Farrin Marouf Sofian

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Education

University of California, Irvine — Irvine, CA
PhD. Computer Science — *9/2025 – 6/2029*
- Supported by Chan-Zuckerberg Initiative

University of California, Irvine — Irvine, CA
M.S. Computer Science — *9/2023 – 3/2025*
- Machine Learning, Deep Generative AI, Game Theory, Probabilistic Models

Publications

Variational Control for Guidance in Diffusion Models
K. Pandey, **FM. Sofian***, F. Draxler, T. Karaletsos, S. Mandt*
Preprint - Under Review (2025)
https://arxiv.org/pdf/2502.03686

SonicDiffusion: Audio-Driven Image Generation and Editing with Pretrained Diffusion Models
*BC. Biner, **FM. Sofian**, UB. Karakaş, D. Ceylan, E. Erdem, et al.*
ACM Transactions on Graphics (TOG) (2024)
https://arxiv.org/abs/2405.00878

GECTurk: Grammatical Error Correction and Detection Dataset for Turkish
*A. Kara, **FM. Sofian**, A. Bond, G. G. Sahin*
IJCNLP-AACL (2023)
https://arxiv.org/abs/2309.11346

* Denotes equal contribution.

Work & Research Experience

Graduate Researcher at Mandt Lab — 2/2024 – Present
University of California, Irvine — *Irvine, California*
- Working on guidance in diffusion models using optimal control and RL for inverse problems.

Machine Learning Engineer Intern — 06/2024 – 09/2024
Adobe — *San Jose, California*
- Developed and optimized a RAG pipeline for the AI assistant in Adobe Acrobat.
- Reduced input token costs by up to 73 cents per question across various datasets, significantly improving cost efficiency.
- Made the pipeline 9x faster compared to the previous version.
- Worked with SOTA RAG techniques and diverse PDF structures.

Research Assistant at Computer Vision Lab — 9/2021 – 12/2023
Koç University & İş Bank Artificial Intelligence Center — *Istanbul, Turkey*
- Conducted research in Turkey's most competitive AI lab. Worked on sound-guided image manipulation and generation as well as audio identification and re-synthesis projects.
- Leveraged Stable Diffusion while designing and implementing various adapter architectures for efficient audio conditioning.
- Tested multiple image inversion techniques to identify the method that best preserves image identity while facilitating editing.

- Conducted experiments and fine-tuned the framework with audio encoding models including AudioCLIP and CLAP, to assess their performance as audio encoders in the proposed framework.
- Conducted under the supervision of Dr. Duygu Ceylan and Prof. Aykut Erdem.

Research Assistant at NLP Lab 10/2022 – 7/2023
KUIS AI lab *Istanbul, Turkey*

- Created the first high-quality dataset of 130k parallel sentences in Turkish with 25 expert curated writing rules for grammatical error schema.
- Implemented and fine-tuned NMT baseline and sequence tagger model for grammatical error correction and detection.
- Worked with High Performance Computing (HPC) clusters and contributed on writing a detailed documentation on how to use HPC clusters for graduate students and companies.
- Published in IJCNLP-AACL 2023.

Machine Learning Engineer Intern 6/2022 – 9/2022
RadiusAI *Tempe, Arizona*

- Researched and proposed deep learning-based solutions for camera calibration, tailored to the company-specific scene geometry.
- Evaluated the effectiveness of deep learning as well as other traditional methods to solve the problem.
- Optimized the computation of a semantic segmentation scores matrix by nearly 50%, utilizing dynamic programming in the pre-processing step.
- Created the company's first fully automated camera calibration, reducing the company's reliance on expensive annotators.

Projects

Birds of Istanbul App 5/2021 — 7/2022

- Led a group of 4 students and collaborated with a psychology department to create Turkey's first audio-based bird identification mobile application.
- Curated a dataset of 355k bird songs local to Turkey and pre-processed the audio using various models such as Sound Separation proposed by Google.
- Examined several self-supervised transformer-based audio models and fine-tuned them on the dataset.

Audio Re-synthesis and Conversion 1/2022 – 4/2022

- Performed extensive literature study to identify the best suitable model for converting voice of a species into another one.
- Fine-tuned 3 pre-trained encoders, utilizing VQ-VAE and HiFi-GAN as the content encoder and vocoder respectively, on a custom dataset.
- Trained and extracted species' sound embeddings from transformer-based audio encoder model.

Wallpaper Recommender 10/2022 – 12/2022

- Developed a Deep Learning framework to find and recommend similar wallpapers based on image similarity.
- Experimented with unsupervised learning approaches to represent images, (e.g SimCLR and SwAV).
- Generated similar new wallpapers using diffusion models and created a demo website for the project.