Konstantinos Themelis

Senior Data Scientist

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Skills

Programming Languages:	Python (expert), C++ (expert), MATLAB (expert), R (proficient), Scala (proficient)
Machine Learning:	Deep Learning (TensorFlow, PyTorch, Keras), Reinforcement Learning, Generative Models (GANs, VAEs)
Statistical Programming:	Regression, Classification, Clustering, Dimensionality Reduction (PCA, t-SNE), Time Series Analysis, Bayesian Methods
Computer Vision:	Object Detection (YOLO, Faster R-CNN, D-FINE), Image Segmentation (Mask R-CNN, U-Net), Object Tracking (DeepSORT, ByteTrack), Image Classification (ResNet, Inception), Feature Extraction (SIFT, HOG), OpenCV
Data Visualization:	Matplotlib, Seaborn, Plotly, ggplot2, Tableau, Power BI
Cloud Computing:	AWS (Amazon Web Services: EC2, S3, Lambd), GCP (Google Cloud Platform: Compute Engine, Cloud Storage, Cloud Functions, Vertex AI), Azure
Edge Computing:	NVIDIA DeepStream SDK, NVIDIA Triton Inference Server
Big Data Technologies:	Spark, Hadoop, Apache Kafka, Apache Flink
Databases:	SQL (MySQL, PostgreSQL, SQL Server), NoSQL (MongoDB)
Other Tools:	Git, Docker, Linux, Jupyter Notebook, LaTeX, Agile Development

Experience

Senior Data Scientist — Qualco Group, Athens — Sep. 2024 – Today

- Improved real-time video stream analysis by implementing the D-Fine algorithm on NVIDIA edge devices, leading to a 9% gain in detection accuracy and enhanced system performance.
- Delivered a high-performance object tracking system with accuracy 95%, leveraging NVIDIA DeepStream SDK and DeepSORT to solve complex real-time tracking challenges.
- Developed comprehensive research proposals and technical documentation on computer vision projects, successfully securing funding from the European Commission.
- Led the development and deployment of a visual language model pipeline, which included a data ingestion service from edge devices. Apache Flink, NVIDIA DeepStream SDK and small object detection and tracking models were utilized to optimize the ML solution and integrate it into a mobile framework.
- Mentored junior data scientists and interns.

Senior Data Scientist — Wappier, Athens — Dec. 2021 – Sep. 2024

- Led the development and implementation of a suite of machine learning models, encompassing classification and regression techniques for key business metrics such as Customer

Lifetime Value (LTV), A/B testing, causal impact analysis, and recommendation systems.

- Successfully scaled a graph-based LTV regression algorithm using GraphFrames API within Databricks to handle large datasets and meet business demands.
- Developed and deployed machine learning time series forecasting tools, strategically utilizing SDK temporal features to enhance LTV estimation performance by 3%.

Data Scientist — Centre of Planning & Economic Research, Athens — Sep. 2020 – May 2021

- Applied k-means clustering techniques to analyze questionnaire data, identifying behavioural growth trends among domestic businesses.
- Leveraged clustering analysis to uncover key patterns and trends within the surveyed dataset.

Postdoctoral Research Associate — Commissariat à l'énergie atomique, Paris-Saclay — Dec. 2021 – Sep. 2024

- Developed and implemented proximal optimization algorithms for tackling inverse problems commonly encountered in astrophysical imaging.
- Utilized variational inference models within TensorFlow Probability to accelerate Bayesian inference and model estimation in astrophysical datasets.
- Focused on research related to weak lensing and the ESA Euclid mission designed to explore the composition and evolution of the dark Universe.

Postdoctoral Research Associate — National Observatory of Athens, Athens — May 2013 – Mar. 2017

- Applied statistical signal processing techniques to analyze data from imaging and remote sensing applications.
- Developed and implemented variational techniques for efficient Bayesian inference, enabling robust data analysis and model estimation.
- Focused on applications within imaging and remote sensing domains, including planetary land cover classification, and environmental monitoring.
- Successfully submitted National and Horizon Europe grant proposals, leading to 3 accepted projects totaling €1M.

