Johnnatan Messias P. Afonso

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Google Scholar, GitHub, LinkedIn, Twitter

RESEARCH INTERESTS

Blockchains, Data Analysis, Social Computing, Machine Learning.

EDUCATION

PhD., Computer Science Saarbrücken, DE

Max Planck Institute for Software Systems - MPI-SWS August 2018 - present
Universität des Saarlandes - UdS
Networked Systems Research Group

- My research (supervised by Dr. Krishna P. Gummadi) focuses on fairness concerns on proof-of-work blockchains and on Decentralized Finance (DeFi). Our work has been published so far in [ACM IMC'21].

M.Sc., Computer Science Belo Horizonte, BR

Universidade Federal de Minas Gerais - UFMG – Anabin H+ March 2015 - June 2017
Laboratório de Computação Social - LoCuS

- Two-year program. My research was supervised by Dr. Fabrício Benevenuto.
- Thesis: Characterizing Interconnections and Linguistic Patterns in Twitter.

B.Sc., Computer Science – Exchange Program Budapest, HU

Eötvös Loránd University - ELTE – Anabin H+ July 2013 - September 2014

- Honors: Granted a scholarship from the Brazilian Scientific Exchange Program (Science without Borders - CAPES) for Academic Excellence to study in a European University for fourteen months.

B.Sc., Computer Science Ouro Preto, BR

Universidade Federal de Ouro Preto - UFOP – Anabin H+ March 2009 - December 2014

- Four-year program, Total Grade: 8/10. My research was supervised by Dr. Ricardo A. R. Oliveira.
- Thesis: Framework Para Sistemas de Navegação de Veículos Aéreos Não Tripulados.

WORK EXPERIENCE

Data Scientist and Full Stack Software Engineer Belo Horizonte, BR

Kunumi Serviços em Tecnologia da Informação June 2017 - July 2018

- I worked on machine learning projects for risk and loan default prediction and on health insurance characterization and forecasting where I directly helped to build and deploy an automation system for medical appointment requests using AI to tackle compliance of each patient's insurance plan and their medical conditions. This project was awarded as the most innovative health software in Brazil in 2019 according to IT Forum 365, promoted by PwC and ITMidia.

Research Intern Saarbrücken, DE

Max Planck Institute for Software Systems - MPI-SWS February 2017 - May 2017
Networked Systems Research Group

- I was supervised by Dr. Juhi Kulshrestha and Dr. Krishna P. Gummadi. I contributed to a project on investigating political bias in social media and web search.
- Our work has been published in [CSCW'17] and [Inf Retrieval J'19].

Research Intern Saarbrücken, DE

Max Planck Institute for Software Systems - MPI-SWS February 2016 - May 2016
Networked Systems Research Group

- I was supervised by Dr. Mainack Mondal and Dr. Krishna P. Gummadi. I contributed to a project on managing online data privacy and security via exposure project.
- Our work has been published in [SOUPS'16], [IEEE Internet Computing'17], and [Int J Adv Eng Sci Appl Math'17].

Research Assistant Belo Horizonte, BR

Universidade Federal de Minas Gerais - UFMG March 2015 - June 2017
Laboratório de Computação Social - LoCuS

- I worked on research theory of social computing and data analysis. My research was supervised by Dr. Fabrício Benevenuto. I worked on the research theory of social computing and data analysis. Our work was published on [HT'17], [WI'17], [ASONAM'16], among others. We also deployed a project that explores the spread of misinformation on Facebook, WhatsApp, and Twitter. It results in many systems and publications that were key to our research on misinformation dissemination within public Whatsapp groups [WWW'19], [ICWSM'19], [WebMedia'18].

Developed Systems and Applications

1. **Eleições sem Fake:** We developed multiple systems to help with the Fake News problem. Those systems were the key to our research on misinformation dissemination within public WhatsApp groups [WWW'19], [ICWSM'19], [WebMedia'18].

2. **Ira Ads**: It explores the demographics of ads from the Russian Intelligence Research Agency (IRA) that run prior to 2016 U.S. elections to exploit Facebook's targeted advertising infrastructure to efficiently target ads on divisive or polarizing topics (e.g., immigration, race-based policing) at vulnerable sub-populations. This system was key to our work published in [FAT*'19].

3. **Who Makes Trends?:** Demographic of Trend Promoters is the distribution (or combination) of demographic groups (such as middle-aged white men, young asian women, adolescent black men) in the crowd promoting (or posting about) a topic before the topic becomes Trending on Twitter. This system was key to our work published in [ICWSM'17].

