Antonios Tragoudaras

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Education

University of Amsterdam (UvA)	*Amsterdam, Netherlands*
MSc in Artificial Intelligence (Informatics Institute)	Aug. 2023 - Present
GPA: 8.31/10 (Finished First year) - In track to graduate with cum-laude (highest distinction).	
King Abdullah University of Science and Technology (KAUST)	*Jeddah, Saudi Arabia*
Ph.D. Student in Electrical and Computer Engineering	Aug. 2022 - Aug. 2023 (Dropped out)
GPA: N/A, 24 Credits - Doctoral Dissertation Research.	
University of Thessaly	*Volos, Greece*
BEng in Electrical & Computer Engineering (5-years studies; 300ECTS)	Sep. 2016 - Nov. 2021
GPA: 7.88/10, Thesis Grade: 10/10, Supervisor: Prof. George Stamoulis.	

Research Experience

Generative AI , Learning Physics from Videos   *University of Amsterdam (UvA)*

Research Project led by Associate Professor Efstratios Gavves to create a new real-world dataset, and test the capabilities of text/&image-to-video models (namely world-models) like OpenAI-SORA. Starting from January 2025, I am planning to extend this research project to conduct my MSc AI thesis, and hopefully lead to a high-quality publication in a renowned AI venue (NeurIPS, ICML, etc.).   *Jul.2024-Present*

Duties/Tasks + Goal:
- Discovering the limitations of SOTA video-generation models.
- Optimizing SOTA generative models capabilities in understanding physics.
- Developing a pipeline for Tracking, and Segmentation (based on DEVA, Grounded SAM) and extending for Depth Estimation to be used on videos generated by world models.
- Goals:
  - Contributing on Open-Sora-Plan.
  - Conduct my MSc AI thesis in the ELLIS Amsterdam MSc Honours Programme.

Visual Perception for Autonomous Vehicles - Brightskies Inc.   *External Collaboration*

Remote Collaboration, monitored by Mahmoud Serour (Autonomous Driving Team Lead) and Mohamed Ezzat (Perception Engineer). Collaboration Initiated by Research Scientist Hakim Ghazzai (AI Team Lead of our research group).   *Mar.2023-Jun.2023*

Duties/Tasks:
- Main Ph.D. Research Topic: Improving Multi-Task Perception Performance through learning better intermediate representations with the fusion of different sensor modalities (LiDAR, Camera, Radar)

Neural Architecture Search, Meta-Heuristic Optimization, Transformers for brain signal decoding   *King Abdullah University of Science and Technology (KAUST)*

Ph.D. Student, supervised by Postdoc Fellow Charalampos Antoniadis   Sep. 2022 - Feb.2023

Journal Publications:
- Enhancing DNN models for EEG/ECoG BCI with a Novel Data-Driven Offline Optimization Method (IEEE Access)

Paper Publications:
- Data-Driven Offline Optimization of Deep CNN Models for EEG and ECoG Decoding (ISCAS'23)

AutoML, Efficient Deep Learning Techniques, and Voice Activity Detection   *Visiting Student Research Program-KAUST*

Visiting Student Research Intern, mentored by Postdoc Fellow Charalampos Antoniadis   Feb. 2022 - Jul. 2022

Paper Publications:
- TinyML for EEG Decoding on Microcontrollers (ISCAS'23)
- Audio-visual Speaker Diarization: Improved Voice Activity Detection with CNN based Feature Extraction (MWSCAS'22)

Accelerating Inference of Deep Neural Networks on FPGAs   *University of Thessaly*

Undergraduate Researcher, mentored by Prof. George Stamoulis and Postdoc Fellow George Floros   Jul. 2021 - Jan. 2022

Journal Publication:

- Design Space Exploration of a Sparse MobileNetV2 Using High-Level Synthesis and Sparse Matrix Techniques on FPGAs (MDPI Sensors'22)

Projects & Skills

PyTorch/Python

- Efficient Language to Vision Alignment allowing VLMs to excel in VQA tasks > ⬤
- Examining Racial and Gender Biases in Large Language Models Through the Lens of Emotional Analysis > ⬤
- Fundamental Generative Models (Varional Autoncoders, Adversarial AE) for Image Generation ⬤
- Visual prompting for in-context learning with CLIP > ⬤ (private repo)
- Developed a hydra DL network with multiple heads (proprietary) to tackle the challenges in autonomous vehicle perception, leveraging the power of multi-task learning > ⬤
  Each head of the hydra network corresponds to a different downstream computer vision task
  BEVFusion is used as backbone (Multi-Task Multi-Sensor Fusion with Unified Bird's-Eye View Representation)
- Implemented a small-scale, Transformer-based model (OpenAI's GPT2) for text generation tasks, using pre-trained weights > ⬤ (private repo)
- Multi-Layer Perceptron trained with back-propagation from scratch using (Numpy) & torch > ⬤ (private-repo)

Tensorflow/Python

- Transformer-based Deep Learning Architecture trained in a data-driven offline fashion along with a meta-heuristic implementation > ⬤
- Extended the capabilities of uNAS (an Auto-TinyML framework) > ⬤

C/C++

- Main program language taught during undergraduate courses, used for personal and course projects mainly
- Coded C++ kernel/function implementing Depth-wise and Point-wise Convolutions, that was utilized during High-Level Synthesis tool (Xilinx Vitis HLS)

Publications

Full list is available at Google Scholar

[1] **Antonios Tragoudaras**, Charalampos Antoniadis, Yehia Masoud. "Enhancing DNN models for EEG/ECoG BCI with a Novel Data-Driven Offline Optimization Method," in *IEEE Access, vol. 11, pp. 35888-35900, 2023*, doi: 10.1109/ACCESS.2023.3265040

[2] **Antonios Tragoudaras**, Charalampos Antoniadis, Yehia Masoud. "TinyML for EEG Decoding on Microcontrollers," in *2023 IEEE 56th International Symposium on Circuits and Systems (ISCAS)]*

[3] **Antonios Tragoudaras**, Pavlos Stoikos, Konstantinos Fanaras, Athanasios Tziouvaras, George Floros, Georgios Dimitriou, Kostas Kolomvatsos, Georgios Stamoulis. "Design Space Exploration of a Sparse MobileNetV2 Using High-Level Synthesis and Sparse Matrix Techniques on FPGAs," in *MDPI Sensors 22, no. 12: 4318]*, doi:10.3390/s22124318

[4] Konstantinos Fanaras, **Antonios Tragoudaras**, Charalampos Antoniadis, Yehia Masoud. "Audio-visual Speaker Diarization: Improved Voice Activity Detection with CNN based Feature Extraction," in *2022 IEEE 65th International Midwest Symposium on Circuits and Systems (MWSCAS), Fukuoka, Japan, 2022, pp. 1-4*, doi: 10.1109/MWSCAS54063.2022.9859533

Awards and Honors

Aug. 2022- Aug. 2023   **KAUST Graduate Fellowship**: Full tuition support, living allowance, housing, and medical coverage.   *KAUST*

Teaching Experrience

Graduate Teaching Assistant at UvA's MSc AI Program   *UvA, Amsterdam, Netherlands*

Assisted in teaching graduate-level (first-year) courses by making sure students understood the material, answering their questions, creating assignments, giving feedback, and grading exams.   Aug. 2024 - Present

Courses:

- Computer Vision 1 (MSc AI)
- Deep Learning 1 (MSc AI)
- Fairness, Accountability, Confidentiality & Transparency in AI (MSc AI)