Aristotelis Ballas

PhD Candidate & Research Associate
Department of Informatics & Telematics
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Aristotelis Ballas is currently working towards the Ph.D. degree in Machine Learning and Artificial Intelligence from the Department of Informatics and Telematics, Harokopio University of Athens, while also working as an AI research associate in the HORIZON2020 REBECCA and HORIZON EUROPE RELEVIUM projects. Additionally, he also holds a diploma in Electrical and Computer Engineering from the National and Technical University of Athens. His research interests and publications focus on machine learning and robust algorithms for representation learning, with an emphasis on domain generalization and AI in healthcare.

Education

2021 - Current
PhD Candidate in Machine Learning
Harokopio University of Athens
Dissertation: Algorithms for robust representation learning
Supervisor: Prof. Christos Diou
Research Interests: Domain Generalization, Feature Disentanglement Representation Learning, Biosignal classification, AI in Healthcare

2014 - 2021
Diploma in Electrical and Computer Engineering
National Technical University of Athens
Integrated M.Sc degree (EQF level 7)
Diploma Thesis: Ωto_abR: A WebApp for the Visualization and Analysis of Click-Evoked Auditory Brainstem Responses

Research & Work Experience

2022 - Current
Machine and Deep Learning Research Associate
Harokopio University of Athens
Horizon Europe Project: RELEVIUM GA. 101057821

Research activities: Development of Eating Behaviour Monitoring Tools,
Back-end and CI/CD system specification,
Participation in design of AI-based algorithms for pain and cachexia monitoring

2021 - Current **Machine and Deep Learning Research Associate**

Harokopio University of Athens
Horizon2020 Project: REBECCA GA. 965231
Research Activities: Development of Early Warning Service for user compliance,
Development of Synthetic Data Generator for generating data from Causal DAGs and SCMs,
Development and integration of data analysis workflow in the REBECCA system

2017 - 2021 **System Engineer**

ALMA Bank (USA)
Provide remote IT consultation and support for a USA located bank from offices in Athens.
Responsibilities included: Design/Installation/Configuration and Development of the domain's hardware and software infrastructure, network, backup and monitoring services
Design and implementation of annual Disaster Recovery Plan
Mitigation of the Infrastructure's High-Risk security vulnerabilities

2016 - 2017 **Help Desk Analyst**

ALMA Bank (USA)
Provided front-line primary technical support to end users on various technical issues and problems related to hardware, software and peripherals.

Teaching Experience

2022 - Current **Data Management II (Postgraduate - Applied Informatics M.Sc)**
Harokopio University of Athens, Dept. of Informatics and Telematics
Co-teached alongside Prof. Christos Diou

Academic Activities

Tutorials

- IEEE BDS23: Tutorial on Domain Generalization

- https://bds-dgtutorial.github.io/

Reviewer for International Journals

- IEEE Transactions on Multimedia

Conference Reviewer

- IEEE Engineering in Medicine and Biology Society
- ACM International Conference on Multimedia Retrieval

Technical Knowledge

Machine Learning

- *Deep Learning frameworks:* PyTorch, Tensorflow, Keras, TinyML, Pytorch-Mobile
- *Scientific Computing Libraries:* Numpy, Scipy, Scikit-Learn, Pandas, MatplotLib, OpenCV

IT Skills

- *Programming Languages*: Python, R, Matlab, C
- *DevOps*: Docker, Jenkins, Git
- *Databases:* MongoDB, SQL
- *Operating Systems:* Windows, Linux
- *Other Skills*: LaTex, Wireshark, VmWare

Foreign Languages

- **English:** Native Language, C2 certificate holder

Scientific Publications

You can also find my publications at my Google Scholar page.

Journals

- A. Ballas and C. Diou, "Towards Domain Generalization for ECG and EEG Classification: Algorithms and Benchmarks," in IEEE Transactions on Emerging Topics in Computational Intelligence, doi: 10.1109/TETCI.2023.3306253.

- A. Ballas and P. Katrakazas, “Ωto_abR: A Web Application for the Visualization and Analysis of Click-Evoked Auditory Brainstem Responses,” Digital, vol. 1, no. 4, pp. 188–197, 2021, doi: 10.3390/digital1040014.

- A. Ballas and C. Diou, “Multi-Scale and Multi-Layer Contrastive Learning for Domain Generalization,” arXiv preprint arXiv:2308.14418, 2023. (Under review at - IEEE TAI)

Conferences

- A. Ballas and C. Diou, “CNN Feature Map Augmentation for Single-Source Domain Generalization,” in 2023 IEEE Ninth International Conference on Big Data Computing Service and Applications (BigDataService), Los Alamitos, CA, USA: IEEE Computer Society, Jul. 2023, pp. 127–131. doi: 10.1109/BigDataService58306.2023.00024.

- A. Ballas and C. Diou, “CNNs with Multi-Level Attention for Domain Generalization,” in Proceedings of the 2023 ACM International Conference on Multimedia Retrieval, in ICMR ’23. New York, NY, USA: Association for Computing Machinery, 2023, pp. 592–596. doi: 10.1145/3591106.3592263.

- A. Ballas, V. Papapanagiotou, A. Delopoulos, and C. Diou, “Listen2YourHeart: A Self-Supervised Approach for Detecting Murmur in Heart-Beat Sounds,” in 2022 Computing in Cardiology (CinC), 2022, pp. 1–4. doi: 10.22489/CinC.2022.298.

- A. Ballas and C. Diou, “A Domain Generalization Approach for Out-Of-Distribution 12-lead ECG Classification with Convolutional Neural Networks,” in 2022 IEEE Eighth International Conference on Big Data Computing Service and Applications

- P. Katrakazas, A. Ballas, M. Anisetti, and I. Spais, “An Artificial Intelligence Outlook for Colorectal Cancer Screening,” in 2022 IEEE Eighth International Conference on Big Data Computing Service and Applications (BigDataService), 2022, pp. 66–72. doi: 10.1109/BigDataService55688.2022.00018.

- A. Ballas and C. Diou, “Multi-layer Representation Learning for Robust OOD Image Classification,” in Proceedings of the 12th Hellenic Conference on Artificial Intelligence, Corfu Greece: ACM, Sep. 2022, pp. 1–4. doi: 10.1145/3549737.3549780.