4. **Search Political Leaning of Twitter Users:** This system helps users to infer the political leaning (between democratic and republican) of Twitter. It was key to our work published in [CSCW'17] and [Inf Retrieval J'19].

5. **Secondary Digital Footprint:** Twitter is social, people converse with other users by mentioning their username in their own tweets (e.g., while replying to other Twitter user's tweet or giving a shout-out to them). These conversations are their secondary digital footprint, even if they delete their account or delete selected tweets, this secondary footprint is not deleted automatically and leaks information about them. This system was key to our research published in [SOUPS'16], [IEEE Internet Computing'17], and [Int J Adv Eng Sci Appl Math'17].

SKILLS

Data Science

Social media data (Twitter, WhatsApp, Google+, Facebook) crawling, cleaning and analysis; feature engineering; descriptive and inferential statistics (incl. correlation, regression, t-test, chi-square); applied machine learning (supervised, unsupervised); Python (incl. Pandas, NumPy, SciPy, Scikit-Learn, XGBoost, Matplotlib), iPython, SQL.

Soft Skills

Scientific and non-scientific presentations.

Programming Languages

Python, C, C++, Java.

Languages

Portuguese (native), English (professional), German (A2).

PRESS

Some of my scientific efforts have been covered by news media and specialized blogs, including The New York Times, The Huffington Post, MIT Tech Review, BBC Brasil, Nexo, and Folha de São Paulo.

PUBLICATIONS

For a full list of publications, kindly check my Google Scholar or DBLP profile.

Journal

1. Kulshrestha, J., Eslami, M., **Messias, J.**, Zafar, M.B., Ghosh, S., Gummadi, K.P. and Karahalios, K., 2019. Search bias quantification: investigating political bias in social media and web search. Information Retrieval Journal (Inf Retrievel J'19), 22(1-2), pp.188-227.

2. Mondal, M., **Messias, J.**, Ghosh, S., Gummadi, K.P. and Kate, A., 2017. Managing longitudinal exposure of socially shared data on the Twitter social media. International Journal of Advances in Engineering Sciences and Applied Mathematics (Int J Adv Eng Sci Appl Math'17), 9(4), pp.238-257.

3. **Messias, J.**, Diniz, J.P., Soares, E., Ferreira, M., Araújo, M., Bastos, L., Miranda, M. and Benevenuto, F., 2017. An evaluation of sentiment analysis for mobile devices. Social Network Analysis and Mining (Soc. Netw. Anal. Min.'17), 7(1), p.20.

4. Mondal, M., **Messias, J.**, Ghosh, S., Gummadi, K. and Kate, A., 2017. Longitudinal Privacy Management in Social Media: The Need for Better Controls. IEEE Internet Computing (IEEE Internet Computing'17).

5. **Messias, J.**, Schmidt, L., Oliveira, R. and Benevenuto, F., 2013. You followed my bot! Transforming robots into influential users in Twitter. First Monday. 18(7).

Conference

1. **Messias, J.**, Alzayat, M., Chandrasekaran, B., Gummadi, K.P., Loiseau P., and Mislove A., 2021, Nov. Selfish & Opaque Transaction Ordering in the Bitcoin Blockchain: The Case for Chain Neutrality. In the ACM SIGCOMM Internet Measurement Conference (IMC 2021). Virtual Event. November, 2021. To appear.

2. **Messias, J.**, Alzayat, M., Chandrasekaran, B., and Gummadi, K.P., 2020, August. On Blockchain Commit Times: An analysis of how miners choose Bitcoin transactions. In Proceedings of the Second International KDD Workshop on Smart Data for Blockchain and Distributed Ledger (SDBD'20).

3. Resende, G., Melo, P., Sousa, H., **Messias, J.**, Vasconcelos, M., Almeida, J. and Benevenuto, F., 2019, May. (Mis) Information Dissemination in WhatsApp: Gathering, Analyzing and Countermeasures. In The World Wide Web Conference (WWW'19), (pp. 818-828). ACM.

4. Melo, P., **Messias, J.**, Resende, G., Garimella, K., Almeida, J. and Benevenuto, F., 2019, July. WhatsApp Monitor: A Fact-Checking System for WhatsApp. In Proceedings of the International AAAI Conference on Web and Social Media (ICWSM'19), (Vol. 13, No. 01, pp. 676-677).

