Mauricio Tec

Hi! I am an inquisitive Ph.D. student at UT Austin. Passionate for the art of mathematics and computers, I began my career tackling real-world problems with economic and financial data. Today, I seek to contribute to ongoing AI research from two perspectives: by developing scalable, parallelizable and decentralized algorithms, and by harnessing Probability and Statistics to provide insights and suggest smarter models. Please reach out if you want to collaborate.

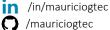
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Education

University of Texas at Austin, USA

PhD Candidate, Statistics GPA: 4.0/4.0 2017 to date

University of Cambridge, UK

MS Mathematics, Cambridge Trust Scholar 2014 - 2015

Instituto Tecnologico Autonomo de Mexico (ITAM), Mexico

BS Applied Mathematics, Bailleres Scholar 2007 - 2013

Universite Paris Dauphine, France

Exchange Student 2011 - 2012

Skills

Computing

- · Advanced Python, R, Julia, C++, Matlab
- · Parallel computing with Intel High-Performance Computing Linux clusters

Machine Learning, Statistics

- Deep Learning
- Bayesian Nonparametrics
- · Reinforcement Learning
- · Dynamic Models and Particle Filters
- · Network Data and Models
- · Random Forests ad GBMs
- · Natural Language Processing
- · Statistical Analysis
- · Time-Series Forecasting

Languages

Fluent in English, Spanish and French Basic German.

Leisure

I like hiking and cycling. You can find me by the river near Austin's Zilker Park. I enjoy playing piano and guitar.

Research

University of Texas at Austin, PhD Statistics

Sep 2017 to Date

Predictive densities with total variation denoising for large networks Advisor: Prof. James G. Scott

- · Developed a novel parallelizable ADMM algorithm for fitting densities on large networks with spatiotemporal edge smoothing. Exploring extensions to conditional densities using nested logistic regression and deep neural networks.
- Tested the methodology on the University of Texas' Stampede2 supercomputer using Ride Austin data (Uber-type non-profit) to study spatiotemporal discrepancies in driver productivity. Achieved ~2000x speed-up over serial code.

Natural Language Processing for policy and food security advocacy Advisors: Prof. Kate Weaver, Eleanor Crook Foundation, James G. Scott

· Designed a Python toolkit and web app that track vote information and news from Members of Congress on Food Security policy issues. Skills: topic modeling, text summarization, web scraping, search engines.

Other research

- · Proposed Random Network models based on clique covers that match the local clustering coefficient and sparsity of real-world networks, outperforming stateof-the-art models for sparse networks in Bayesian frameworks (with Prof. Sinead Williamson).
- Investigated the use of fast online dynamic Bayesian nonparametric density estimation techniques in non-stationary bandit problems in Reinforcement Learning (with Prof. Stephen G. Walker).

Publications

Williamson, S., Mauricio Tec. "Random clique covers for graphs with local density and global sparsity". Submitted to AISTATS 2019. Preprint arXiv:1810.06738.

Zuniga-Garcia, N., Mauricio Tec, J. G. Scott, N. Ruiz-Juri, R. Machemehl. "Evaluation of Ride-Sourcing Search Frictions and Driver Productivity: A Spatial Denoising Approach". Preprint arXiv:1809.10329. Presented at INFORMS 2018. In review for publication by Transportation Research Part C.

Teaching

Teaching Assistant, Department of Statistics, University of Texas at Austin Aug 2017 to May 2017

• (i) International Public Policy with Python (ii) Data Analysis for Health Sciences.

Lecturer - Department of Statistics, Instituto Tecnologico Autonomo de Mexico Aug 2015 - Jul 2017 & Jan 2013 - Aug 2014

- · Designed and taught courses in Statistics, Data Science and Reinforcement Learning for students of Applied Mathematics.
- · Used diverse data science technologies in teaching, including Github, Python (NumPy, Pandas, Tensorflow, Scikit-learn, Jupyter Notebooks), R (Rcpp, Shiny, Rmarkdown, tidyverse), Matlab, Julia, STAN and C++.

Industry

CI Banco - Data Scientist

Jan 2016 - Aug 2017

Financial group in Mexico that offers portfolio management, and brokerage services

- · Saved five hours of manual daily work by implementing a data warehouse and a comprehensive set of performance reporting tools using SQL, R, and Shiny.
- Developed an in-house portfolio optimization toolkit using R and C++, achieving automated profitable mid-term investment strategies.

CIDAC - Research Analyst

Jan 2013 - Aug 2014

Independent think-tank devoted to the evaluation and engineering of public policy in Mexico

- · Proposed policy evaluation metrics and performance indexes using multivariate statistics, influencing their adoption by the National Health Institute of Mexico (IMSS) and the International Labor Organization (ILO) in Latin America.
- · Targeted multiple audiences and organizations for media coverage and fundraising by drafting and editing publications, plan proposals, reports, presentations, and blog posts