Mehmet Aytuğ Yürük

Undergraduate Researcher in Computer Vision & Medical Imaging
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Education

B.Sc. in Artificial Intelligence & Data Engineering | GPA: 3.79 / 4.00 2024 – 2028 (Expected)
Istanbul University *Istanbul, Turkey*

High School Diploma 2020 – 2024
Sakarya Science High School *Sakarya, Turkey*

Research Experience

Undergraduate Researcher 2025 – Present
Istanbul University *Istanbul, Turkey*

- Fine-tuned and evaluated five ResNet and four Vision Transformer architectures across two retinal age-estimation studies on 9,857 images, using ImageNet-pretrained models and consistent patient-disjoint data splits while investigating Graham filtering as a retinal preprocessing strategy; achieved a best test MAE of 4.86 years with ViT-L/16.
- Explored alternative color-space representations for retinal age prediction through single-model experiments, a 12-channel fusion architecture, and matched ensemble comparisons; the color-space ensemble reduced MAE by 3.06% over its RGB counterpart, supported by 100,000 patient-cluster paired bootstrap resamples.
- Evaluated BCE, Asymmetric Loss, and hybrid objectives for long-tailed multi-label concept recognition on ROCOv2 (79,789 radiology images, 1,947 UMLS concepts); ASL improved the EfficientNet-B0 score from 0.5809 to 0.5882, with the best configuration reaching 0.5916 using EfficientNet-B4.

Publications & Manuscripts

- **M. A. Yürük**, A. Memiş. "Decoding Chronological Age from the Retinal Fundus Images: A Deep Learning-based Analysis with Vision Transformers." *34th Signal Processing and Communications Applications Conference (SIU), 2026*. IEEE. **Published**.
- **M. A. Yürük**, A. Memiş. "Age Prediction and Categorization from Retinal Fundus Images Using Residual Neural Networks." *5th International Informatics and Software Engineering Conference (IISEC), 2026*. IEEE. **Published**.
- **M. A. Yürük**, A. Memiş. "Multi-Label Medical Concept Recognition using Asymmetric Loss-Driven EfficientNet: Analyzing the Detection of Rare Concepts Under Long-Tailed Imbalance." *MEDICON 2026*. **Accepted**.
- **M. A. Yürük**, A. Memiş. "Exploring the Impact of Alternative Color Spaces in Deep Retinal Age Prediction from Fundus Images." *Submitted to ATEEC 2026*. **Under Review**.
- F. Ç. Eraslan, K. E. Eslemez, **M. A. Yürük**, et al. "Calibration and Selective-Risk Reliability of Tabular Models under Controlled Feature Shift." *UBMK 2026*. **Accepted**.

Selected Projects

BiyoVes – Python Library & Desktop Application

- Developed and released an open-source Python library for automated biometric photo generation, integrating SCRFD-based face detection, landmark-based alignment, MODNet foreground segmentation, and standards-compliant cropping for passport and visa photo formats.
- Built a desktop application on top of the library that enables users to upload a photo, select the target document format and print layout, and automatically generate ready-to-use biometric photo sheets.

Technical Skills

Python, PyTorch, OpenCV, Git, GitHub

Awards & Competitions

TEKNOFEST 2242 University Students Research Project Competition 2025
Finalist

TÜBİTAK 2204-D Climate Change Research Projects Competition 2022, 2023
Two-time Finalist