Daniel de Souza Severo

For more information: https://dsevero.com

BIO & RESEARCH INTERESTS

Broadly, my interests are information theory, generative modeling, and data compression. Current compression algorithms are not well suited to handle structured and high-dimensional data, such as images and graphs. I'm interested in building computationally efficient compressors for structured data that can be used with deep generative models. I have 5 years of industry experience applying machine learning to real-world problems, as well as open-source contributions to large projects such as dask/Dask and facebookresearch/NeuralCompression.

EDUCATION

University of Toronto
Electrical & Computer Engineering
- Doctor of Philosophy (Ph.D.) — Started Fall 2020
- Undergraduate Exchange Program (1 year) — 2013 - 2014

Federal University of Santa Catarina, Brazil — 2010 - 2015
Bachelor of Science in Electronics Engineering
First Class Honours, 99th percentile.

RESEARCH EXPERIENCE

Google AI — Toronto, Jan/2022 - Jan/2023
Student Researcher with Lucas Theis and Johannes Ballé

Meta AI (previously FAIR) — New York, Summer 2021
Research Scientist Intern with Karen Ullrich

Vector Institute for AI — Toronto, 2020 - Current
Ph.D. Student Researcher with Alireza Makhzani

FIRST AUTHOR PUBLICATIONS

Ruan*, Yangjun, Karen Ullrich*, Daniel Severo*, et al.: *Improving Lossless Compression Rates via Monte Carlo Bits-Back Coding*. Accepted as a Long Talk at ICML 2021. arXiv: 2102.11086 [cs.LG].

Severo, Daniel, Elad Domanovitz, and Ashish Khisti: *Regularized Classification-Aware Quantization*. Accepted at BSC 2021. arXiv: 2107.09716 [cs.LG].

Severo*, Daniel, James Townsend*, Ashish Khisti, et al.: *Compressing Multisets with Large Alphabets using Bits-Back Coding*. Accepted to IEEE Journal on Selected Areas in Information Theory, 2023. 2021. arXiv: 2107.09202 [cs.IT].

— *Your Dataset is a Multiset and You Should Compress it Like One*. Accepted as a Talk in Deep Generative Models and Downstream Applications Workshop @ NeurIPS 2021. 2021.

OTHER PUBLICATIONS

Domanovitz, Elad, Daniel Severo, Ashish Khisti, et al.: "Data-Driven Optimization for Zero-Delay Lossy Source Coding with Side Information". In: *ICASSP 2022-2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*. IEEE. 2022, pp. 5203–5207.

Neklyudov, Kirill, Rob Brekelmans, Daniel Severo, et al.: *Action Matching: Learning Stochastic Dynamics from Samples*. 2022. arXiv: 2210.06662 [cs.LG].

Reys, Arthur D., Danilo Silva, Daniel Severo, et al.: *Predicting Multiple ICD-10 Codes from Brazilian-Portuguese Clinical Notes*. Accepted at BRACIS 2020. arXiv: 2008.01515 [cs.CL].

Silva, Henrique P., Arthur D. Reys, Daniel S. Severo, et al.: *Predição de Incidência de Lesão por Pressão em Pacientes de UTI usando Aprendizado de Máquina*. Accepted to XVIII Congresso Brasileiro de Informática em Saúde (CBIS 2021). 2021. arXiv: 2112.13687 [cs.LG].

PREPRINTS

Severo, Daniel, Flávio Amaro, Estevam R. Hruschka Jr, et al.: *Ward2ICU: A Vital Signs Dataset of Inpatients from the General Ward*. 2019. arXiv: 1910.00752 [cs.LG].

AWARDS

Best Paper Award at NeurIPS Workshop 2021
Your Dataset is a Multiset and You Should Compress it Like One received the Best Paper Award at the Deep Generative Models and Downstream Applications workshop at NeurIPS 2021.

Vector Scholarship in AI Recipient 2020-21 2020
The Vector Scholarship in AI supports the recruitment of top students to AI-related master's programs in Ontario and is valued at $17,500.
https://vectorinstitute.ai/aimasters

NSERC Applied Research Rapid Response to COVID-19 Grant 2020
Our project titled "Canadian Hospital Simulator For Management of COVID19 Cases and Contact Tracing" was awarded $75,000.00.
https://www.nserc-crsng.gc.ca/Innovate-Innover/CCI-COVID_eng.asp

Virtual Design Challenge Winner 2019
Won 1st place at the VDC hosted by The University of British Columbia with my paper *Proof of Novelty*. Received a cash prize of $3,000.
https://github.com/dsevero/Proof-of-Novelty

Student Merit Award and Medal 2015
Graduated with the highest GPA ever obtained (at the time) for my major. Elected "Best Student" by the faculty of Electrical & Electronics Engineering at the Federal University of Santa Catarina.

Science Without Borders Scholarship 2013
Awarded a full scholarship that covered tuition, transportation, necessary materials and living costs to study 2 academic semesters at the University of Toronto.

ACADEMIC SERVICES

Transactions on Machine Learning Research (TMLR)
- Reviewer June/2022 - Now

TEACHING EXPERIENCE

Federal University of Santa Catarina - *Teaching Assistant*
- Communications Theory Fall and Winter 2015
- Introduction to Electronics Fall and Winter 2013
- Single-Variable Calculus Fall 2010

CERTI Foundation - *Programming Instructor* 2010 - 2013

OPEN SOURCE CONTRIBUTIONS

Craystack
- https://github.com/j-towns/craystack/pulls?q=author:dsevero

Neural Compression
- https://github.com/facebookresearch/NeuralCompression

Dask & Dask-ML
- https://github.com/dask/dask/pulls?q=author:dsevero
- https://github.com/dask/dask-ml/pulls?q=author:dsevero

OTHER PROFESSIONAL EXPERIENCE

3778 Healthcare - *Machine Learning Engineer* 2018 - 2020
Linx Impulse - *Head of Data Science* 2016 - 2018
CERTI Foundation - Research Engineer 2015 - 2016
Wavetech Technology - *Embedded Systems Intern* 2015
CERTI Foundation - Electrical Engineering Intern 2010 - 2013
WEG Industries - *Electrical Engineering Intern* Summers 2011 and 2012