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Education

2016 - 2019   Ph.D. in Applied Computing
National Institute for Space Research (INPE)
Sao Jose Dos Campos, Brazil

2014 - 2016   Ms.C. in Applied Computing
National Institute for Space Research (INPE)
Sao Jose Dos Campos, Brazil

2009 - 2013   Bs.C in Computer Science
Sao Paulo State University (UNESP)
Presidente Prudente, Brazil

Professional Experience

08/2023 - 10/2023 Visiting Scholar in the group of Professors Santo Fortunato and Filippo Radicchi, Indiana University, Luddy Center for Artificial Intelligence, Bloomington, IN, USA.

12/2019 -   Assistant Professor, Federal University of Ouro Preto, Department of Computing, Ouro Preto, Brazil

03/2018 - 02-2019 Visiting Ph.D. student, Humboldt University of Berlin, Department of Physics, Berlin, Germany.

08/2017 - 12/2017 Teaching assistant, Federal University of Sao Paulo, Sao Jose dos Campos, Brazil.

06/2013 - 09/2013 Internship, University of Alberta, Computing Science Centre, Edmonton, Canada.

01/2011 - 05/2013 Scholarship in Scientific Initiation student, Sao Paulo State University, Department of Cartography, Presidente Prudente, Brazil.

Professional Service

Editor
Topic Coordinator of a special issue at Frontiers in Physics, named "Integrating Physical and Social Sciences towards the Sustainable Development Goals".

Referee
PLoS One, European Physical Journal Special Topics, Measurement, Scientific Reports, International Journal of Dynamics and Control, Frontiers in Physics, Sustainable Cities and Society

Program Committee

- Referee ad hoc XLIII Congresso Nacional de Matemática Aplicada e Computacional, 2024.
- Brazilian Symposium on Geoinformatics (GEOINFO), Sao Jose dos Campos, Brazil, 2022.
- Referee ad hoc XL Congresso Nacional de Matemática Aplicada e Computacional, 2021.
- Referee ad hoc XIV Conferência Brasileira de Dinâmica, Controle e Aplicações, 2019.
- Referee ad hoc 8th International Conference on Physics and Control (Physcon), 2017.

Organization
- 6th International Conference on Nonlinear Science and Complexity, Sao Jose dos Campos, Brazil (2016).
- XXIV Congresso de Iniciação Científica da Unesp, Presidente Prudente, Brazil (2012).

Undergraduate students

1. Gabriel Ferreira da Costa, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Simulation of epidemiological models in temporary mobility networks", ongoing.
2. Romulo Junio Vieira Rocha, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Characterization of mobility networks in different scales", ongoing.
3. Pablo V. R. Silva, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Developing a software to build road networks from shapefiles", ongoing.
4. Romulo Junio Vieira Rocha, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Correspondences between mobility network structures and the spread of COVID-19", 2023.
5. Diogo Freitas dos Santos Nascimento, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Modeling and characterization of mobility networks at different scales", 2023.
6. Gabriel Ferreira da Costa, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Simulation of epidemiological models in temporary mobility networks", 2023.
7. Rafael Coelho Monte Alto, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Cascade failures in networks with multiple layers", 2023.
8. Vinicius de Paula Silva, Federal University of Ouro Preto, Brazil. Capstone project "TSAPI: a distributed application for time series comparison", 2022.
9. Iuri da Silva Diniz, Federal University of Ouro Preto, Brazil. Capstone project "Generation of functional networks from time series of a weather radar" on Automation Engineering, 2022.
10. Vinicius Fonseca de Oliveira, Federal University of Ouro Preto, Brazil. Capstone project "Robustness analysis of the mobility network of the city of Sao Paulo" on Computer Science, 2021.
11. Suleimane Ducure, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific initiation Project "Complex networks with multiple layers", 2021.
12. Douglas Meneses Barbosa, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Robustness analysis in complex networks with heuristically guided attacks", 2021.
13. Suleimane Ducure, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Robustness analysis in mobility networks", 2021.
14. Iuri da Silva Diniz, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Time series analysis through complex networks", 2021.
15. Vinicius de Paula Silva, Department of Computing, Federal University of Ouro Preto, Brazil. Scientific Initiation Project "Time series analysis through complex networks", 2021.
16. Jeferson Feitosa Mendes, National Center for Monitoring and Early Warning of Natural Disasters, Brazil. Scientific Initiation Project "Interfaces between urban mobility, hydrology and public health issues - a conceptual view", 2020.

Master students

1. Carlos Eduardo Silva de Oliveira, Department of Computing, Federal University of Ouro Preto, Brazil. Project "Evaluating machine learning models for traffic forecast", ongoing.

