Daniel de Souza Severo

For more information: https://dsevero.com

RESEARCH INTERESTS

Minimum Description Length (MDL) Principle and its connections to machine learning and data compression. Currently working on lossless compression through bits-back coding and deep latent variable models with my advisors Ashish Khisti (UToronto) and Alireza Makhzani (Vector Institute).

EDUCATION

University of Toronto
Electrical & Computer Engineering
Master of Applied Science (M.A.Sc.) — 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.

AWARDS

Vector Scholarship in Artificial Intelligence 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.

PUBLICATIONS

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].

PREPRINTS

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

Severo, Daniel: *A Report on the Ziggurat Method*. 2020. DOI: 10.6084/m9.figshare.10324868.v1.

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].

TEACHING EXPERIENCE

Federal University of Santa Catarina
Teaching Assistant
Assisted professors by ministering tutorials, preparing lecture materials and helped students individually at regular office hours.

- **Communications Theory** Fall and Winter 2015
  Amplitude and frequency modulations; multiplexing; noise in communication systems; pulse modulation; analog-to-digital conversion; digital transmission in baseband and passband.
- **Introduction to Electronics** Fall and Winter 2013
  Operational amplifiers; diodes; the bipolar junction transistor; field effect transistors; optoelectronic components.
- **Single-Variable Calculus** Fall 2010
  Real-valued functions; limits; continuity; derivatives and applications; definite and indefinite integrals; integration techniques; improper integrals.

CERTI Foundation 2010 - 2013
Intern Programming Instructor
Responsible for the technical training of new and current interns. Created a training course in LabVIEW programming that is still in use as of 2020.

PROFESSIONAL SERVICE

NeurIPS 2019: Conference on Neural Information Processing Systems
Reviewer for the Machine Learning for Health (ML4H) workshop.

OPEN SOURCE CONTRIBUTIONS

Dask: Scalable analytics in Python
`https://github.com/dask/dask/pulls?q=author:dsevero`

Dask-ML: Scalable Machine Learn with Dask
`https://github.com/dask/dask-ml/pulls?q=author:dsevero`

Ward2ICU: A Vital Signs Dataset of Inpatients from the General Ward
`https://github.com/3778/Ward2ICU`

PROFESSIONAL EXPERIENCE

Vector Institute for Artificial Intelligence 2020 - Current
Graduate Student Researcher
Currently working on machine learning and information theory (source coding).

3778 Healthcare 2018 - Current
Machine Learning Engineer & Researcher
Developed a Fast Healthcare Interoperability Resources DataLake for running high volume machine learning models; Feature engineering and mathematical modeling for clustering algorithms used to segment patients into similar health groups; Ranked patients by future spendings using financial data achieving a precision at n=1,000 of 50% from a 15,000 total; Predicted patient LoS (Length of Stay) with regression techniques and hospital sensor data;

Linx Impulse 2016 - 2018
Head of Data Science
Developed recommendation algorithms for E-commerce customers; Provided ad-hoc big data analyses to find insights from our data; Designed and monitored competitive A/B experiments devised to validate our systems performance in the face of competition; Internal A/B testing tool using the SciPy and Jupyter stack; Bandit algorithms for online optimization.

Wavetech Technology Solutions 2015
Embedded Systems Engineering Intern.
Worked on microcontroller programming in C/C++ for cochlear implants.

CERTI Foundation 2010 - 2013 (Intern.)
Implemented signal processing routines (filter design 2015 - 2016 (R. Eng)
and realization) in C; Programmed back-end and front-end Python software for Raspberry Pi; Embedded eLua on a platform previously developed by CERTI.

WEG Industries Summers 2011 and 2012
Electrical Engineering Intern.
Software upgrade, in LabVIEW, of an automatic calibrator of multimeters in order to account for different input frequencies; Conception and implementation of a hardware and software (LabVIEW) system that acquires, processes and stores data of specific parameters of electric motors.

REFERENCES

Prof. Ashish Khisti University of Toronto
Professor and Canada Research Chair (Tier II)
Department of Electrical & Computer Engineering
`https://www.comm.utoronto.ca/~akhisti/`

Prof. Alireza Makhzani Vector Institute
Faculty member at the Vector Institute for Artificial Intelligence
Adjunct Professor and Canada CIFAR AI Chair
Department of Electrical & Computer Engineering
`http://www.alireza.ai/`

Prof. Danilo Silva Federal University of Santa Catarina
Associate Professor
Department of Electrical and Electronic Engineering
`http://danilosilva.sites.ufsc.br/index.html`

Prof. Chen Feng The University of British Columbia
Assistant Professor
School of Engineering
`https://people.ok.ubc.ca/cfeng01/index.html`

Prof. Frank R. Kschischang University of Toronto
Distinguished Professor of Digital Communication
Department of Electrical & Computer Engineering
`https://www.comm.utoronto.ca/frank/`