable energy consumption and production based on deep learning and apparatus thereof” **Registration No:** 1025335080000
5. Sung-Wook Baik, LEE, Mi-Young, **Zulfiqar Ahmad Khan**, Kim Minje, Yoon Sangil, and Lee Sumin “Method for predicting energy production and consumption data using double sequence deep learning model, and apparatus thereof” **Registration No:** 1025218070000
6. Sung-Wook Baik, LEE, Mi-Young, **Zulfiqar Ahmad Khan**, Fath U Min Ullah, Kim Minje, Yoon Sangil, and Lee Sumin “method for predicting energy consumption and production based on using hybrid convolutional neural network and regression neural network and apparatus thereof” **Registration No:** 1025218080000

## Technical Skills

- Programming Languages: Python, C++, PhP, etc.
- Deep Learning Frameworks: TensorFlow, Keras, PyTorch, etc.
- Computer Vision Tools: OpenCV, Scikit-image, Pillow, etc.
- Data Analysis & Visualization: Pandas, NumPy, Matplotlib, Seaborn, etc.
- Database Management: XAMP, MySQL, SQLite
- IoT Technologies: MQTT, Raspberry Pi, Arduino
- Version Control: Git, GitHub
- Development Environments: Spyder, Geany, Jupyter Notebook, 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 Publisher (60+ reviews)

- IEEE Transactions on Cybernetics
- IEEE Transactions on Industrial Informatics
- Journal of King Saud University - Computer and Information Sciences
- Engineering Application of Artificial Intelligence
- Knowledge Based System.
- Information Processing and Management
- Artificial Intelligence Review
- Cluster Computing
- Energy Efficiency

- Stochastic Environmental Research and Risk Assessment
- Scientific Report
- IET Generation, Transmission & Distribution
- IET Renewable Energy
- detailed review list ([ORCID](#))

## References

### Prof. Sung Wook Baik - Ph.D. Supervisor

- Professor and Director of Intelligent Media Laboratory (IMLab)
- Department of Software, Sejong University, Seoul, South Korea
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### Dr. Monowar Bhuyan

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### Dr. Amin Ullah

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