2. Antonio Pedro, Department of Computing, Federal University of Ouro Preto, Brazil. Project "The role of commuting networks on time series forecast with GNN", ongoing.
3. Valmir R. Bueno Junior, Department of Computing, Federal University of Ouro Preto, Brazil. Project "Fraud prediction in financial transactions", ongoing.
4. Augusto F. Guilarducci, Department of Computing, Federal University of Ouro Preto, Brazil. Project "Investigating the Brazilian Graduation Programs in Computer Science via bibliometric data", ongoing.
5. Matheus de Moraes Gonçalves Correia, National Institute for Space Research, Brazil. Project: "Construction and analysis of mobility networks at the intra-urban scale", 2024.

Assignments as public examiner/opponent

1. External examiner of MSc defense of Aurelienne A. Souza Jorge, National Institute for Space Research, Sao Jose dos Campos, Brazil, "Complex network metrics in a meteorological context" (2022).
2. External examiner of MSc defense of Bruno Vitorelli Tacca de Oliveira, Sao Paulo State University, Brazil, "INTRACS - Sistema em código aberto para coleta e processamento de dados inerciais com protótipo multisensor sem fio de baixo custo e customização em métodos de processamento" (2022).
3. External examiner of PhD defense of Alessandra Marli Maria Morais Gouvêa, Federal University of Sao Paulo, Brazil, "Detecção de Comunidades em Redes Complexas por Dinâmica de Partículas" (2022).
4. External examiner of MSc defense of Humberto Hayashi Sano, Federal University of Sao Paulo, Brazil, "Modelagem e análise da robustez de redes aéreas temporais" (2021).

Teaching

Federal University of Ouro Preto (UFOP)

2020 to present   Numerical Calculus (BCC760)
                       Web Programming (BCC481)

2021 to present   Complex Networks (PCC121)

Publications

Journals

1. SANTOS, L. B. L.; SOARES, G. G.; GARG, T.; JORGE, A. A. S.; LONDE, L. R.; REANI, R. T.; BACELAR, R. B.; OLIVEIRA, C. E. S.; **FREITAS, V. L. S**.; SOKOLOV, I. M. Vulnerability analysis in Complex Networks under a Flood Risk Reduction point of view. Frontiers in Physics, 2023.
2. SANTOS, L. B. L.; ANAZAWA, T. M.; FERREIRA, L. N.; **FREITAS, V. L. S**. Editorial: Integrating physical and social sciences towards the sustainable development goals. Frontiers in Physics, v. 11, p. 1-2, 2023.
3. JORGE, A.; **FREITAS, V. L.S.**; COSTA, I. C.; SANTOS, L. B.L. . Graph4GIS: Geographical graphs for GIS platforms based on weather radar dataset. Software Impacts, v. 1, p. 100530-100534, 2023.
4. HOJO-SOUZA, N. S.; **FREITAS, V. L. S.**; GUIDONI, D. L.; DE SOUZA, F. H. Clinical symptom profile of hospitalized COVID-19 Brazilian patients according to SARS-CoV-2 variants. EPIDEMIOLOGY AND HEALTH, v. 45, p. 1-10, 2023.
5. TOMÁS, LÍVIA RODRIGUES; SOARES, GIOVANNI GUARNIERI; JORGE, AURELIENNE A. S.; MENDES, JEFERSON FEITOSA; **FREITAS, V. L. S.**; SANTOS, LEONARDO B. L. Flood risk map from hydrological and mobility data: A case study in São Paulo (Brazil). Transactions in GIS. , v.26, p.1 - 25, 2022.
6. **FREITAS, V. L. S.**; YANCHUK, S.; GRANDE, H. L. C.; MACAU, E. E. N. The effects of time-delay and phase lags on symmetric circular formations of mobile agents. THE EUROPEAN PHYSICAL

JOURNAL. SPECIAL TOPICS (ONLINE). , p.1 - , 2021.

7. **FREITAS, V. L. S.**; MOREIRA, G. J. P.; SANTOS, L. B. L. Robustness analysis in an inter-cities mobility network: modeling municipal, state and federal initiatives as failures and attacks toward SARS-CoV-2 containment. PeerJ. , v.8, p.e10287 - , 2020.

8. **FREITAS, V. L. S.**; YANCHUK, S.; ZAKS, M.; MACAU, ELBERT E. N. Synchronization-based symmetric circular formations of mobile agents and the generation of chaotic trajectories. Communications in Nonlinear Science and Numerical Simulation. , v.94, p.105543 - , 2020.

