

Toshpulatov Mukhiddin

Assistant Professor, Intelligent Network & Embedded Systems Lab,

Computer Engineering Department, Gachon University

muhiddin@gachon.ac.kr

April 06, 2026

Education

- PhD in Smart Engineering, Biomedical Science & Engineering, Inha University, 2025
 - Thesis: Advancing Sign Language Recognition: A Multimodal Deep Learning Framework with Keypoint Vectorization
- MSc in Mathematics and Computer Science, Samarkand State University, 2002
- BSc in Mathematics and Mechanics, Samarkand State University, 2000

Research Interests

- Artificial Intelligence: Deep Learning, Machine Learning, Natural Language Processing
- Human-Computer Interaction: Hand & Fingertips Detection, Tracking, AR/VR/XR
- Computer Vision Technologies: Autoencoder, CNN, GAN, Diffusion Models, Vision Transformers
- Transformer-based Deep Learning Applications: Language Processing, Pose Estimation, Action Recognition, Privacy-preserving
- Medical AI: Medical Image Processing, Smart Healthcare

Research Experience

- Research Professor, Computer Engineering Department, Gachon University, 2026.03.01 - Present
 - Multimodal approaches, Transformers, Diffusion models, LLM agents.
- Senior Researcher, Voice AI Research Institute, Inha University, 2025.10.03 - Present
 - Multimodal sign language recognition, Vision Transformers, Diffusion models, LLM.
- Postdoctoral Researcher, KAIST, SpaceTop Research Center (ITRC), 2025.03.17 -202.10.02
 - VR keyboard project focused on accurately detecting and tracking fingertips. Research Assistant, Inha University, 2019 - 2025
 - Supported AI and medical AI courses and guided student research

Teaching Experience

- National University of Uzbekistan, Djizakh Branch, 2025 - Present
 - Courses: Deep Learning in Computer Vision, Cybersecurity.
- Karshi Irrigation and Agrotechnology Institute, 2022 - 2024
 - Courses: Deep Learning, Mathematical Modeling
- Tashkent University of Information Technology, 2013 - 2018
 - Courses: Machine Learning, Numerical Analysis, Mathematical Modeling
- Jizzakh Polytechnical Institute, 2010 - 2013
 - Courses: Numerical Analysis, Mathematical Modeling

Awards

- Outstanding Researcher, Best Researcher, Inha University, 2025
- Best Paper Awards, BigData, and Korean Computer Congress, 2024
- Excellent Paper Awards, BK21, BMSE Research Fair, Inha University, 2020 - 2023
- Scientific Title “Docent” (equivalent to the “Associate Professor” in post-Soviet countries), Supreme Attestation Commission of Uzbekistan, 2018
- Best Researcher-Professor Award, Ministry of Higher Education, Science and Innovation, Uzbekistan, 2016

Publications

Journal Papers

- Toshpulatov, M., Safarov, F., et al. (2026). Adaptive feature refinement for texture-preserving single image super-resolution Cluster Computing Publisher: Springer US Volume: 29, Issue: 3 Publication Date: February 16, 2026, **IF(4.2)**.
- Safarov F., Toshpulatov, M., et al. (2025). Hyperspectral Anomaly Detection with Enhanced Spectral Graph Transformer Network, **IEEE Access**, **IF(4.82)**.
- Toshpulatov, M., Lee, W., & Lee, S. (2025). Deep learning pathways for automatic sign language processing. **Pattern Recognition**, 164, 111475, (**SCIE**, **IF=9.84**).
- Toshpulatov, M., Lee, W., & Lee, S. et al (2024). DDC3N: Doppler-driven convolutional 3D network for human action recognition, **IEEE Access**, 10.1109/ACCESS.2024.3422428, (**SCIE**, **IF=4.82**).
- Toshpulatov, M., Lee, W., & Lee, S. (2023). Talking human face generation: survey, *Expert Systems with Applications*, 219, 119678, (**SCIE**, **IF=9.29**).
- Toshpulatov, M., Lee, W., & Lee, S. (2022). Human pose, hand, and mesh estimation using deep learning: survey, *The Journal of Supercomputing*, 78 (6), 7616-7654, (**SCIE**, **IF=3.96**).
- Toshpulatov, M., Lee, W., & Lee, S. (2021). Generative adversarial networks and their application to 3D face generation: a survey, *Image and Vision Computing*, 104-119, (**SCIE**, **IF=4.3**).