DevOps Engineer — University of Piraeus, Piraeus — Nov. 2005 – Dec. 206

- Worked as full-time High Performance Computing Linux cluster administrator and web developer.

Projects

Forecasting of Large-Scale Travelling Disturbances GitHub Link

- A research project to investigate LSTID Forecasting through the application of Temporal Fusion Transformers to time series analysis of ionospheric data.
- The project aims to develop a predictive model for Large-Scale Travelling Disturbances, leveraging the transformer's ability to capture temporal dependencies within the signal.

Education

Ph.D. in Statistical Signal Processing — University of Athens — 2012

- Thesis: Bayesian signal processing techniques for hyperspectral image unmixing.

Diploma in Computer Engineering and Informatics — University of Patras — 2005

- GPA: 8.49/10
- Recognized for outstanding academic achievement through the Hellenic State Scholarship Foundation's Honorary Distinction Award.

Publications

- K. Themelis, A. Belehaki, K. Koutroumbas, A. Segarra, V. de Paula, V. Navas-Portella, D. Altadill, "Neural network-based short-term forecast of Large Scale Travelling Ionospheric Disturbance occurrence above middle and southern Europe", J. Space Weather Space Clim. vol. 15, Aug. 2025.
- J.-L. Starck, K. Themelis, N. Jeffrey, A. Peel, F. Lanusse, "Weak lensing mass reconstruction using sparsity and a Gaussian random field", Astronomy & Astrophysics, vol. 649, no. A99, May 2021.
- P. Giampouras, A. Rontogiannis, K. Themelis, K. Koutroumbas, "Online sparse and low-rank subspace learning from incomplete data: A Bayesian view", Signal Processing, vol. 137, pp. 199-212, Aug. 2017.
- P. Giampouras, K. Themelis, A. Rontogiannis, K. Koutroumbas, "Simultaneously sparse and low-rank abundance matrix estimation for hyperspectral image unmixing", IEEE Transactions on Geoscience and Remote Sensing, vol. 54, no. 8, pp. 4775-4789, Aug. 2016.
- K. Themelis, A. Rontogiannis, K. Koutroumbas, "Variational Bayes group sparse time-adaptive parameter estimation with either known or unknown sparsity pattern", IEEE Transactions on Signal Processing, vol.64, no.12, pp.3194-3206, June 2016.
- A. Belehaki, I. Tsagouri, I. Kutiev, P. Marinov, B. Zolesi, M. Pietrella, K. Themelis, P. Elias, K. Tziotziou, "The European Ionosonde Service: nowcasting and forecasting ionospheric conditions over Europe for the ESA Space Situational Awareness services", Journal of Space Weather and Space Climate, 5 A25, 2015.
- K. Themelis, A. Rontogiannis, K. Koutroumbas, "A variational Bayes framework for sparse adaptive estimation", IEEE Transactions on Signal Processing, vol.62, no.18, pp.4723-4736, Sept. 2014.
- K. Themelis, F. Schmidt, O. Sykioti, A. Rontogiannis, K. Koutroumbas, I. Daglis, "On the Unmixing of MeX/OMEGA Hyperspectral Data", Planetary and Space Science, Elsevier, vol. 68, issue 1, pp.34-41, Aug. 2012.
- K. Themelis, A. Rontogiannis, K. Koutroumbas, "A Novel Hierarchical Bayesian Approach for Sparse Semi-Supervised Hyperspectral Unmixing", IEEE Transactions on Signal Processing, vol. 60, no. 2, pp. 585-599, Feb. 2012.

Awards and Recognition

- Participant of the EU-funded Enhanced Eurotalents Marie Sklodowska-Curie Actions fellowship for academic years 2017-2018.