VADIM ATLASSOV

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PUBLICATIONS

Schlattner, I., Atlassov, V., Abdrakhmanov, A., & Lee, M.-H. (2025). *Latent-Aligned Diffusion for Controllable Chest X-ray Synthesis*. IEEE Transactions on Medical Imaging. (Under Review)

- Developed a novel latent-guided diffusion framework enabling multimodal CXR synthesis: text-to-image, image-to-image, and coordinate-to-image pipelines.
- Designed a latent-to-spatial module aligned with anatomical priors, improving spatial control over pathology localization.
- Achieved second to the state-of-the-art fidelity on MIMIC-CXR: FID reduced to 59.14 (vs. 73.32 baseline).
- Enhanced anatomical realism with DICE score improvement from 0.51 to 0.60 (+18% over baseline).
- Enabled clinically grounded synthesis through CLIP-based semantic guidance and explicit anatomical conditioning.

EDUCATION

M.Sc. in Electrical & Computer Engineering
Nazarbayev University, Kazakhstan — June 2023
Specialization: Deep Learning and Computer Vision
GPA: 3.21/4.00

B.Eng. in Electrical Engineering
Brno University of Technology, Czech Republic — March 2019
GPA: 3.2/4.00

B.Eng. in Instrument Engineering
East Kazakhstan Technical University — June 2020
GPA: 3.71/4.00

TECHNICAL SKILLS

Deep Learning & Computer Vision

- Image Segmentation: U-Net, 3D segmentation
- Object Detection: YOLO v3,4 architecture
- Generative Models: Stable Diffusion, ControlNet
- Medical Imaging: X-ray synthesis, anatomical mapping
- Libraries: PyTorch, OpenCV, Torchvision

Programming & Tools

- Languages: Python, CUDA, C, Rust
- Frameworks: PyTorch, Torchxrayvision, LDM, PIL, Hugging Face
- Data Analysis: NumPy, Pandas, Matplotlib
- GPU Computing: CUDA optimization, Nvidia Nsight

Image Processing

- Noise reduction and feature extraction
- Multi-dimensional data analysis
- 3D volumetric processing
- Quantitative image analysis

Languages

- English (IELTS 7.5), Russian (Native)
- Kazakh (B2), Czech (B2), German (A1)

RESEARCH EXPERIENCE

Research Assistant — April 2025 – Present
Human-Computer Interaction Lab, Nazarbayev University
Supervised by Dr. Min-Ho Lee — Latent-Aligned Diffusion for Controllable Chest X-ray Synthesis

- Designed a latent-to-spatial conditioning module for guided CXR generation using diffusion models.
- Integrated organ and pathology masks into a masked feature pipeline for precise disease localization.
- Achieved improved image quality on MIMIC-CXR: MS-SSIM 0.510, FID 59.14, DICE 0.60.

Research Assistant July 2022 - May 2023
ALARIS Lab, Nazarbayev University
Supervised by Prof. Almas Shintemirov - Computer Vision for Robotics

- Developed CNN model for 6-DoF robot arm control in 3D space
- Implemented image-based visual servoing optimization achieving 77.3% precision with 10.2mm MAE
- Integrated feedback control system reducing movement lag and mechanical drift

PROJECTS

Inference optimization in object detection models January 2022 - June 2022

- Optimized YOLOv3/4 object detection model with parallelization of image processing and CUDA programming for efficient matrix operations
- Developed parallelized batch processing pipeline improving GPU memory efficiency by 12.44%
- Implemented custom training pipeline for enhanced detection accuracy

HONORS AND AWARDS

2023 Research Assistant, Project EMULATE **Dortmund University, Germany**

2021-2023 Graduate Students' Representative (Top 4 GPA) **Nazarbayev University**

2019 Government Academic Exchange Stipend Winner **East Kazakhstan State Technical University**

2018 Top GPA Student Award (1/1500) **East Kazakhstan State Technical University**