Abhinav Prakash

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Summary

I am a Texas A&M IE PhD with research experience in data science and machine learning.

Education

Texas A&M University, College Station, TX
PhD, Industrial Engineering, 2022

Visvesvarya National Institute of Technology, Nagpur, India
BTech, Mechanical Engineering, 2012

Work Experience

Senior Data Scientist, **Walmart Global Tech**, Sunnyvale, CA [Sep 2022 - Present]

- Building recommendor systems and personalization models for e-commerce.

Research Scientist Intern, **Amazon**, Seattle, WA (Remote) [May 2021 - Aug 2021]

- Built multiple predictive models—heuristic-based, parametric, and nonparametric—and reduced the prediction error by 10% for a supply risk metric.
- Queried and cleaned gigabytes of data, did exploratory data analysis and visualization, engineered and tested features.

Graduate Research Assistant, **Texas A&M University**, College Station, TX [May 2017 - Aug 2022]

- Conducted research using various data science and machine learning methodologies: nonparametric regression, time series forecasting, Bayesian modeling, hypothesis testing, and deep learning.
- Published research papers in reputed academic journals.

Executive, **Bharat Petroleum Corporation Limited**, India [Jul 2012 - Apr 2015]

- Managed aspects of fuel retail business related to sales analytics, business development, and quality control in a given business area.

Software Skills

- **Programming and code management:** Python, R, Matlab, C++, SQL, Shell scripting, and Git.
- **ML and linear algebra libraries:** Numpy, Scipy, Pandas, Scikit-Learn, XGBoost, Armadillo/RcppArmadillo.
- **Computing:** Good understanding of data structures, computational complexity, vectorization, high performance computing (batch computing using LSF and SLURM).

Selected Projects

- **DSWE** *(Data Science for Wind Energy)* - Developed an open-source R package with various data science models for regression, function comparison, distribution matching, etc. that are used by wind energy practitioners. Used *Rcpp* and *RcppArmadillo* libraries to implement the computationally intensive algorithms in C++ with R wrapper. GitHub | CRAN.
- **Nonparametric regression with time-dependent data**: Developed a nonparametric regression technique using Gaussian process (GP) regression to avoid a phenomenon called temporal overfitting—model performing worse on a test data that is from a different time domain. Paper | </> Code.
- **Hypothesis testing**: Developed a high-dimensional hypothesis testing method to statistically compare nonparametric functions given two noisy datasets. Paper | </> Code.

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- **Bayesian modeling**: Implemented a Bayesian model to estimate the extreme events and quantify their uncertainty for hydrological applications (extreme water levels). Paper | </> Code.
- **Video frame prediction**: Implementing a deep learning model in TensorFlow using convolutional LSTMs to predict future video frames and detect crack formation in cathode particles of lithium-ion batteries using the X-ray images of their stress profiles (ongoing project).
- **Wind power prediction challenge***: Applied various machine learning algorithms with modified cross-validation schemes (as the data was not independent) to predict wind power given the wind conditions. Used ensemble of trees as the final method (Course: Analysis & Prediction). **We were the winning team in the class*.
- **Large-scale stochastic optimization**: Implemented sample average approximation scheme on L-shaped algorithm for solving large scale stochastic linear program using CPLEX callable library in C++ (Course: Large Scale Stochastic Optimization).

Publications

- **Prakash A.**, Tuo R., & Ding, Y. (2022). The temporal overfitting problem with applications in wind power curve modeling. *Technometrics*. Paper.
- **Prakash A.**, Tuo R., & Ding, Y. (2022). Gaussian process aided function comparison using noisy scattered data. *Technometrics*. Paper.
- Ding, Y., Kumar, N., **Prakash, A.**, Kio, A. E., Liu, X., Liu, L., & Li, Q. (2021). A case study of space-time performance comparison of wind turbines on a wind farm. *Renewable Energy*. Paper.
- **Prakash, A.**, Panchang, V., Ding, Y., & Ntaimo, L. (2020) Sign constrained Bayesian inference for nonstationary models of extreme events, *Journal of Waterway, Port, Coastal, and Ocean Engineering*. Paper.