Bernardo Aurelio Gonzalez Torres

 users.soe.ucsc.edu/~bernardotorres   ✉ bernardo.gtorres@gmail.com

 bernardo-gonzalez-torres   (831) 783 7341 (only text messages)

INTERESTS

Unsupervised Learning, Deep Learning, Anomaly detection, Optimization, Robust Learning

EDUCATION

2020 — **M. Sc. in Computer Science**, UC Santa Cruz, USA
Advisor: Prof. Yang Liu
Thesis title: *An Algorithmic Introduction to Clustering*
GPA: 4.0/4.0
Relevant Coursework: *Machine Learning, Advanced Machine Learning, Numerical Optimization, Fourier Analysis of Boolean Functions*

2016 — **M. Sc. in Computer Science**, Computer Research Center (CIC-IPN), Mexico
Advisors: Prof. Ricardo Menchaca-Mendez and Prof. Mordejai Zvi Retchkiman Konigsberg
Thesis title: *Data reduction for Machine Learning algorithms (In Spanish)*
GPA: 9.6/10.0
Relevant Coursework: *Discrete Mathematics, Linear Algebra, Probability Theory, Analysis of Algorithms, Pattern Recognition, Foundations of Machine Learning, Convex Optimization, Multi-objective Optimization*

2012 — **B. Sc. in Mechatronics Engineering**, National Polytechnic Institute (IPN), Mexico
GPA: 9.05/10.00
Rank 1/120

EXPERIENCE

Mar 2021 - Present — **ML Consultant**
Provide expertise in the design and implementation of ML solutions:

- Designed and implemented a face recognition system for a Mexican government agency
- Established a methodology to use and manage confidential data

Oct 2018 - Dec 2020 — **Graduate Student Researcher**, *UC Santa Cruz, USA*
Unsupervised learning and applications:

- Implemented and evaluated a novel deep learning based Anomaly Detection algorithm for visual inspection in manufacturing lines
- Researched different clustering algorithms and the relationship between them
- Proposed a clustering-based algorithm to empirically improve the results of the Goemans–Williamson algorithm for the Max-Cut problem (NP-hard problem)
- Designed a sub-quadratic version of the DBSCAN clustering algorithm
- Designed and implemented a preference based fair clustering algorithm
- Implemented a graph clustering algorithm based on Fast-ppr, an approximated version of the personalized pagerank algorithm

Summer 2018 — **Machine Learning Research Intern**, *Bosch Center for Artificial Intelligence, Sunnyvale, USA*
Distributed Optimization for HD-Maps (Mentor: Jeff Irion):

- Contributed to the development of a novel method to solve large-scale Graph SLAM problems using a computer cluster.
- Main responsibilities: Unit tests implementation to ensure code correctness, results validation through tests and experiments, and engineered data serialization for interfacing with C++ code

Summer 2017	**Machine Learning Research Intern**, *Bosch Center for Artificial Intelligence, Palo Alto, USA* Robust loss functions for HD-Maps (Mentors: Sauptik Dhar, Jeff Irion):

- Contributed to the development of robust algorithms for large-scale Graph SLAM problems through robust loss functions.
- <u>Main responsibilities</u>: Formulation and implementation of novel edge types (using robust loss functions) in the g2o framework

TEACHING EXPERIENCE

2018 - 2020	**Graduate Teaching Assistant**, *UC Santa Cruz, USA* Courses: Introduction to Data Structures, Introduction to Data Structures and Algorithms, Foundations of Data Science Instructors (respectively): Prof. Nina Bhatti, Prof. Patrick Tantalo, Prof. Yang Liu

- Worked with up to 250 students, holding office hours and lab sessions, both on-site and on-line
- Helped students troubleshooting their algorithms and assisted them to debug their codes
- Wrote homework problems
- Provided feedback to students in final projects evaluation
- Coordinated graders

PUBLICATIONS

- Sauptik Dhar, Bernardo A. Gonzalez Torres. **"DOC^3 - Deep One Class Classification using Contradictions"**. *arXiv preprint: 2105.07636*. June 2021

- Angel E. Rodriguez Fernandez, Bernardo A. Gonzalez Torres, Ricardo Menchaca Mendez, Peter F. Stadler. **"Clustering Improves the Goemans–Williamson Approximation for the Max-Cut Problem"**. *Computation*. August 2020

- Bernardo A. Gonzalez Torres. **"An Algorithmic Introduction to Clustering"**. *arXiv preprint: 2006.04916*. June 2020

SCHOLARSHIPS, HONORS AND AWARDS

2017 - 2020	Graduate Research Assistantship at UC Santa Cruz
2016 - 2017	Miguel Velez fellowship for Latin American graduate students at UC Santa Cruz
2013 - 2015	Mexican National Council for Science and Technology (CONACyT) scholarship for M.Sc. studies
2012	Best student of the class of 2007-2012 in the field of Mechatronics Engineering at National Polytechnic Institute (IPN)
2007 - 2011	Telmex foundation scholarship for outstanding students for Bachelors studies
2006 - 2007	National Polytechnic Institute scholarship for the first year of Bachelor studies
2003 - 2006	National Polytechnic Institute scholarship for High School studies

COMPUTER SKILLS

- *Programming languages:* Python, C, Matlab, Lisp

- *Machine Learning libraries:* Pytorch, Scikit-learn, Numpy, Scipy, Pandas, Matplotlib

- *Distributed Data Processing:* Apache Spark

- *Optimization software:* IBM CPLEX, CVX, CVXPY, g2o

- *OS:* Linux, macOS, Microsoft Windows

- *Others:* Latex, Containers

LANGUAGES

- Spanish (Native language)

- English (Fluent)

- German (Basic)