Mehdi Rezaie

github.com/mehdirezaie • phy.ohio.edu/∼rezaie/• Google Scholar • mr095415@ohio.edu

Skills

- **Statistical Data Analysis, Machine Learning, and Scientific Computation**
  - Modeling, Prediction with Linear, Non-Linear, Non-Parametric Regression Methods
  - Programming in Python (Numpy, Scikit-learn, Scipy, Tensorflow, Pandas, MPI4Py), Julia, Fortran, C, Shell
  - Experimentation, Testing with Monte Carlo Simulations, Bootstrap and Jackknife Resampling
  - Bayesian Statistics, Monte Carlo Markov Chains
  - Exploratory Data Analysis, Data Transformation and Processing
  - Time Series with Fourier Analysis
  - Databases with SQL (Select, Join, Aggregation)
  - Github Version Control, Jupyter Notebook, LaTeX Documentation
  - High Performance Computation, Parallel Computing with Message Passing Interface (MPI)
  - Visualization with Matplotlib, Seaborn, Gnuplot,Tableau
  - Analytical Problem-Solving, Structured Thinking
- **Modeling, Applications, and Data Mining**
  - Developed, implemented, validated, and applied a software called SYSNet, based on Neural Networks, for non-linear modeling of systematic effects in big astrophysical data, legacysurvey.org. My non-linear model outperformed linear regression, and reduced the order of systematic error by two many folds below 1% (see the **paper** arxiv.org/abs/1907.11355 which is submitted to MNRAS, github.com/mehdirezaie/SYSNet).
  - Modified, validated, and applied a non-parametric regression model on the Supernovae Hubble diagram. My method outperformed linear regression with more than 68.27% in bias (see github.com/mehdirezaie/SN).
  - Implemented, evaluated sophisticated data mining methods, including decision tree, greedy set cover, K-fold cross-validation, and bootstrapping on plants data for classification. My implementations achieved more than 80% accuracy in predicting whether or not a plant is resistant to heat (see github.com/mehdirezaie/DataMining).
  - Applied data mining processes (involving data cleaning, exploratory data analysis, feature extraction, pattern discovery and classification) to discover new knowledge about the correlation between the stock market prices and Facebook Check-in data (see github.com/mehdirezaie/Facebook).
- **Teamwork, Collaborations, and Communication**
  - In collaboration with the clustering and imaging working groups, I carried out regression and clustering analyses on millions galaxies for two galaxy survey experiments, DESI and eBOSS.
  - Experience with Slack, Zoom, Uberconference, and Github, to develop, maintain, and share codes, visualizations, and documents with my collaborators.
  - Organized and led a series of problem solving strategies discussion meetups with the undergraduate physics students at Chamran University

Notable Honors

- Ranked 3rd among +8000 participants in the nationwide qualifying exam of the M.Sc. program 2012
- International Standardized GRE Physics exam: 990/990 (scaled score), 94% below 2014

Research Experience

- Research Assistant, Department of Physics and Astronomy, Ohio University 2015-present
- Research Fellow, Asia Pacific Center for Theoretical Physics, South Korea 2014-2015
- Research Assistant, Institute for Research in Fundamental Sciences, Iran 2012-2015

Education

- **PhD candidate, Department of Physics and Astronomy, Ohio University** Ohio, USA
  "Robust Measurement of Galaxy Clustering using Neural Networks", GPA: ***3.8/4*** 2015-due 2020
- **M.Sc. Physics, Department of Physics, Sharif University of Technology** Tehran, Iran
  "Massive Neutrinos and Cosmological Observables", GPA: ***18.46/20*** 2012-2015
- **B.Sc. Physics, Department of Physics, Chamran University** Ahvaz, Iran
  Magna cum laude, Distinguished student for three consecutive years, GPA: ***18.51/20*** 2008-2012