Aristotelis Styanidis

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Dedicated and results-oriented electrical and computer engineer with one year of specialized experience as a research assistant in machine and deep learning. Demonstrated expertise in developing and implementing machine learning models. Committed to fostering close collaboration with fellow engineers, emphasizing a quality-centric, end-to-end approach across projects in diverse sectors. My main research interests are computer vision, signal processing, and natural language processing, with a strong focus on practical applications through machine and deep learning.

Research Experience

Machine Learning Engineer - Research Assistant Apr 2023 - Present
Information Technologies Institute, Centre for Research & Technology Hellas Thessaloniki, Greece

- 3D model reconstruction from video input using Structure from Motion
- Underwater image enhancement using generative AI models
- Vibration and acoustic anomaly detection using autoencoders
- Q&A information extraction and trending topic detection using LLMs

Machine Learning Engineer - Research Assistant Jan 2023 - Apr 2023
iSense Group, ICCS, NTUA Athens, Greece

- Explored the capabilities and limitations of high-dimensional hyperspectral images, in conjunction with a Cyber-Physical Sorting System, for effectively categorizing urban waste.
- Built and trained object detection models, such as YOLO, to achieve intelligent urban waste classification.
- Integrated solutions to more complex products in collaboration with Robotic Engineers, Material Scientists, and Product/Business constraints.

Education

KU Leuven Oct 2021 - Feb 2023
Advanced MSc in Artificial Intelligence Leuven, Belgium

- Grade: 70.45 %, Cum Laude - Distinction
- Track: Engineering and Computer Science
- Dissertation: "Automatic Segmentation of Glomerular Substructures in Kidney Biopsy Electron Microscopy Images using Deep Learning Techniques", Advisors: Prof. Maarten De Vos, Prof. dr. Amélie Dendooven

Aristotle University of Thessaloniki Sep 2013 - Apr 2020
Diploma in Electrical and Computer Engineering Thessaloniki, Greece

- Grade: 78.50 %, Very Good
- Track: Electronics and Computers
- Dissertation: "Transportation Mode Recognition and Daily Timeline Creation Using Deep Learning", Advisor: Prof. Anastasios Delopoulos

Publications & Poster Presentations

Aristotelis Styanidis, Michail Loufakis, Panagiotis Symeonidis, Dimosthenis Ioannidis, Dimitrios Tzovaras, George Oikonomou, Ioannis Kourmpetis, Ilias Agoudimos and Panagiota Papagianni (2024). **Vibration-based Anomaly Detection on Weather Radar Rotating Machinery using One Dimensional Convolutional Autoencoder**. In Proceedings of Fourteenth Conference on Uncertainty in Artificial Intelligence. UAI 2024. (submitted)

Michail Loufakis, **Aristotelis Styanidis**, Panagiotis Symeonidis, Dimosthenis Ioannidis, Dimitrios Tzovaras, George Oikonomou, Ioannis Kourmpetis, Ilias Agoudimos and Panagiota Papagianni (2024). **Acoustic Anomaly Detection on Weather Radar Machine Sounds Using Augmented Spectrograms**. In Proceedings of Ninth International Congress on Information and Communication Technology. ICICT 2024. (accepted)

Amélie Dendooven, **Aristotelis Styanidis**, Louis Raes, Amaryllis Van Craenenbroeck, Matthias Maeyens, Konstantinos Kontras, Maarten De Vos. #4694 **Automatic Segmentation Of Glomerular Substructures By Deep Learning**, Nephrology Dialysis Transplantation, Volume 38, Issue Supplement_1, June 2023. (published)

Selected Projects

Vibration Anomaly Detection

- Processed raw vibration signals, including data cleaning, resampling, and scaling.
- Implemented an overlapping sliding window approach to capture temporal dependencies in data segments.
- Applied data augmentation techniques, including noise addition, rotation, magnitude warping, and time warping.
- Developed a robust deep learning framework using a 1D convolutional autoencoder for detecting anomalies in radar vibration data provided by the Hellenic Air Force.

Acoustic Anomaly Detection

- Derived mel spectrograms for individual audio signals and implemented a 50% overlap sliding window approach for creating mel spectrogram frames. Utilized a window size of 1024 samples tailored for Fast Fourier Transform (FFT).
- Developed a deep learning framework for acoustic anomaly detection using a 2D convolutional autoencoder for detecting anomalies in radar acoustic data provided by the Hellenic Air Force.

Semantic Segmentation in Electron Microscopy

- Annotated two glomerular substructures in kidney biopsy electron microscopy images.
- Developed a deep learning framework for semantic segmentation using the U-Net architecture, achieving state-of-the-art performance.
- Leveraged unlabelled data using contrastive learning to construct meaningful representations, ultimately improving model performance.

Transportation Mode Recognition

- Designed an Android app.
- Collected acceleration and location data from a diverse user group for five different transportation modes.
- Conducted data preprocessing and manually extracted relevant features.
- Experimented with three different architectures, with the best performance achieved through combining acceleration and location data.

Skills

- **Programming:** Python (PyTorch, Tensorflow, Numpy, Pandas, Scikit-learn, Librosa, TorchAudio, OpenCV), C++
- **Experienced with:** Unix/Linux, SQL, Android Studio, Matlab, Git
- **Soft Skills:** Teamwork, Adaptability, Fast Learner, Time Management, Communication Skills
- **Languages:** Greek (native), English (proficient), French (intermediate), German (intermediate), Portuguese (elementary)

References

Dr. Fotios Konstantinidis
Scientific Project Manager, iSense Group, ICCS, NTUA (Jan 2023 - Apr 2023)
E-mail: fotios.konstantinidis@iccs.gr
Address: Iroon Politechniou str. 9, Polytechnic Campus, 15773, Zografou, Athens, Greece

Prof. Maarten De Vos
MSc Thesis Supervisor, KU Leuven (Feb 2022 - Feb 2023)
E-mail: maarten.devos@kuleuven.be
Address: ESAT– box 2440, KU Leuven, Kasteelpark Arenberg 10, 3001, Leuven, Belgium

Prof. Anastasios Delopoulos
Diploma Thesis Supervisor, Aristotle University of Thessaloniki (Feb 2019 - Feb 2020)
E-mail: antelopo@ece.auth.gr
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