Sukhrobbek Ilyosbekov

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RESEARCH INTERESTS

Computer Vision, Deep Learning, Medical Image Analysis, Explainable AI, Object Detection and Segmentation

EDUCATION

Northeastern University, Boston, MA **January 2024 – May 2026**

- Master of Science in Computer Science; GPA: 4.0/4.0
- Relevant Coursework: CS 7180 Advanced Perception, Machine Learning, Computer Vision

Suffolk University, Boston, MA **September 2021 – May 2023**

- Bachelor of Science in Computer Science; Cum Laude; GPA: 3.5/4.0

INTI International College Subang, Malaysia **September 2019 – July 2021**

- Bachelor of Science in Computer Science (Transfer Program)

Tashkent University of Information Technologies, Uzbekistan **September 2017 – June 2019**

- Bachelor of Science in Software Engineering

AWARDS & HONORS

- **National Physics Olympiad, 1st Place**, Uzbekistan - First student from my high school to win at national level
- **University Coding Competition Winner**, Tashkent University of Information Technologies
- **Outstanding Project Award**, Bookshelf Scanner - Computer Vision Course, Northeastern University

TECHNICAL SKILLS

- **Deep Learning & Computer Vision:** PyTorch, TensorFlow/Keras, OpenCV, YOLO, EfficientNet, ResNet, U-Net, GradCAM++, CNNs, Vision Transformers, Image Classification, Object Detection, Depth Estimation, Super-Resolution, Explainable AI
- **Machine Learning:** Supervised/Unsupervised Learning, Transfer Learning, XGBoost, K-means Clustering, Model Evaluation, Hyperparameter Tuning, NLP
- **Programming Languages:** Python, C#, C++, Java, TypeScript, JavaScript, PHP, Kotlin
- **Infrastructure & DevOps:** Docker, Kubernetes, AWS, Azure
- **Frameworks & Tools:** .NET, Entity Framework, MAUI, Blazor, SignalR, Socket.IO, Prisma, NestJS, ElysiaJS, Next.js, Angular, Avalonia, React Native, FastAPI, RabbitMQ, MassTransit, PostgreSQL, CUDA, Unity, Godot

RESEARCH PROJECTS

MelanomaNet: Explainable Deep Learning for Multi-Class Skin Lesion Classification

Repository: https://github.com/suxrobgm/explainable-melanoma

- Developed an explainable deep learning system for multi-class skin lesion classification across all 9 ISIC 2019 diagnostic categories using EfficientNet V2 backbone with high-resolution (384×384) input for maximum detail preservation.
- Implemented GradCAM++ attention visualization for model explainability and developed novel ABCDE criterion analysis with automated feature extraction (Asymmetry quantification, Border irregularity measurement, Color variation via K-means clustering, Diameter calculation).
- Designed GradCAM-ABCDE alignment metrics to validate model attention correlation with clinical dermatological features, producing comprehensive clinical interpretability reports.
- **Stack:** Python, PyTorch, EfficientNet V2, GradCAM++, OpenCV, K-means Clustering, Focal Loss, ISIC 2019 Dataset

LightDepth: Lightweight Monocular Depth Estimation

Repository: https://github.com/suxrobgm/lightdepth

- Designed a lightweight monocular depth estimation model using ResNet18 encoder with U-Net style decoder and skip connections, achieving competitive performance with 42% fewer parameters (14.3M vs 24.8M) than Depth Anything V2.
- Achieved 72% faster inference time while outperforming on relative error metrics (5.3% better AbsRel, 31.1% better SqRel) on NYU Depth V2 benchmark.
- **Stack:** Python, PyTorch, ResNet18, U-Net Architecture, L1 Loss, NYU Depth V2 Dataset