9. **FREITAS, V. L. S.**; KONSTANTYNER, T. C. R. O.; MENDES, J. F.; SEPETAUSKAS, C. S. N.; SANTOS, L. B. L. The correspondence between the structure of the terrestrial mobility network and the spreading of COVID-19 in Brazil. CADERNOS DE SAÚDE PÚBLICA. , v.36, p.1 - 12, 2020.

10. **FREITAS, V. L. S.**; LACERDA, J. C.; MACAU, E. E. N. Complex Networks Approach for Dynamical Characterization of Nonlinear Systems. INTERNATIONAL JOURNAL OF BIFURCATION AND CHAOS. , v.29, p.1950188 - , 2019.

11. **FREITAS, V. L. S.**; MACAU, E. E. N. Collision Avoidance Mechanism for Symmetric Circular Formations of Unitary Mass Autonomous Vehicles at Constant Speed. MATHEMATICAL PROBLEMS IN ENGINEERING (ONLINE). , v.2018, p.1 - 11, 2018.

12. NOETEL, J.; **FREITAS, V. L. S.**; MACAU, E. E. N.; SCHIMANSKY-GEIER, L. Optimal noise in a stochastic model for local search. PHYSICAL REVIEW E. , v.98, p.022128 - , 2018.

13. **FREITAS, V. L. S.**; DE SOUSA, F. L.; MACAU, E. E. N. Reactive model for autonomous vehicles formation following a mobile reference. APPLIED MATHEMATICAL MODELLING. , v.61, p.167 - 180, 2018.

14. NOETEL, J.; **FREITAS, V. L. S.**; MACAU, E. E. N.; SCHIMANSKY-GEIER, L. Search and return model for stochastic path integrators. CHAOS (WOODBURY, N.Y. ONLINE). , v.28, p.106302 - , 2018.

15. **FREITAS, V. L. S.**; REIS, B. M. F.; TOMMASELLI, A. M. G. AUTOMATIC SHADOW DETECTION IN AERIAL AND TERRESTRIAL IMAGES. Boletim de Ciências Geodésicas. , v.23, p.578 - 590, 2017.

Conferences

1. OLIVEIRA, A. S.; ALVARENGA, J. P. R.; CECOTE, T. C.; **FREITAS, V. L. S.**; LUZ, E. J. S. Toxic Speech Detection in Portuguese: A Comparative Study of Large Language Models. In: 16th International Conference on Computational Processing of Portuguese (PROPOR 2024), 2024, Santiago de Compostela. Proceedings of PROPOR 2024. Santiago de Compostela: Association for Computational Linguistics, 2024. v. 16.

2. DUARTE, F. H. O.; MOREIRA, G. J. P.; LUZ, E. J. S.; SANTOS, L. B. L.; **FREITAS, V. L. S**. Time Series Forecasting of COVID-19 Cases in Brazil with GNN and Mobility Networks. In: Brazilian Conference on Intelligent Systems (BRACIS), 2023, Belo Horizonte. Lecture Notes in Artificial Intelligence (LNAI). Cham, Switzerland: Springer Nature, 2023. v. 14197. p. 361-375.

3. DUARTE, F. H. O.; MOREIRA, G. J. P.; LUZ, E. J. S.; SANTOS, L. B. L.; **FREITAS, V. L. S**. Correlations between epidemiological time series forecasting and influence regions of Brazilian cities. In: XXIV Brazilian Symposium on Geoinformatics (GEOINFO), 2023, São José dos Campos. Proceedings of GEOINFO 2023. São José dos Campos: INPE, 2023.

4. OLIVEIRA, AMANDA S.; CECOTE, THIAGO C. ; SILVA, P. H. L. ; GERTRUDES, J. C.; **FREITAS, V. L. S.**; LUZ, EDUARDO J. S. . How Good Is ChatGPT For Detecting Hate Speech In Portuguese?. In: Simpósio Brasileiro de Tecnologia da Informação e da Linguagem Humana, 2023, Brasil. Anais do XIV Simpósio Brasileiro de Tecnologia da Informação e da Linguagem Humana (STIL 2023), 2023. p. 94-103.

5. **FREITAS, V. L. S.**; SANTOS, L. B. L.; TANG, M.; ZOU, Y.; MACAU, E. E. N. The effects of COVID-19 on Chinese commuting patterns in early 2020. In: XXIII Brazilian Symposium on Geoinformatics - GEOINFO, 2022, São José dos Campos, v. 23. p. 317-322.

