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.

Contact

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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 in Intel's 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 state-of-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