Mani Bayani

Curriculum Vitae

PERSONAL DETAILS

Address	415 Lefferts Ave, Apt A16, Brooklyn, New York
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EDUCATION

Ph.D. Economics 2016-present
The Graduate Center of the City University of New York
Fields: Econometrics and Machine Learning, High-Dimensional Models, Policy Analysis
Dissertation: "Essays on Machine Learning Methods in Economics"

M.Sc. Applied Mathematics 2020-present
Columbia University in the City of New York

M.Sc. Analytics 2018-2021
Georgia Institute of Technology
Computational Data Analytics Track

M.Sc. Computer Science 2018-2021
University of Illinois at Urbana–Champaign
Concentration: Machine Learning

M.A. Economics 2011-2014
University of Tehran, Iran
Thesis title: "*The implementation of hidden Markov models for estimating CO2 emissions*"

B.Sc. Computer Science 2006-2010
Sheikh Bahaei University, Iran

WORKING PAPERS

- **Robust PCA Synthetic Control Model [Under Reiview]**
  https://arxiv.org/abs/2108.12542
- **The Contribution of the Minimum Wage to US Wage Inequality: A Penalized Spline Approach**
  https://mbayani.github.io/The-Contribution-of-the-Minimum-Wage-to-US-Wage-Inequality/

WORK IN PROGRESS

- **Improving Time Series Extrinsic Regression**

RESEARCH EXPERIENCE

Data Science Institute Scholar 2020-2021
Columbia University
Research on broadband funding with Professor Henning Schulzrinne

Data Science Fellow 2020-present
The Baruch College of the City University of New York
Analysis of Baruch students' academic performance with Professor Sonali Hazarika

Research Assistant 2020-present
City University of New York, The Graduate Center
Research on using artificial intelligence to analyze complex and highly dimensional economic models with Professor Lilia Maliar

TEACHING EXPERIENCE

Adjunct Instructor 2017-present
The Brooklyn College of the City University of New York
Math for Economist (Econ 3410)

Adjunct Instructor 2018-present
The Gabelli School of Business, Fordham University
Statistical Decision Making (Econ 2142)
Statisitcs 1 (Econ 2140)

Teaching Assistant 2020-present
The Graduate Center of the City University of New York
Machine learning for economist (Graduate), for Professor Lilia Maliar

Teaching Assistant 2019-present
Georgia Institute of Technology
High-Dimensional Data Analytics (Graduate), for Professor Kamran Paynabar

Teaching Assistant 2017-2018
Columbia University
Statistics and Econometrics (Undergraduate), for Professor Homa Zarghamee

EXPERIENCE

A Collaborative Filtering Recommender System App Fall 2021
https://github.com/mbayani/A-Collaborative-Filtering-Recommender-System-App

Search on Video Spring 2020
https://github.com/mbayani/Search-on-video

Company Specific Disruptive News and Continuity Detector Fall 2019
https://github.com/mbayani/Company-Specific-Disruptive-News-and-Continuity-Detector

Software Test Developer 2009-2011
Metaco Holding
Isfahan,Iran

SCHOLARSHIPS AND AWARDS

Doctoral Student Research Grant 2020-2021
The Graduate Center of the City University of New York

The Advanced Research Collaborative Fellowship 2018-2019
The Graduate Center of the City University of New York

Graduate Center Fellowship 2016-2020
The Graduate Center of the City University of New York

Graduate Fellowship 2015-2016
Western Michigan University

SKILLS

Languages	Persian (native) English (fluent)
Software	Proficient in PYTHON, R, MATLAB ,LaTeX Experience with TABLEAU, SQL

REFERENCES

Lilia Maliar, Professor of Economics
The Graduate Center, CUNY
Email: lmaliar@gc.cuny.edu

Wim Vijverberg, Professor of Economics
The Graduate Center, CUNY
Email: wvijverberg@gc.cuny.edu

Kamran Paynabar, Associate Professor of Industrial and Systems Engineering
Georgia Institute of Technology
Email: kamran.paynabar@isye.gatech.edu

Sonali Hazarika, Associate Professor of Economics
Baruch College, CUNY
Email: sonali.hazarika@baruch.cuny.edu

Paul Goldberg, Associate Professor of Economics
Brooklyn College, CUNY
Email: paulg@brooklyn.cuny.edu

THESIS ABSTRACT

Paper I: "Robust PCA Synthetic Control"

In this study, I propose a five-step algorithm for synthetic control method for comparative studies. My algorithm builds on the synthetic control model of Abadie et al., 2015 and the later model of Amjad et al., 2018. I apply all three methods (robust PCA synthetic control, synthetic control, and robust synthetic control) to the answer the hypothetical question, what would have been the per capita GDP of West Germany if it had not reunified with East Germany in 1990? I then apply all three algorithms in two placebo studies. Finally, I check for robustness. This paper demonstrates that my method can outperform the robust synthetic control model of Amjad et al., 2018 in placebo studies and is less sensitive to the weights of synthetic members than the model of Abadie et al., 2015.

Paper II: "Improving Time Series Extrinsic Regression"

Time series extrinsic regression, or scalar-on-function regression, is a method to estimate a scalar dependent variable based on time series observations. The common methods of time series estimation (like ARIMA) are not suitable for these types of data sets since time series estimations put higher weight on the most recent data point in the time series, while in time series extrinsic regression all data points in the time series could be equally important for the estimation of the scalar dependent variable. In this study, I suggest implementing smooth-sparse decomposition method to improve the prediction accuracy of deep learning models like ROCKET (exceptionally fast and accurate time series classification using random convolutional kernels), InceptionTime and Resnet on time series extrinsic regression.

Paper III: "The Contribution of the Minimum Wage to US Wage Inequality: A Penalized Spline Approach"

I reassess the effect of minimum wage on US earnings inequality using data from 1979 to 2012 and a penalized spline technique that addresses potential biases in parametric estimation in prior works. I find that, in contrast with the initial study of Lee (1999) and based on the Current Population Survey, the spillover effect of minimum wage on upper tail and lower tail of wage distribution, where the minimum is nominally nonbinding, is small and not significant.