5. Ribeiro, F.N., Saha, K., Babaei, M., Henrique, L., **Messias, J.**, Benevenuto, F., Goga, O., Gummadi, K.P. and Redmiles, E.M., 2019, January. On microtargeting socially divisive ads: A case study of russia-linked ad campaigns on facebook. In Proceedings of the Conference on Fairness, Accountability, and Transparency (FAT*'19), (pp. 140-149). ACM.

6. Resende, G., **Messias, J.**, Silva, M., Almeida, J., Vasconcelos, M. and Benevenuto, F., 2018, October. A System for Monitoring Public Political Groups in WhatsApp. In Proceedings of the 24th Brazilian Symposium on Multimedia and the Web (WebMedia'18), (pp. 387-390). ACM.

7. **Messias, J.**, Vikatos, P. and Benevenuto, F., 2017, August. White, man, and highly followed: Gender and race inequalities in Twitter. In Proceedings of the International Conference on Web Intelligence (WI'17), (pp. 266-274). ACM.

8. Reis, J., Kwak, H., An, J., **Messias, J.** and Benevenuto, F., 2017, July. Demographics of news sharing in the us twittersphere. In Proceedings of the 28th ACM Conference on Hypertext and Social Media (HT'17), (pp. 195-204). ACM.

9. Vikatos, P., **Messias, J.**, Miranda, M. and Benevenuto, F., 2017, July. Linguistic diversities of demographic groups in Twitter. In Proceedings of the 28th ACM Conference on Hypertext and Social Media (HT'17), (pp. 275-284). ACM.

10. Chakraborty, A., **Messias, J.**, Benevenuto, F., Ghosh, S., Ganguly, N. and Gummadi, K.P., 2017, May. Who makes trends? understanding demographic biases in crowdsourced recommendations. In Proceedings of the International AAAI Conference on Web and Social Media (ICWSM'17).

11. Kulshrestha, J., Eslami, M., **Messias, J.**, Zafar, M.B., Ghosh, S., Gummadi, K.P. and Karahalios, K., 2017, February. Quantifying search bias: Investigating sources of bias for political searches in social media. In Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing (CSCW'17), (pp. 417-432). ACM.

12. **Messias, J.**, Benevenuto, F., Weber, I. and Zagheni, E., 2016, August. From migration corridors to clusters: The value of Google+ data for migration studies. In Proceedings of the 2016 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM'16), (pp. 421-428). IEEE Press.

13. **Messias, J.**, Diniz, J.P., Soares, E., Ferreira, M., Araujo, M., Bastos, L., Miranda, M. and Benevenuto, F., 2016, August. Towards sentiment analysis for mobile devices. In 2016 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM'16), (pp. 1390-1391). IEEE.

14. Mondal, M., **Messias, J.**, Ghosh, S., Gummadi, K.P. and Kate, A., 2016. Forgetting in social media: Understanding and controlling longitudinal exposure of socially shared data. In Twelfth Symposium on Usable Privacy and Security (SOUPS'16), (pp. 287-299).

TALKS

- 2021: Selfish & Opaque Transaction Ordering in the Bitcoin Blockchain: The Case for Chain Neutrality. ACM SIGCOMM Internet Measurement Conference (IMC 2021). Virtual Event. November, 2021.
- 2020: On Blockchain Commit Times: An analysis of how miners choose Bitcoin transactions. Second International KDD Workshop on Smart Data for Blockchain and Distributed Ledger (SDBD'20). Virtual Event.
- 2020: Countering Misinformation on Social Media Platforms. ThoughtWorks. Virtual Event, BR.

- 2020: Countering Misinformation on Social Media Platforms. SMART Data Sprint 2020. Lisbon, PT.
- 2019: (Mis)Information Dissemination in WhatsApp: Gathering, Analyzing and Countermeasures. 5th International Conference on Computational Social Science (IC2S2'19). Amsterdam, NL.
- 2016: From Migration Corridors to Clusters: The Value of Google+ Data for Migration Studies. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM'16). San Francisco, US.
- 2016: Towards Sentiment Analysis for Mobile Devices. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM'16). San Francisco, US.
- Among others.

TEACHING

Courses

- 2019, 2020: Teaching Assistant for Operating Systems at MPI-SWS and UdS.
- 2016, 2017: Teaching Assistant for Analysis and Algorithm Design at UFMG.
- 2013: Design and Analysis of Algorithms for high school students at Escola Estadual Dom Silvério.
- 2013: Operating System for high school students at Escola Estadual Dom Silvério.
- 2013: Introduction to Hardware for high school students at Escola Estadual Dom Silvério.