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Sreelekha Guggilam

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Education

University at Buffalo, The State University of New York — Buffalo, NY
Ph.D. in Computational Data Science (CDSE), GPA: 4.00/4.00 — Aug 2017–Present (Feb 2022)

- Mentors: Dr. Abani Patra, Dr. Varun Chandola
- Thesis: "Anomaly Detection in Streaming Time-series Database"

University at Buffalo, The State University of New York — Buffalo, NY
Masters in Civil Engineering (Transportation Statistics), GPA: 4.00/4.00 — Aug 2016–Sept 2017

University at Buffalo and Roswell Park Cancer Institute(RPCI) — Buffalo, NY
Masters in Biostatistics-Bioinformatics, GPA: 3.77/4.00 — Aug 2014–Sept 2015

- Mentors: Dr. Song Liu, Dr. Jianmin Wang, Dr. Yao Song
- Thesis: "Statistical Assessment of TCGA Ovarian Cancer Sequencing Dataset for Prognostic Utility"

Indian Statistical Institute (ISI) — Bangalore, India
Bachelors in Mathematics (B.Math), First Class Honors — Jul 2011 –May 2014

Technical Skills

Research Focus: Anomaly detection, Large Deviations Theory, Bayesian Non-parametric Models, Mixture Models, Extreme Value Theory, Multivariate Time Series Databases, Streaming Data, High-Dimensional Streams
Languages: Python, C/C++, SAS, R, SQL, Matlab, Limdep
Tools/Frameworks: Pandas, Numpy, Scipy, SkLearns, Pytorch, TensorFlow, Teradata

Research Experience

Research Assistant - Anomaly Detection in Streaming High-Dimensional Time Series Database
Mentors: Dr. Abani Patra, Dr. Varun Chandola (University at Buffalo) — Sept 2019-Present
Solved outstanding problems in anomaly detection in evolving data. Among the pioneers in using extreme value theory and large deviations theory to study multivariate anomalies.

1. Conceptualized and published an integrated clustering and anomaly detection algorithm (INCAD) for non-parametric, unsupervised anomaly detection in streaming data using extreme value theory
2. Formulated the mathematical framework for extending univariate Generalized Pareto Distribution for high dimensional data
3. Designed a large deviations theory inspired fast anomaly detection model (LAD) in high-dimensional multivariate time-series database
4. Investigated the impact of local and global policy implementation on COVID-19 trends using LAD

Graduate Thesis - Statistical Assessment of TCGA Ovarian Cancer Sequencing Dataset for Prognostic Utility
Mentors: Dr. Song Liu, Dr. Jianmin Wang, Dr. Yao Song (SUNY Buffalo, RPCI) — Feb 2015-Sept 2015

1. Examined and modeled the hazard rates and survival of ovarian cancer patients in the TCGA dataset using binary predictors in R.
2. Evaluated the credibility of the TCGA data to study various cancer risk factors and related survival outcomes.
3. Validated the results deduced from the TCGA data with SEER (standard) data results.

Teaching

Teaching Assistant — Sept 2017-Sept 2019
Institute of Computational Data Science (University at Buffalo, SUNY)
Mentored students and fulfilled responsibilities as a Head TA for graduate courses: Programming and Database Fundamentals for Data Scientists (EAS 503), Introduction to Probability Theory for Data Science (EAS 502), Applications of Data Science: Industry Overview (EAS 504) and Data Science Project (EAS 560).

Industry Experience

American Express, World Financial Center NY, USA
Risk Manager - Global Corporate Portfolios Nov 2015–Jun 2016

Risk And Data Analytics for Corporate Credit Portfolios

1. Quantified the change in spending trends in cross-sold clients prior to and post the onboarding process.
2. Developed and improved risk margins for corporate clients in Global Corporate Payments.
3. Responsible for identifying and monitoring trends in risk-based industries and states to enable risk control actions on the portfolios.

