

Muhammad Osama Zeeshan

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Summary

Computer Vision and Machine Learning researcher with a PhD in Systems Engineering at École de technologie supérieure (ÉTS). My research focuses on human-centered visual intelligence, multimodal learning, vision-language models, facial dynamics, and personalized model adaptation under real-world distribution shifts. I also bring more than five years of industry engineering experience in software development, image analysis, and video-processing systems. My research has been published in ECCV, ICLR, WACV, and CVPR Workshops, and I am particularly interested in digital humans, neural representations, and AI-native visual content creation.

Top Publications

Zeeshan, M. O., Sharafi, M., Savary, B., Koerich, A. L., Pedersoli, M., & Granger, E. Clip-autt: Test-time personalization with action unit prompting for fine-grained video emotion recognition. **ECCV 2026**.

Zeeshan, M. O., Gillet, N., Koerich, A. L., Pedersoli, M., Bremond, F., & Granger, E. MuSACo: Multimodal Subject-Specific Selection and Adaptation for Expression Recognition with Co-Training. **WACV 2026**.

Sharafi, M., Belharbi, S., **Zeeshan, M. O.**, Salem, H. B., Etemad, A., Koerich, A. L., Pedersoli, M., ... & Granger, E. Personalized Feature Translation for Expression Recognition: An Efficient Source-Free Domain Adaptation Method. **ICLR 2026**.

Gonzalez-Gonzalez, M., Belharbi, S., **Zeeshan, M. O.**, Sharafi, M., Aslam, M. H., Pedersoli, M., ... & Granger, E. BAH dataset for ambivalence and hesitancy recognition in videos for behavioural change. **ICLR 2026**.

Zeeshan, M. O., Pedersoli, M., Koerich, A. L., & Granger, E. Progressive multi-source domain adaptation for personalized facial expression recognition. **IEEE Transactions on Affective Computing, 2025**.

Zeeshan, M. O., Aslam, M. H., Belharbi, S., Koerich, A. L., Pedersoli, M., Bacon, S., & Granger, E. Subject-based domain adaptation for facial expression recognition. **IEEE FG 2024**.

Praveen, R. G., de Melo, W. C., **Zeeshan, O.**, Ullah, N., Aslam, H., Denorme, T., ... & Granger, E. A joint cross-attention model for audio-visual fusion in dimensional emotion recognition. **CVPR 2022**.

Education

PhD in Systems Engineering, Ecole de technologie superieure (ETS), Montreal, Canada
Jan 2022 – 2026

Master of Science in Data Sciences, Bahria University, Islamabad, Pakistan
Sep 2018 – Dec 2020

Bachelor of Science in Computer Sciences, Air University, Islamabad, Pakistan
Sep 2010 – May 2014

Research Experience

Machine Learning Researcher

LIVIA & ILLS Labs, Ecole de technologie superieure (ETS), Montreal, Canada
Jan 2022 –

- Developed personalized deep learning models for behavior and emotion recognition, adapting to individual-specific patterns and variability.
- Designed and implemented unsupervised, gradual, multi-source, and test-time domain adaptation methods for robust generalization under distribution shifts.
- Built multimodal learning approaches integrating visual, physiological, and audio signals for adaptive prediction and behavior analysis.
- Conducted large-scale experimental evaluations on noisy real-world datasets to assess robustness, cross-domain performance, and reproducibility.
- Created Python and PyTorch pipelines for preprocessing, model training, evaluation, ablation studies, and robustness analysis.
- Collaborated with interdisciplinary researchers on personalized and multimodal AI systems across behavioral health, computer vision, and affective computing.
- Co-developed the BAH dataset for ambivalence and hesitancy recognition, enabling research in personalization, zero-shot learning, and domain adaptation.

Visiting Research Scientist

STARS, Inria - French National Institute for Research in Digital Science and Technology, Valbonne, France

Feb 2026 – Apr 2026

- Conducted collaborative research on computationally efficient machine learning methods for personalized human behavior and expression analysis.
- Investigated test-time multimodal domain adaptation methods that improve robustness and efficiency without requiring access to original training data.
- Explored personalized adaptation strategies for models operating under changing human behavior, subtle facial expressions, and real-world distribution shifts.

Industrial Experience

Senior Software Engineer

Jin Technologies

Jan 2019 – Jan 2022

- Developed scalable backend systems and RESTful APIs supporting data-driven production applications.
- Collaborated with cross-functional teams to design and implement reliable software systems.
- Optimized systems for performance, reliability, and scalability across deployment environments.

Software Developer - Video Content Retrieval

Bahria University Research Lab

Sep 2017 – Jan 2019

- Developed computer vision pipelines for detecting and recognizing text in video streams.
- Built systems for indexing and retrieving visual information from large multimedia datasets.
- Designed data-processing workflows for noisy, low-quality, real-world visual data.

Android Developer & Image Analyst

Steprobotics

Feb 2015 – Aug 2017

- Developed computer vision algorithms for solar irradiance, skyline, and shading estimation.
- Built the Step Solar mobile application integrating geospatial analysis, local data storage, and external APIs.

Machine Learning Research Assistant - Computational Biology

Air University, Islamabad, Pakistan

Jan 2014 – Mar 2015

- Developed machine learning and image-analysis pipelines for microscopy-based sperm cell classification and recognition.
- Processed high-resolution sperm microscopy images and extracted discriminative visual features to identify head and tail abnormalities according to WHO criteria.
- Developed and evaluated classification models for computer-aided semen analysis across Normal, Abnormal, and Neutral categories.

Technical Skills

Programming: Python, SQL, Java

Machine Learning & AI: Computational Efficiency, Model Complexity Analysis, Computer Vision, Multimodal Learning, Self-Supervised Learning, Domain Adaptation, TTA, Generative Models, Evaluation & Benchmarking

Frameworks & Tools: PyTorch, TensorFlow, OpenCV, Git, Linux

Research Engineering: Reproducible pipelines, heterogeneous data preprocessing, large-scale experiments, ablation studies, benchmarking, Git, Linux

Awards and Honors

2025–2026: FRQNT award for “Personalized DL Models for Diverse Individuals”, Quebec, Canada

2022–2026: Funded 4-year scholarship to pursue PhD at ETS, Montreal, Canada

2019: Top 100, Hello Tomorrow Global Summit, Le Centquatre, Paris, France