

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Charalambos Tzamos

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EDUCATION

Ph.D. in Machine Learning and Computer Vision

2022 -

Department of Cybernetics, Czech Technical University

Advisor: Prof. [Zuzana Kúkelová](#)

Topic: Combining Algebraic and Learning-based Approaches for Camera Geometry Estimation.

M.Sc. in Algorithms, Logic and Discrete Mathematics

2019 - 2021

National and Kapodistrian University of Athens

National Technical University of Athens

Thesis: “[Upper bounds on the number of embeddings of minimally rigid graphs](#)”

Advisor: Prof. [Ioannis Z. Emiris](#)

Abstract: In graph theory, a rigid graph is a graph that has a finite number of embeddings in \mathbb{R}^d up to rigid motions, with respect to a set of edge length constraints. An embedding of graph in \mathbb{R}^d is an assignment of vertices to points in \mathbb{R}^d , which also induces a set of edge lengths that correspond to the distances between the connected vertices. An important class of rigid graphs is the class of minimally rigid graphs. A minimally rigid graph, is a graph that is rigid and has the property that the removal of any edge yields a graph that is not rigid. It is a major open problem to find tight upper bounds on the number of the embeddings in \mathbb{R}^d . For a long period, only the trivial bound of $\mathcal{O}(2^{d \cdot |V|})$ was known on the number of embeddings, that is derived from the direct application of Bézout’s Theorem. In [Bartzos et al.], the bound was improved for $d \geq 5$, using matrix permanents. Recently in [Bartzos et al.], the asymptotic bound was improved in all dimension. In the special case of $d = 2$, the asymptotic upper bound was improved to $\mathcal{O}(3.7764^{|V|})$. It is known that the number of solutions of a well-constrained algebraic system is related to the number of embeddings. In particular, the number of the complex solutions of such an algebraic system extends the notion of real embeddings in the complex space, allowing us to bound the complex solutions, using tools from the complex algebraic geometry. In this thesis, by counting outdegree-constrained orientations of a graph that are related to the algebraic bounds [Bartzos et al.], we improve the existing upper bounds, for the class of minimally rigid graphs, on the number of embeddings. In the case $d = 2$, the bound is improved to $\mathcal{O}(3.46^{|V|})$.

B.Sc. in Computer Science

2014 - 2019

National and Kapodistrian University of Athens

Speciality: Theoretical Foundations • Data and Knowledge management

Thesis: “[VentusNet: Deep Learning for Wind Speed Prediction](#)” • Citation count: 2

Advisor: Prof. [Ioannis Z. Emiris](#)

Abstract: In this thesis, we develop a deep neural network architecture based on recurrent layers in order to forecast wind speed sequences. Our network’s input is a conjunction of wind measurements and wind speed forecasts from another model. We analyse our data into time series so that, we capitalise on the temporal nature of our data and the recurrent layers. Mean absolute error, mean squared error and the logarithm of the hyperbolic cosine are used as the evaluation metrics of our model. Based on our experimental results, we show that our model achieves to improve that model’s forecast whose forecasts are used as features on our model’s input.

EMPLOYMENT

Research Associate

Jul 2022 -

[Athena Research Center](#), Greece

The project aims at developing a novel stochastic approach for reducing the construction risk of the new generation of circuits, which will bring a significant progress in Electronic Design Automation of Integrated Circuits. Recent advances in Cloud Computing, Artificial Intelligence, and Internet of Things, create demands for denser and lower consumption Integrated Circuits, which operate on high frequencies, and with ever-increasing data transferring speeds. Under these circumstances, Crosstalk electromagnetic noise appears, and must be addressed during the Circuit Design stage. In this context, we employ Computational Geometry tools to enhance certain procedures such as random-walk-based capacitance extraction.

Research Fellow

May 2022 -

[Visual Recognition Group](#) and [Center for Machine Perception](#), Czechia

Combining Algebraic and Learning-based Approaches for Camera Geometry Estimation.

Research Assistant

Nov 2021 - Mar 2022

[Athena Research Center](#), Greece

The project aims at developing a novel stochastic approach for reducing the construction risk of the new generation of circuits, which will bring a significant progress in Electronic Design Automation of Integrated Circuits. Recent advances to Cloud Computing, Artificial Intelligence, and Internet of Things, create demands for denser and lower consumption Integrated Circuits, which operate on high frequencies, and with ever-increasing data transferring speeds. Under these circumstances, Crosstalk electromagnetic noise appears, and must be addressed during the Circuit Design stage. In this context, we design a method for spatial indexing data structure for facilitating region queries in the context of random-walk-based capacitance extraction.

IT Consultant (Internship)

Mar 2018 - May 2018

[Imerys](#), Greece

CURRENT AND PAST AFFILIATIONS

Laboratory of Algebraic and Geometric Algorithms

2018 -

*National and Kapodistrian University of Athens, Greece • [EρΓA Lab](#)
Collaboration with Prof. [Ioannis Z. Emiris](#)*

Visual Recognition Group

2022 -

*Department of Cybernetics, Czech Technical University, Czechia • [VRG](#)
Collaboration with Prof. [Zuzana Kúkelová](#)*

Athena Research & Innovation Center

2021 -

*Institute for Language and Speech Processing, Greece • [Athena RC](#)
Collaboration with Dr. [George A. Ioannakis](#)*

LANGUAGES

Greek: Native

English: Fluent

PROFESSIONAL ACTIVITIES

Conference Referee

- *CSAE – International Conference on Computer Science and Application Engineering*

Professional Memberships

- *ACM – Association for Computing Machinery*

TECHNICAL SKILLS

Languages: Python, C/C++, Matlab, Maple, Prolog, Haskell, SQL, HTML, Java(Script), Sage, L^AT_EX, Bash
Technologies: Tensorflow, PyTorch, Git, Scikit-learn, NumPy, Pandas, Linux, Jira, Confluence

JOURNAL PUBLICATIONS

In publications marked with (*), the authors are listed alphabetically.

J.DAM 2023 (*) E. Bartzos, I.Z. Emiris and C. Tzamos, *An asymptotic upper bound for graph embeddings*, Discrete Applied Mathematics, vol. 327, pp. 157–177, 2023.
doi.org/10.1016/j.dam.2022.12.010

CONFERENCE PUBLICATIONS

In publications marked with (*), the authors are listed alphabetically.

ISSAC 2022 (*) E. Bartzos, I.Z. Emiris, I.S. Kotsireas, and C. Tzamos. 2022. *Bounding the Number of Roots of Multi-Homogeneous Systems*. In Proceedings of the 2022 Int'l Symposium on Symbolic and Algebraic Computation (ISSAC '22), July 4–7, 2022, Villeneuve-d'Ascq, France. ACM, New York, NY, USA, 8 pages.

doi.org/10.1145/3476446.3536189

CASC 2021 (*) E. Bartzos, I.Z. Emiris, and C. Tzamos. *The m -Bézout bound and distance geometry*. In F. Boulier, M. England, T.M. Sadykov, and E.V. Vorozhtsov, editors, Computer Algebra in Scientific Computing - 23rd Intern. Workshop, CASC 2021, Sochi, Russia, September 13-17, 2021, Proc., volume 12865 of LNCS, pages 6–20. Springer, 2021.

doi.org/10.1007/978-3-030-85165-1_2