Bahar Aydemir

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Computer Vision and Machine Learning: PhD specializing in computer vision, machine learning, and generative AI with applications in visual saliency prediction.

Technical and Research Expertise: 5+ years of experience with Python, PyTorch, and C++, along with proficiency in statistical analysis and mathematical foundations. Track record of leading and collaborating on research projects, translating into multiple publications in top-tier venues.

Combining academic excellence with hands-on research and project management, I am well-prepared for roles as an applied/research scientist or research engineer. I possess a strong analytical background, a passion for innovation, and a commitment to advancing AI techniques to solve complex problems.

Skills

Theory: Computer Vision, Machine Learning, Generative AI, Transfer Learning, Deep Learning Model Architectures (CNN, RNN, GAN, VAE), Transformers, Diffusion Models, Image Processing, Image Manipulation, Feature Extraction, Linear Algebra, Probability and Statistics

Programming Languages: Python, C, C++, LaTeX, Java, SQL

Software Packages: PyTorch, OpenCV, scikit-learn, pandas, NumPy, SciPy, Jupyter, Seaborn

Deployment/Version Control: Conda, Docker, git, Kubernetes, Amazon Web Services (AWS)

Education

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland *September 2018 – July 2024*
PhD in Computer and Communication Sciences
Thesis: Visual Saliency Prediction for Natural Images, Comics Panels, and Comics Pages

Middle East Technical University (METU), Ankara, Turkey *2013 - 2018*
Bachelor of Science in Computer Engineering, CGPA: 3.92 (Ranked 3rd out of 130)

Izmir Science High School, İzmir, Turkey *2009 - 2013*
GPA: 93.15 / 100

Experience

AI/ML Specialist @ TelescopeAI *September 2024 - Present*

- Migrated PyTorch models to TensorFlow using ONNX, ensuring compatibility and performance across diverse hardware environments.
- Collaborated with Intel to optimize and validate model performance for human attention prediction.

Research Assistant @ EPFL, Image and Visual Representation Lab *September 2019 - July 2024*

- Developed a data augmentation technique for saliency prediction that preserves the complexity and variability of real-world scenes using latent diffusion, consistently improving SoTA modxels.
- Incorporated temporal data into image saliency prediction, allowing models to analyze static images while also understanding how attention evolves over time, outperforming SoTA models.
- Modeled the appearance and size dissimilarities of objects in a scene to reason about the differences between regions for saliency prediction, consistently improving baseline models.

Project Supervisor & Teaching Assistant @ EPFL *September 2019 - July 2024*

- Proposed and supervised semester and thesis projects for undergraduate and graduate students, including eye tracking for saliency estimation in comics and 360-degree scenes, face detection in comics, temporal saliency estimation, data augmentation for saliency estimation, and exploring color and attributes in CLIP latent space.

- Proposed and supervised projects for the Computational Photography class, including image-to-image style transfer and emotion-based image enhancement.
- Conducted exercise sessions for Introduction to Computation and Communication, Object Oriented Programming, and Linear Algebra classes.

Algorithmic Trading Project @ METU *September 2017 - July 2018*

- As a team of five, developed a web-based framework to design, test, and optimize trading algorithms. Provided an easily accessible, user-friendly, and simple-to-use interface. I built the data acquisition structure and implemented various financial indicators and operators.

Internship @ CERN *June 2017 - September 2017*

- Created Python bindings for the C++ Data Access Library (DAL) algorithms, enabling DAL users to access the ATLAS detector's data acquisition system for C++, Java, and Python clients in a distributed environment.

Internship @ Turkish Aerospace Industries (TAI) *June 2016 – August 2016*

- Implemented an auto-generated user interface in Groovy that connects scripts from mission control, planning, and ground software groups, enabling easy testing, integration, and demonstrations.

Publications

- **Workshop Organizer & Challenge Chair**: AI for Visual Arts Workshop and Challenges (AI4VA), in conjunction with *The European Conference on Computer Vision (ECCV)*, 2024.
- **Data Augmentation via Latent Diffusion for Deep Saliency Prediction**, B Aydemir, D Bhattacharjee, T Zhang, M Salzmann, S Süsstrunk, *The European Conference on Computer Vision (ECCV)*, 2024.
- **Unlocking Comics: The AI4VA Dataset for Visual Understanding**, P Grönquist, D Bhattacharjee, B Aydemir, B Ozaydin, T Zhang, M Salzmann, S Susstrunk, *Proceedings of the European Conference on Computer Vision (ECCV) Workshops*, 2024.
- **Saliency Prediction In 360° Architectural Scenes: Performance and Impact of Daylight Variations**, C Karmann, B Aydemir, K Chamilothori, S Kim, S Süsstrunk, M Andersen, *Journal of Environmental Psychology*, 2023.
- **TempSAL - Uncovering Temporal Information for Deep Saliency Prediction**, B Aydemir, L Hoffstetter, T Zhang, M Salzmann, S Süsstrunk, *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023.
- **Beyond The Shadow Of Z: Non-Linear Reading and Experimental Approaches to Comics**, B Aydemir, R Baroni, *Comicalités*, 2022.
- **Modeling Object Dissimilarity for Deep Saliency Prediction**, B Aydemir, D Bhattacharjee, S Kim,T Zhang, M Salzmann, S Süsstrunk, *Transactions on Machine Learning Research(TMLR)*, 2022.
- **Virtual Reality to Assess Visual Attraction and Perceived Interest to Daylit Scene Variations**, C Karmann, K Chamilothori, S Schoenmakers, B Aydemir, M Andersen, *Academy of Neuroscience for Architecture (ANFA)*, 2021.

Achievements

EPFL IC Doctoral School Fellowship	*Lausanne, Switzerland, 2018*
METU Computer Engineering Final Projects	*Third place, Ankara, Turkey, 2018*
Dean's High Honor List	*METU, All semesters, 2014 – 2018*
Acıbadem University Project Competition,	*First Place, İstanbul, Turkey, 2013*
State University of New York Genius Olympiad	*Silver Medal, NY, USA, 2012*
İzmir Economy University Science and Engineering Projects	*Second place, İzmir, Turkey, 2012*

Languages & Hobbies

English-Fluent, French-Beginner, Turkish-Native
Drawing, Painting, Nature Photography, Sculpting, Pattern and Character Design, Generative AI