Mauricio Tec

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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
BS Applied Mathematics, Bailleres Scholar
2007– 2012

Universite Paris Dauphine, France
Exchange Student of M1 Applied Mathematics
2011 – 2012

Skills

Computing

- Advanced Python, R, Julia, C++, Matlab
- Parallel computing using 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 play piano and guitar.

Organizational

- Graduate Student Assembly representative of the Statistics Department (2017-2018)
- Co-chair & Communication Officer of the 50th Wolfson College Research Event at the University of Cambridge (2014-2015).

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 fast and flexible ADMM algorithm for fitting conditional densities on each vertex of big spatiotemporal networks with noisy and sparse data, using total variation edge smoothing. Experimented with diverse models for local model fitting, including neural networks.
- Coded the algorithm using Julia, with attention to memory usage, and featuring parallelism at all levels: distributed, multithreading and vectorization; ~2k lines of code. Tested it on UT's Stampede2 supercomputer using Ride Austin data (ride-sharing non-profit) to study spatiotemporal discrepancies in driver productivity.

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. Coded in Python (with Prof. Sinead Williamson).
- Compared existing Deep Reinforcement Learning approaches. Examined the statistical principles behind Alpha Zero. Replicated the algorithm for simple games using Python and Tensorflow. Investigated the use of Bayesian density estimation techniques in bandit problems. (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, ITAM
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, Scikit-learn, Jupyter Notebooks), R (Rcpp, Shiny, Rmarkdown, tidyverse), Matlab, Julia, STAN and C++.

Industry

CIBanco – Data Scientist
Jan 2016 – Aug 2017
Financial group 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

- 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, and blog posts