Pristech Analytics Bangalore, India
Statistical Analyst Intern Nov 2013–Mar 2014

Environmental Social and Governance (ESG) Compliance Tracker

1. Modeled a highly efficient ranking scheme to ensure a lowered risk and heightened profitability of investments.
2. Predicted the ranking scheme by considering the level of ESG compliance of over 6000 companies (about 68 industries) spread across the world to enable a more educated investment.
3. Validated a data-driven scoring system for each industry based on the type of industry, rate of non-compliance within the industry and associated risk using R and Excel.
4. Implemented the scoring system for each company based on industry, location of the event, the loss incurred, time of the event and other dependent factors.
5. Optimized R code based on the methodology and generated inter-industry and intra-industry comparative rankings.
6. *Offered patent rights for the project.*

Online parking systems

1. Optimized parking pricing system for parking space prediction using Markov chains in R.
2. Reduced the cost of predictive parking by about 20%.

Ramco Cements India
Statistical-Financial Intern Jun 2013-Jul 2013

Financial Ratio Analysis

1. Conducted a quantitative analysis on the company's financial statements using financial accounting ratios
2. Interpreted the trend in the company's performance over the years and determined the most effective solutions.

Publications

[1] **S. Guggilam**, V. Chandola, and A. K. Patra, "Anomaly detection for high-dimensional data using large deviations principle", in *(In Submission)*, 2021.

[2] **S. Guggilam**, V. Chandola, and A. K. Patra, "Anomaly detection using extreme value theory", in *Statistical Analysis and Data Mining Journal*, 2021.

[3] **S. Guggilam**, V. Chandola, and A. K. Patra, "Fast anomaly detection for time series databases", in *(In submission)*, 2021.

[4] **S. Guggilam**, V. Chandola, and A. K. Patra, "Identifying effective covid-19 policies using large deviations on time series databases", in *(In submission)*, 2021.

[5] **S. Guggilam**, V. Chandola, and A. K. Patra, "Stablizing neural networks using large deviations theory", in *(In preparation)*, 2021.

[6] **S. Guggilam**, S. M. A. Zaidi, V. Chandola, and A. K. Patra, "Integrated clustering and anomaly detection (incad) for streaming data", in *International Conference on Computational Science*, Springer, 2019, pp. 45–59.

[7] **S. Guggilam**, *Statistical Assessment of TCGA Ovarian Cancer Sequencing Dataset for Prognostic Utility*. State University of New York at Buffalo, 2015.

Workshops and Conferences

- CDSE Days, Institute of Computational Data Science, SUNY Buffalo, NY. 2021
- International Conference on Computational Science (ICCS) 2019
- CDSE Days, Institute of Computational Data Science, SUNY Buffalo, NY. 2019
- UB Navigate Project 2018
- Statistical and Applied Mathematical Science Institute (SAMSI) for the workshop on Model Uncertainty: Mathematical and Statistical (MUMS) 2018
- Statistical and Applied Mathematical Science Institute (SAMSI) for the workshop on Precision Medicine (PMED) 2018
- CDSE Days, Institute of Computational Data Science, SUNY Buffalo, NY. 2018
- National Program on Differential Equations (NPDE) Workshop in IIT Madras 2013
- Special Class on Graph Theory, Tata Institute of Fundamental Research (TIFR), Bombay India 2012

Awards and Scholarships

- Runner up: STEM for Everyone: Women in STEM Cooperative (WiSC) 2021
- Travel Support: UB Navigate Project for women in STEM 2018
- Travel Support: SAMSI for the workshop on Model Uncertainty: Mathematical and Statistical (MUMS) 2018
- Travel Support: SAMSI for the workshop on Precision Medicine (PMED) 2018
- Honors degree in Mathematics from Indian Statistical Institute 2014
- Full student scholarship (merit-based) throughout the completion of the degree at Indian Statistical Institute 2011–2014

Memberships and Outreach Activities

- Student Member at Association for Women in Mathematics (AWM) 2014–Present
- Student Member at Women in STEM Cooperative (WiSC) 2014–Present
- Student Member at SIAM 2014–Present
- Student Member at Institute of Actuaries, India 2013–2015
- Volunteer at Youth for Seva (YFS) Fall 2012-2014
- Student Member at CBIT-MUN (Model United Nations) 2010–2011
- Member of the cultural team for the university fest “CARPEDIEM” at CBIT 2010–2011