Bogdan Mursa

EDUCATION

Computer Science PhD student
Oct 2017 - Present
BABEŞ-BOLYAI UNIVERSITY
Cluj Napoca, România

THESIS TOPICS: Complex Systems; Complex Networks; Network motifs
SUPERVISOR: Professor Anca Andreica
ADVISORS: Professor Laura Dioșan

High Performance Computing and Big Data Analytics (MCS)
Oct 2015 - Jul 2017
BABEŞ-BOLYAI UNIVERSITY
Cluj Napoca, România

THESIS TITLE: Parallel computation of network motif discovery
SUPERVISOR: Associate Processor Virginia Niculescu

Bachelor of Science in Computer Science
Oct 2012 - Jul 2015
BABEŞ-BOLYAI UNIVERSITY
Cluj Napoca, România

THESIS TITLE: Simulation and Reporting in Recovery Software
SUPERVISOR: Lecturer Professor Dan Mircea Suciu

RESEARCH

My research interests largely focus on applications of Complex systems with emphasize on the Theory of Complex Networks. In particular, I am currently interested in study of network motifs - patterns of interconnections that appear much more frequently in real-world networks than in random networks. My research results aim to serve as a theoretical foundation for a new framework that can be used to analyse the behaviour and dynamics of complex networks with a higher accuracy while making use of a meso-scale analysis, namely network motifs. A secondary goal of my research is to propose a new null-model for generating random networks with specific concentration of network motifs, while considering as input different topological properties for which there was found an important correlation factor between them and network motifs in the studies led for the published papers.

CONFERENCE PAPERS

2018 Mursa, B.E.M., Andreica, A., Diosan, L.: Parallel acceleration of subgraph enumeration in the process of network motif detection. 20th International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC). doi: 10.1109/SYNASC.2018.00039

2019 Mursa, B.E.M., Andreica, A., Diosan, L.: Study of connection between articulation points and network motifs in complex networks. In Proceedings of the 27th European Conference on Information Systems (ECIS), Stockholm & Uppsala, Sweden, June 8-14, 2019. ISBN 978-1-7336325-0-8 Research Papers. https://aisel.aisnet.org/ecis2019_rp/127

2019 Mursa, B.E.M., Andreica, A., Diosan, L.: An empirical analysis of the correlation between the motifs frequency and the topological properties of complex networks. Knowledge-Based and Intelligent Information & Engineering Systems: Proceedings of the 23rd International Conference KES-2019. doi: 10.1016/j.procs.2019.09.188

2019 Mursa, B.E.M., Andreica, A., Diosan, L.: Mining network motif discovery by learning techniques. Hybrid Artificial Intelligent Systems - 14th International Conference, Proceedings. doi: 10.1007/978-3-030-29859-3_7

2021 Mursa, B.E.M., Andreica, A., Diosan, L.: Network motifs: A key variable in the equation of dynamic flow between macro and micro layers in Complex Networks. Knowledge-Based Systems, Volume 213. doi: https://doi.org/10.1016/j.knosys.2020.106648

Achievement & Awards

2014   Student of the Year - Babes-Bolyai University, Faculty of Mathematics and Computer Science

2014   Microsoft Imagine Cup World Finalist

Teaching

Lab Assistant

2017 - present   Parallel and Distributed Programming (semester 1)

2017 - present   Operating Systems (semester 2)

2021 - present   Artificial Intelligence (semester 2)

Employment History

AI consultant freelancer
Jul 2020 - Present
Freelancer
Cluj Napoca, RO

Consulting companies to find solutions to severe problems encountered in their business processes. My expertise is mainly based on techniques that make use of Artificial Intelligence and Graph & Complex Networks Theory with the management of large datasets.

Job description: Implementing requirements for: ETL processes, data aggregation (reports), Artificial intelligence modelling

Consultant
Feb 2018 - Jul 2020
Sortlist
Cluj Napoca, RO

I am responsible to automatise manual business logic processes by making use of AI technologies.

Job description: Creating models that make use of Artificial Intelligence techniques to optimize and automatise core business processes. The focus is on: natural language processing (Named-entity recognition, binary relations); classifications (Neural networks, SVM); forecasting (prediction modeling); recommender systems (based on Complex Networks Theory - using patterns of interconnections (motifs) or open triangles)

Technical Leader
Nov 2016 - Feb 2018
Yardi
Cluj Napoca, RO

I was responsible to create and design architectures for Big Data & AI projects requested by the company business logic.

Job description: Add intelligent solutions and algorithms to dozens of Big Data ETL processes from which I can remind: natural language processing, information extraction, computer vision, inference tasks

Software developer
Aug 2014 - Nov 2016
Yardi
Cluj Napoca, RO

I had to develop new processes while using Big Data technological stack.

Job description: Implementing requirements for: ETL processes, data aggregation (reports), optimal data query

Other Information

Programming Experience   Languages: Python, Scala, SQL, NoSQL, LaTeX; Frameworks: Spark, Hadoop, MITIE, Tensorflow, openCV, scikit, NetworkX, pandas, numpy

Certificates   MongoDB, NetworkX

Languages   Romanian, English

References

Prof. Anca Andreica
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Prof. Laura Dioșan
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