

Nuren Zhaksylyk

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EDUCATION

- Nazarbayev University** **Astana, Kazakhstan**
• *BSc in Computer Science; CGPA: 3.69/4.00 (Cum Laude)* *August 2019 - June 2023*
BSc Thesis: Computer Vision enabled segmentation of vessels and lesion detection on x-ray coronary angiograms
Courses: Brain Computer Interface, Machine Learning: Theory and Practice, Structural Bioinformatics, Geostatistics, Artificial Intelligence, Data Mining and Decision Support, Linear Algebra with Applications, Probability, Algorithms
- Mohamed bin Zayed University of Artificial Intelligence** **Abu Dhabi, UAE**
• *MSc in Computer Vision; ; CGPA: 3.70/4.00* *August 2023 - June 2025*
Research Interest: Multi-modal learning, Model Soups, Medical Imaging
Courses: Mathematical Foundations of Artificial Intelligence, Human and Computer Vision, Foundations of Artificial Intelligence, Visual Object Recognition and Detection, Medical Imaging: Physics and Analysis, Intermediate Music AI
- Bumblekite: Machine Learning Summer School in Healthcare & Biosciences** **Zurich, Switzerland**
• *Scholarship winner* *August 6 - August 13 2022*
Topics: clinical static, time series, engineering toolbox, imaging and multimodal data, -omics, communication skills

WORK EXPERIENCE

BioMedIA Lab, MBZUAI **Abu Dhabi, UAE**
Graduate Student Researcher *May 2023–Present*

- Exploring advanced techniques in model soups to enhance deep learning model performance in medical domain.
- Contributed to the team's participation in the SegAorta challenge (MICCAI 2023), achieving a Dice score of 88% on the validation set with a single model for aorta segmentation from 3D CT scans.
- Utilizing PyTorch for model development and wandb for logging. Skilled in creating efficient Python pipelines for training diverse models.
- Engaging in pair programming, pairing 1st-year Master's students with 2nd-year students for collaborative research paper development under Dr. Yaqub's guidance.

Ryte.ai **Astana, Kazakhstan**
Junior Data Curation Specialist (full-time) *July 2022–December 2022*

- Streamlined data curation by automating Excel file connections, reducing data search time significantly.
- Implemented an NLP model to optimize workload distribution, achieving balanced task allocation among data curators.
- Conducted detailed manual verification of physician account mappings across multiple platforms, ensuring data accuracy.

Nazarbayev university **Astana, Kazakhstan**
Research Assistant (part-time) *May 2021–December 2021*

- Executed matrix multiplication algorithms on NVIDIA GPUs, attaining 85% efficiency of the CuBLAS SGEMM standard using CUDA and NVIDIA GeForce-1050M.
- Utilized NVIDIA Visual Profiler and NSight Systems for bottleneck analysis, enhancing SGEMM algorithm performance.

Smart System Technologies **Astana, Kazakhstan**
Internship *May 2021–August 2021*

- Played a key role in developing Kazakhstan's first national product for road quality assessment using the YOLO model.
- Managed and labeled a dataset of over 100,000 road images, enhancing the model's accuracy in defect detection.
- Enhanced team collaboration and project management skills through Agile methodologies, including Scrum and Kanban.

PROJECTS

FissionFusion: Fast Geometric Generation and Hierarchical Souping for Medical Image Analysis

- Introduced faster way of generating models for souping via Cyclic learning rate scheduler.
- Found out that transfer learning from ImageNet results in rough loss surfaces in medical domain: RSNA, HAM10000, APTOS, CheXpert, EyePACs.
- Introduced Hierarchical souping approach extending idea of model soups to medical domain.
- Achieved around 6% improvement using Hierarchical souping on HAM10000 and CheXpert and better results both in-domain and out-of-distribution datasets compared to greedy model souping.
- Submitted findings to MICCAI 2024 for revision.

Real-Time Segmentation of Ultrasonic Images on Mobile Device

- Evaluated various AI models for ultrasonic image segmentation; SegResNet was identified as the best fit for mobile deployment due to its balance of accuracy and efficiency.
- Achieved high Dice scores and optimized SegResNet for real-time performance on mobile devices, demonstrating its practicality for in-field medical diagnostics.
- Trained models using BUSI, Open Kidney Ultrasound, and CT to Ultrasound datasets, focusing on kidney and breast ultrasound imaging challenges.
- Developed a PyTorch and Java-based mobile application, facilitating on-device real-time analysis of ultrasonic images.
- Advanced mobile medical diagnostics technology, enhancing healthcare accessibility in remote and resource-limited environments.

PUBLICATIONS

Dataset for Automatic Region-based Coronary Artery Disease Diagnostics Using X-Ray Angiography Images

- Developed the ARCADE dataset, a comprehensive collection of X-ray angiography images for coronary artery disease diagnostics.
- Annotated 1500 images for coronary vessel tree classification and another 1500 for stenosis detection, using expert medical input for accuracy.
- Implemented machine learning models for semantic segmentation and vessel detection, enhancing automated CAD diagnosis.
- Contributed to a crucial area of medical research, providing a significant resource for the medical and scientific community.
- Published in Nature Scientific Data, detailing the dataset development and its potential impact.

SKILLS & INTERESTS

- Programming Languages: Python, Java
- Machine Learning Libraries: PyTorch, TensorFlow

ACTIVITIES

- **Computer Vision Team Lead in Google Developers Student Club at Nazarbayev University:** organisation of Compose Camp, ML Fest, speaker sessions with experts
- **Volunteer and Scholarship owner from charity fund Mereke:** assistance in transporting coal to low-income families as part of the Give Warmth campaign

HONORS & ACHIEVEMENTS

- **1st place in HackNU 2023.** Huawei and EGov track: Online service for delivery of documents. Implemented facial recognition for verification.
- **Dean's List** for Academic Outstanding in Spring 2020, Fall 2020, Spring 2021
- Accepted to **Bumblekite: Machine Learning Summer School in Healthcare & Biosciences** that was held between 6-13 August, 2022 at ETH Zurich
- Winner of **Scholarship** for the 2022-2023 academic year from **charity fund Mereke** for high academic performance
- Chosen as representative of Computer Science department for the **AUA Youth Forum 2020** from Nazarbayev University