Conference Papers

- Toshpulatov, M., Lee, W., Lee, S., & Lee G. (2026). Real-Time Multimodal Fingertip Contact Detection via Depth and Motion Fusion for Vision-Based Human-Computer Interaction, in Proceedings CVPR 2026, 185-187 (Best Paper Award).
- Toshpulatov, M., Lee, W., Lee, S., Kuvandikov, J., & Oh, S. (2026). Sentimentogram: Learning Personalized Emotion Visualizations from User Preferences, in Proceedings ACL Findings, 2026.
- Toshpulatov, M., & Lee, W. (2026). [Enhancing Sign Language Recognition: A Computationally Efficient and Interpretable Multi-Modal Approach](#), in Proceedings Big Data and Smart Computing (BigComp2026), pp 390-393.
- Toshpulatov, M., Lee, W., & Lee, S. (2024). The language of silence: a deep dive into interpretable sign language recognition, in Proceedings Korean Software Congress 2024, 185-187 (Best Paper Award).
- Toshpulatov, M., & Lee, W. (2024). A Novel Scholarly Approach to Action Recognition: A CNN Architecture Enhanced with Innovative Preprocessing Techniques, in Proceedings Big Data Applications and Services (BIGDAS2024) (Best Paper Award).
- Toshpulatov, M., & Lee, W. (2024). Human action recognition utilizing Doppler-enhanced convolutional 3D networks, in Proceedings of the International Conference on Big Data and Smart Computing (BigComp).
- Toshpulatov, M., & Lee, W. (2024). Streamlining Computational Complexity: A Novel Data Processing Approach for Enhanced 3DCNN Performance in Human Action Recognition, in Proceedings Korean Computer Congress 2024, 107-109.
- Toshpulatov, M., & Lee, W. (2023). Athletes' action recognition through skeleton-based human pose estimation and 3D convolutional networks, in Proceedings System Engineering Conference, 57-59.
- Toshpulatov, M., Lee, W., & Lee, S. (2022). Privacy-preserving of human identification in CCTV data using a novel deep learning-based method, in Proceedings International Conference on Big Data and Smart Computing (BigComp).
- Toshpulatov, M., Lee, W., & Lee, S. (2020). Research Issues on Generative Adversarial Networks and Applications, in Proceedings International Conference on Big Data and Smart Computing (BigComp).

Invited Talks

- “Recent advancement in DL-based Sign Language Processing, AI & Big Data Workshop, Inha University, 26 September 2025, Incheon, South Korea
- “Recent advancement in AI embedded HCI”, Tashkent Institute of Management and Economics, 17-18 April 2025, Tashkent, Uzbekistan
- “Transformer based novel sign language recognition approaches”, Djizakh Polytechnical Institute, 21-22 February 2025, Djizakh, Uzbekistan.
- “Multimodal action recognition methods”, Djizakh Polytechnical Institute, 11-12 Mart, 2024, Djizakh, Uzbekistan.
- “AI in education systems”, Sambhram University, 26-27 July 2022, Djizakh, Uzbekistan.

Technical Skills

- Python, PyTorch, TensorFlow, Keras, Matlab, Pandas

Languages

- Uzbek (native), Russian (fluent), English (fluent), Korean (intermediate)

References

- Wookey Lee, Professor, INHA University, trinity@inha.ac.kr (PhD supervisor)
- Suan Lee, Assistant Professor, Semyung University, suanlee@semyung.ac.kr (PhD thesis co-advisor)
- Geehyuk Lee, Professor, KAIST, geehyuk@kaist.ac.kr, Director, the KAIST SpaceTop Research Center
- Jinsu Cho, Professor, Gachon University, jscho@gachon.ac.kr, Intelligent Network & Embedded Systems Lab, Department of Computer Engineering
