Emmanouil Theodosis

Contact Information

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github.com/manosth
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Research Interests Deep learning theory, representation learning, model-based autoencoders, theoretical machine learning, nonlinear optimization, tropical geometry, compressive sensing

Education

Harvard University Sep 2019 - May 2024
PhD in Computer Science, GPA: 3.835/4.00
Relevant courses: *Adaptive Methods in Machine Learning*, *Advanced Topics in the Theory of Machine Learning*, *Big Data Systems*, *Decision Theory*, *Probability I*
Thesis: "*Learning structured representations in machine learning*"
Advisor: **Demba Ba**

National Technical University of Athens Oct 2012 - Oct 2018
BSc & MSc in Electrical and Computer Engineering, GPA: 8.56/10
Relevan courses: *Speech and Natural Language Processing*, *Computer Vision*, *Patern Recognition*, *Operating Systems*, *Compilers*, *Algorithms*, *Digital Signal Processing*
Thesis: "*Tropical analysis of algorithms on graphs*"
Advisor: **Petros Maragos**

Work Experience

Amazon, USA May 2021 - Aug 2021
Applied Scientist Intern at *Amazon Web Services*
Project: *Blind source synchronization using model-based deep learning.*
Supervisor: Karim Helwani

National Technical University of Athens, Greece Oct 2018 - Jun 2019
Research Assistant at *CVSP*
Project: *Optimal curve fitting using tropical approximations.*
Supervisor: **Petros Maragos**

Teaching Experience

ES 157: Biological Signal Processing Fall 2020
Harvard University
Instructor: **Demba Ba**

Publications

Preprints

[1] **Theodosis, E.**. Helwani, K., Soltanmohamadi, E., Goodwin, M., and Krishnaswamy, A. "Complex recurrent neural architecture for system identification with application to blind source synchronization". *Working paper* (2021)

[2] **Theodosis, E.**, Tolooshams, B., Tankala, P., Tasissa, A., and Ba, D. "On the convergence of group-sparse autoencoders". *In submission* (2020)

[3] Tasissa, A., **Theodosis, E.**, Tolooshams, B., and Ba, D. "Towards improving discriminative reconstruction via simultaneous dense and sparse coding". *In submission* (2020)

[4] **Theodosis, E.** and Maragos, P. "A robust, adaptive pruning algorithm based on tropical geometry". In *arXiv* (2019)

Conference papers

[5] Maragos, P. and **Theodosis, E.** "Multivariate tropical regression and piecewise-linear surface fitting". In *International Conference on Acoustics, Speech, and Signal Processing* (2020)

[6] Retsinas, G., Filntisis, P., Efthymiou, N., **Theodosis, E.**, Zlatintsi, A., and Maragos, P. "Person identification using deep convolutional neural networks on short-term signals from wearable sensors". In *International Conference on Acoustics, Speech, and Signal Processing* (2020)

[7] **Theodosis, E.** and Maragos, P. "Tropical modeling of weighted transducer algorithms on graphs". In *International Conference on Acoustics, Speech, and Signal Processing* (2019)

[8] **Theodosis, E.** and Maragos, P. "Analysis of the Viterbi algorithm using tropical algebra and geometry". In *International Workshop on Signal Processing Advances in Wireless Communications* (2018)

Journal articles

[9] Maragos, P., Charisopoulos, V., and **Theodosis, E.** "Tropical geometry and machine learning". In *Proceedings of the IEEE*, vol. 109, no. 5, pp. 728-755, 2021.

Book chapters

[10] Maragos, P. and **Theodosis, E.** "Tropical geometry and piecewise-linear approximation of curves and surfaces on weighted lattices". In *Shape Analysis: Euclidean, Discrete and Algebraic Geometric Methods*, edited by M. Breuss, A. Bruckstein, C. Kiselman, and P. Maragos, Springer, to appear.

Honors and Awards

Amazon Post-internship Fellowship Aug 2021
Funding excellent applicants to extend promising parts of their internship.

A. G. Leventis Scholarship Aug 2021
Awarded to Greek students of high scholastic ability who are pursuing graduate studies in the United States.

Certificate of Distinction in Teaching Fall 2021
Certificate acknowleding the special contribution of Harvard graduate students who portrayed excellence while teaching.

Robert L. Wallace Prize Fellowship 2019-2021
Awarded to outstanding candidates whose research is focuses on subjects related to the study of acoustics and noise. Awarded two consecutive years.

Gerondelis Foundation Scholarship May 2020
Awarded to Greek students pursuing graduate studies in the United States.

Thomaidio Award (Publications) 2018
Awarded to undergraduate students of the National Technical University of Athens who published a research paper before their graduation.

"**The Great Moment of Education" Eurobank EFG Scholarship** Oct 2012
Achieved the highest score at the national exams in Nea Genia Ziridis.

Professional Service

Invited Reviewer (Journals)
Signal Processing

Invited Reviewer (Conferences)
WCCI 2022 (*FUZZ-IEEE, IJCNN*), ITCS 2022, AISTATS 2021, EUSIPCO 2020

Tutorials
"*Deep Learning in Neuroscience*", Neurosur 2021

Mentoring Service

"MentoRes" mentoring initiative Oct 2021 - Present
Providing lightweight mentoring to underprivilleged students from Greece applying to PhD programs in the US.

Student mentoring
George Tsilimigkounakis (NTUA) Spring 2022
Co-advised Masters' thesis on non-convex tropical regression.

Pranay Tankala (Harvard) Spring 2020
Advised a summer project on deep clustering.

Tutorials
"*Deep Learning in Neuroscience*", Neurosur 2021

Programming Skills

Languages: Python, C, MATLAB, HTML/CSS
Other: LaTeX, Unix, Git

Languages

Greek (*Native*), English (*Fluent*), French (*Basic*)