Tuna Han Salih Meral

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Summary

Highly accomplished and innovative Machine Learning Engineer with a strong background in Computer Science and Computer Engineering. Possesses a proven track record of developing machine learning solutions, and leading successful research and development projects.

Education

Virginia Tech, Blacksburg, VA — ***Ph.D. in Computer Science*** Aug 2023 - May 2027
Boğaziçi University, Istanbul, Turkey — ***M.S. in Computer Engineering*** Sep 2018 - Jan 2022
Boğaziçi University, Istanbul, Turkey — ***B.S. in Computer Engineering*** Sep 2012 - Jun 2017

Experience

Virginia Tech — ***Research Assistant in Generative AI*** Aug 2023 - Current

- Leading the research efforts on text-to-image generation.
- Contributed to the development and publication of methods enhancing the text-image fidelity of diffusion-based text-to-image models.
- Collaborated with Google to implement research findings in closed-source diffusion-based image generation models, resulting in a substantial improvement in image fidelity.

Lyrebird Studio — ***Machine Learning Engineer*** Nov 2022 - Aug 2023

- Developed and maintained image-based generative machine learning services, handling 5 million daily requests.
- Architected robust machine learning CI/CD pipelines using **GitHub Actions** and utilized **AWS CDK** for building architecture as code, enabling seamless deployment of research team outputs as production-ready services.
- Developed golden AMIs for GPU-accelerated instances using Packer, resulting in a remarkable reduction in boot-up time from tens of minutes to a few seconds, ensuring faster scale-up to meet high-volume demands.
- Led the design and deployment of diffusion-based model training and image generation services, effectively handling thousands of daily requests on **GPU-accelerated** instances with high performance and stability.
- Integrated deep learning-based generative solutions into existing applications, significantly enhancing their capabilities and user experience.

Vispera — ***Machine Learning Engineer*** Aug 2021 - Nov 2022

- Spearheaded the automation of deep learning model training using **Python** and **TypeScript**, resulting in a tenfold increase in daily model deployments, significantly reducing development time and costs.
- Launched a user-friendly **VueJS** front-end service empowering researchers to train and deploy new models by providing real-time monitoring of online and offline metrics, enhancing model observability and researchers' productivity.
- Successfully coordinated the transition of the deep learning stack to **TensorFlow 2**, streamlining the adoption of state-of-the-art deep learning models for production, leading to improved performance and maintainability.
- Worked as a full-stack machine learning engineer, using **VueJS** in frontend services; **Python** in machine learning services; **TypeScript**, **NodeJS**, **Go**, **PostgreSQL**, and **MongoDB** in backend services.

Vispera — ***Computer Vision Research Engineer*** Oct 2019 - Aug 2021

- Led research and development for deep learning image recognition models, utilizing **Python**, **TensorFlow**, and **OpenCV**, to solve challenging problems related to out-of-distribution recognition and hierarchical classification.
- Successfully implemented state-of-the-art deep learning image recognition models, achieving exceptional classification accuracy above 95% on online measurements, ensuring the delivery of high-performance solutions to meet business requirements.
- Pioneered the formulation and implementation of a novel zero-shot learning-based image recognition model using **PyTorch**, which significantly reduced image annotation time by four times. This innovative approach recommends best matches without annotated data, optimizing the model development process.

Idea Technology Solutions — ***Computer Vision Research Engineer*** Aug 2017 - Oct 2019

- Introduced a novel tree-based deep learning architecture and method based on sparse execution of neural networks using **Python**, **TensorFlow**, and **TensorFlow Lite**.
- Proposed a k-centroids-based clustering algorithm to determine better anchor boxes for object detection models, increasing the model's object detection performance by approximately 15%.

Publications

- Meral, T. H. S., Simsar, E., Tombari, F., & Yanardag, P. (2023). CONFORM: Contrast is All You Need For High-Fidelity Text-to-Image Diffusion Models. arXiv preprint arXiv:2312.06059. **In review for CVPR 2024**
- Biçici, U. C., Meral, T. H. S., & Akarun, L. (2023). Conditional Information Gain Trellis. **In review for Pattern Recognition Letters**
- Meral, T. H. S. (2022). Unsupervised Routing Strategies for Conditional Deep Neural Networks. MSc Thesis. Boğaziçi University.
- Meral, T. H. S., Köse, F., Özcan, I., Dal, M., Yıldırım, M., Türksoy, K., Zaman, K., & Öncü, S. (2020). BURST: Software and Simulation Solutions of an Autonomous Vehicle. In 2020 28th Signal Processing and Communications Applications Conference (SIU) (pp. 1-4). IEEE.
- Kokciyan, N., Erdogan, M., Meral, T. H. S., & Yolum, P. (2018). Privacy-Preserving Intersection Management for Autonomous Vehicles. In Proceedings of the Tenth International Workshop on Agents in Traffic and Transportation (ATT 2018) (pp. 49-56).

Honors & Awards

Teknofest Autonomous Vehicle Competition - The Most Original Software Prize	Winner - 2021
Anadolu Sigorta Datathon Challenge	Runner-up - 2020
Teknofest Autonomous Vehicle Competition	Finalist - 2020
Teknofest Autonomous Vehicle Competition - *Simulation*	Winner - 2020
Teknofest Autonomous Vehicle Competition	Finalist - 2019
Teknofest Autonomous Vehicle Competition - *Simulation*	Winner - 2019
Mercedes-Benz Hackathon	Winner - 2018
BSH Analytics for Production Excellence Hackathon	Winner - 2017
Boğaziçi University Computer Engineering Senior Projects Competition	Runner-up - 2017
TUBITAK Undergraduate Software Project Competition	Finalist - 2016

Workshops & Research

inzva - METU ImageLab AI Labs Joint Program — ***Guide*** June 2021

- Conducted lectures for the review of probability, statistics, and graphical models for the Deep Generative Models course, organized in collaboration with Prof. Gökberk Cinbiş from METU.

Boğaziçi University Autonomous Vehicle Team — ***Head of Autonomous Team*** Jul 2018 - Dec 2020

- Founded a team and laboratory for building an electric autonomous vehicle, creating autonomous driving research and development opportunities at Boğaziçi University.
- Developed a simulation environment using Gazebo, ROS, C++, and Python to simulate competition scenes, achieving the highest scores for two consecutive years in TeknoFest National Autonomous Vehicle Competition.

Coursework

- Embodied AI
- Learning-based Computer Vision
- How to Generate (Almost) Anything
- Autonomous Robots
- Cognitive Science
- Computer Vision
- Natural Language Processing