Tural Sadigov

U.S. Permanent Resident

October 2022

Hamilton College, 198 College Hill Rd, Clinton, NY

+1 (812) 650 - 2583

turalsadigov.github.io/

tsadigov@hamilton.edu

turalsadigov

tural-sadigov

About me

Visiting Assistant Professor of Mathematics and Statistics with Ph.D. in Applied Mathematics and 7+ years experience in developing and teaching both mathematics and data-related courses such as various levels of Statistics, Machine Learning, Probability, and Time Series Analysis (on Coursera) and mentoring undergraduate Machine Learning projects in Statistical Methods in Machine Learning course. Using R and RStudio extensively in all data-related courses. Creator of R package stats2data for the Statistical Modeling and Applications course at Hamilton College. Problem solver since his high school Mathematical Olympiad years. More detailed cv: `https://turalsadigov.github.io/cv.html`

Current and Past Positions

2020 - Visiting Assistant Professor — Hamilton College

Redesigned a series of data science courses such as Statistical Analysis of Data, Statistical Modeling, and Its Applications and Statistical Methods in Machine Learning by incorporating heavy coding into lectures, assessments, and projects, and actively participated in data science initiatives of Hamilton College where one such initiative resulted in a data science major. Successfully engaged students in Machine Learning projects. Played a crucial role in increasing the number of majors in mathematics and data science.

2017 - Coursera Instructor — Coursera

Practical Time Series Analysis

2015 - 20 Applied Mathematics Lecturer and Math Service Coordinator — SUNY Polytechnic Institute

Promoted data analysis certificate by delivering technical lectures in various statistics and applied mathematics courses such as Applied Probability, Regression, and Time Series Analysis at undergraduate and graduate levels.

Education

2008 - 15 Ph.D and MA, Applied Mathematics — Indiana University

Bloomington, IN

2003 - 08 BS, Mathematics — Boğaziçi University

Istanbul, Turkey

Data Science and Coding Skills

- Python, R, SQLite
- Supervised/Unsupervised Machine Learning
- Data Wrangling, Cleaning, Preprocessing & Feature Engineering
- Time Series Analysis: ARIMA, SARIMA
- Statistical Inference
- Data Visualization (ggplot)
- Familiarity with TensorFlow
- Communication, reporting and dashboard: Quarto, R Markdown, Jupyter Notebook, R Shiny. Sample R Shiny web app: Link to the app
- Leadership: have been advising many students in math and data science majors at the college, was the Math Service Coordinator in my previous job

Research Experience

2020, 21 Summer Research Associate — Air Force Research Lab Griffis Institute

Proved the existence of theoretical neural network solutions for differential equations, and designed and implemented numerical algorithms in Python to solve partial differential equations. This was a teamwork consisting of two research scientists, me, and one of my students.

Awards/Grants

- Summer research grants, Air Force Research Lab/Griffis Institute, 2021-22 ($36000)
- Dean's Pedagogical Development Awards, Hamilton College, 2021-22 ($4500)
- Teaching Grant from Herkimer College and Hamilton College for teaching Financial Mathematics, 2022 ($10000)
- SGU Award for Excellence in Teaching, SUNY Poly, AY 2018-19
- Bronze Medal, 44th International Mathematical Olympiad, Tokyo, Japan, 2003
- Gold Medal (four times), Azerbaijan Mathematical Olympiad, 2000-03

Selected mentored ML projects (All are teamwork)

1. *Does Economic Development Predict Democratization?*, With Chiara Bondi, John Madigan, 2022
    - Methods: Joining dataset from various sources, data wrangling (pivoting), training and testing split, data imputation, feature engineering, Regularized Regression Models (LASSO, Ridge, Elastic-Net), cross-validation and hyper-parameter tuning
2. *A Regularized Binomial Logistic Regression Approach to Cancer Classification Using Gene Expression*, Joshua Horowitz, Mukund Jayaran, 2022
    - Methods: feature engineering, training and testing split, Multiple Logistic Regression with L1 regularization,
3. Predicting Career Longevity of NBA Rookies, Margaret Phipps, Luke Devine, 2021
    - Methods: feature engineering, training and testing split, Support Vector Classifier, Support Vector Machines (with polynomial and radial kernels), cross validation and hyper-parameter tuning, confusion matrices
4. Identifying Parkinson's Disease Through Speech Patterns, Ian Nduhiu, Lindsay Gearty (Methods: Support Vector Machines), 2021
    - Methods: training and testing split, Support Vector Classifier, Support Vector Machines (with polynomial and radial kernels), cross validation and hyper-parameter tuning, confusion matrices, ROC curves, AUC comparison
5. Predicting Housing Rent Prices Using House Characteristics, Taron Kui, Iftikhar Ramnandan, Jenny Tran, 2021
    - Methods: examination of multicollinearity, training and testing split, pruned regression/decision tree, bagged model and random forest, cross validation and hyper-parameter tuning,
6. How Race, Income, and Education Relate to Inter- net Access in US Counties, Lindsay Gearty, Margraet Phipps (Methods: Multiple Polynomial Regression, Forward/Backward Variable Selection), 2021
    - Methods: feature engineering, multiple linear regression, polynomial regression, backward variable selection using various measures, examination of multicollinearity

Selected data-related talks

1. Theoretical Analysis of Artificial Neural Network solutions to the damped, driven Korteweg de-Vries equation, AMS Special Session, 2022
2. Support Vector Machines, CUNY - Hunter College, 2021
3. Model Selection & Validation in Machine Learning, CUNY - Hunter College, 2021
4. Support Vector Machines: Overview and Applications, CUNY - Hunter College, 2020
5. Support Vector Machines: Overview and Applications, Hamilton College, 2020
6. Stochastic Calculus: Ito Integrals and Stochastic Differential Equations, SUNY Poly, 2019
7. Stochastic Processes, Markov Chain and Brownian Motion, SUNY Poly, 2019

Publications

1. Safety Prediction Model for Reinforced Highway Slope using a Machine Learning Method, 2020 (Link to the paper)
2. A Determining Form for the Subcritical Surface Quasi-Geostrophic Equation, 2019 (Link to the paper)
3. Determining form and data assimilation algorithm for weakly damped and driven Korteweg–de Vries equation — Fourier modes case, 2017 (Link to the paper)
4. A determining form for the damped driven nonlinear Schrödinger equation—Fourier modes case, 2015 (Link to the paper)