FSRCNN: Accelerating Super-Resolution Convolutional Neural Network

Repository: https://github.com/suxrobgm/fsrcnn

- Implemented the FSRCNN architecture for single image super-resolution based on Dong et al. (ECCV 2016), achieving 40× speedup over SRCNN with end-to-end learned upsampling filters supporting 2×, 3×, and 4× scaling factors.
- Evaluated on Set5 (+1.78 dB PSNR, +0.0507 SSIM over bicubic) and Set14 (+1.26 dB PSNR, +0.0477 SSIM) benchmarks with comprehensive ablation studies.
- **Stack:** Python, PyTorch, Mixed Precision Training (AMP), T91/Set5/Set14/DIV2K Datasets

Bookshelf Scanner: Multi-Modal Book Detection and Recognition
Repository: https://github.com/suxrobgm/bookshelf-scanner

- Developed an end-to-end pipeline for book detection from bookshelf images using YOLO segmentation for instance detection and Moondream2 vision-language model for title/author extraction.
- Integrated cutting-edge computer vision (object segmentation) with Large Language Models (LLMs) for multi-modal understanding and text recognition.
- **Stack:** Python, YOLO, Moondream2 LLM, Llama CPP, PyTorch, FastAPI, Angular

AoE4 Matchmaking: ML-Assisted Player Matching System
Repository: https://github.com/suxrobgm/aoe4-matchmaking

- Designed a machine learning-assisted matchmaking system combining unsupervised player clustering, XGBoost predictive outcome model, and traditional ELO rating system for balanced competitive matches.
- Applied feature engineering on player statistics and implemented ensemble methods to predict match outcomes and optimize player pairing.
- **Stack:** Python, XGBoost, K-means Clustering, Pandas, NumPy, FastAPI, Angular

WORK EXPERIENCE

Full Stack Developer | EmTech Care Labs | Portland, ME **January 2025 – June 2025**

- Built a HIPAA-compliant healthcare platform enabling collaborative care planning for patients with Alzheimer's disease, implementing real-time messaging and notification systems.
- Led architectural migration from AWS Amplify Gen 1 to Gen 2, reducing build times and modernizing the backend; integrated mono-repository approach for improved maintainability.

Freelance Full Stack Developer | Upwork **July 2022 – Present**

- **Medical AI Research:** Designed healthcare application scanning medical images using deep learning models (PyTorch, OpenCV) for disease detection; deployed on Azure Kubernetes Service with HIPAA compliance.
- Developed large-scale MMO game "Chestnut" with server-side physics engine, real-time synchronization, and Web3 integration demonstrating distributed systems expertise.

.NET Software Engineer | Virtuworks | Miami, FL **December 2022 – December 2023**

- Led migration of legacy ASP.NET Web Forms to Blazor WebAssembly framework, improving application performance; developed responsive UI components and optimized server applications.

.NET Software Engineer | Frost Pixel Studio | Russia **October 2021 – May 2022**

- Enhanced web application performance by 30% using efficient caching strategies; designed knowledge management platform using Node.js, TypeScript, Dgraph, and React.

.NET Software Engineer | Smart Meal Service | Russia **September 2020 – October 2021**

- Developed robotic cashier application and self-service kiosk integrated with POS systems using computer vision for product recognition; contributed to full SDLC across multiple projects.

Game Developer | Pentalight Technology | Malaysia **March 2020 – February 2021**

- Developed multiplayer functionality for smart city VR project on Unity; integrated UI/HUDs for VR platform using MLAPI and SteamVR with real-time networking.

PERSONAL SOFTWARE PROJECTS

- **Med Image Scanner:** HIPAA-compliant platform connecting to hospital PACS via DICOM for AI-powered analysis on medical imaging studies (PyTorch, OpenCV, OHIF Viewer).
  https://github.com/suxrobgm/med-image-scanner
- **Logistics TMS:** Enterprise-scale multi-tenant SaaS fleet management system with real-time tracking, SignalR messaging, and mobile driver app.
  https://github.com/suxrobgm/logistics-app
- **ChessMate:** Online chess platform with PvP and AI opponents, rated/unrated matches using Spring Boot backend and Angular frontend.
  https://github.com/suxrobgm/online-chess
- **Blazor Form Builder:** Drag-and-drop form builder library for Blazor applications with JSON schema generation.
  https://github.com/suxrobgm/blazor-form-builder