6. SILVA, P. H.; MOREIRA, G.; **FREITAS, V. L. S.**; SILVA, R.; MENOTTI, D.; LUZ, E.. A Decidability-Based Loss Function In: 2022 International Joint Conference on Neural Networks (IJCNN), 2022, Padua.

7. SILVA, G.; SILVA, P.; **FREITAS, V. L. S.**; MOREIRA, G. J. P.; LUZ, E.. Cardiac Arrhythmia Detection in ECG Signals Using Graph Convolutional Network. In: Simpósio Brasileiro de Computação Aplicada à Saúde (SBCAS), 22, 2022, p. 25-35. ISSN 2763-8952. DOI: https://doi.org/10.5753/sbcas.2022.222434.

8. OLIVEIRA, R. F.; **FREITAS, V L. S.**; MOREIRA, G. J. P.; LUZ, E. J. S. Explorando Redes Neurais de

Grafos para Classificação de Arritmias. In: Simpósio Brasileiro de Computação Aplicada à Saúde (SBCAS), 2022, p. 178-189. ISSN 2763-8952. DOI: https://doi.org/10.5753/sbcas.2022.222510.

9. **FREITAS, V. L. S.**; QUILES, M. G.; MACAU, E. E. N. Controle baseado em redes neurais artificiais para agentes móveis em formação In: CNMAC 2017 XXXVII Congresso Nacional de Matemática Aplicada e Computacional, 2017.

10. **FREITAS, V. L. S.**; MACAU, E. E. N. Reactive Agent-based Model for Convergence of Autonomous Vehicles to Parallel Formations Heading to Predefined Directions of Motion In: 9th International Conference on Agents and Artificial Intelligence, 2017, Porto. Proceedings of the 9th International Conference on Agents and Artificial Intelligence. SCITEPRESS - Science and Technology Publications, 2017. v.1. p.166.

11. **FREITAS, V. L. S.**; MACAU, E. E. N. Uso de redes complexas para caracterização dinâmica de sistemas não-lineares In: Conferência Brasileira de Dinâmica, Controle e Aplicações - DINCON, 2015, Natal. Proceeding Series of the Brazilian Society of Computational and Applied Mathematics. São Carlos: SBMAC - Sociedade de Matemática Aplicada e Computacional, 2015.

12. **FREITAS, V. L. S.**; TOMMASELLI, A. M. G. An adaptive technique for shadow segmentation in high-resolution omnidirectional images In: IX Workshop de Visão Computacional, 2013, Rio de Janeiro.

13. **FREITAS, V. L. S.**; TOMMASELLI, A. M. G. Extração seletiva de linhas de controle em imagens CBERS-2B HRC In: VIII WVC - Workshop de Visão Computacional, 2012, Goiânia.

14. **FREITAS, V. L. S.**; TOMMASELLI, A. M. G.; MARCATO JUNIOR, J. Implementação de uma ferramenta interativa para triangulação multissensor In: SIMGEO - Simpósio Brasileiro de Ciências Geodésicas, 2012, Recife.

15. **FREITAS, V. L. S.**; BERVEGLIERI, A.; Tommaselli, A. M. G. Implementação de uma ferramenta para localização semiautomática de pontos de apoio em imagens aéreas In: III SBG - Simpósio Brasileiro de Geomática, 2012, Presidente Prudente.

Citation information

https://scholar.google.com.br/citations?user=XX3euXkAAAAJ&hl=pt-BR

according to Google Scholar.

Invited presentations

- **09/2021** Collective motion with a NeuroEvolution algorithm, Workshop em Computação Aplicada (WorCAP 2021). Online.
- **10/2021** Partículas com Dinâmica de Osciladores de Fase Acoplados em Formações Circulares Simétricas, XXIV Encontro Nacional de Modelagem Computacional (XXIV ENMC) e XII Encontro de Ciência e Tecnologia de Materiais (XII ECTM). Online.
- **08/2020** Aplicações da rede de mobilidade intermunicipal em pesquisas sobre o COVID-19, Seminar at the Federal University of Sao Paulo. Online.
- **10/2020** Mobility Analysis on 2020 Coronavirus Pandemic, Latin American and Caribbean Association for Information Systems (LACAIS). Online.
- **09/2020** Synchronization-based symmetric circular formations of mobile agents and the generation of chaotic trajectories, Workshop em Computação Aplicada (Worcap), National Institute for Space Research, Brazil. Online.
- **04/2018** Symmetric circular formations of unitary mass autonomous vehicles at constant speed, Research Seminar in Applied Dynamical Systems, Technical University of Berlin, Institute of Mathematics, Berlin, Germany.