ANIRUDDHA PATHAK

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OBJECTIVE

Highly motivated graduate student with strong experience in Machine Learning, Statistical Computing, Nonparametric methods and Bayesian analysis seeking internship opportunity to explore the practical implementation of data analytics into real-life business problems.

EDUCATION

Doctor of Philosophy in Statistics Aug 2020 - Present
Iowa State University, Ames, IA; CGPA: 3.80/4
Advisor : Prof. Somak Dutta

Master of Science in Statistics Aug 2018 - Jul 2020
Indian Institute of Technology, Kanpur, India; CGPA: 9.2/10

Bachelor of Science with Honors in Statistics Jul 2015 - Jun 2018
Ramakrishna Mission Residential College, Narendrapur; University of Calcutta; India.
Honors(Major) Subject Aggregate Marks : 84.25%.
Minor Subjects : Mathematics, Computer Science.

RESEARCH EXPERIENCE

Extensions to the Analysis of Multi-Environment Field Trials in presence of Missing Values
PhD Research Project Aug 2022 – Present

- **Advisor**: Prof. Somak Dutta, Iowa State Univeristy.
- **Abstract**: Currently working on an extension of the Finlay-Wilkinson model for genome-environment interaction data in presence of missing values.

Structure in the Least-Significant-Bit Does Not Imply Concealed Message in an Image
ISU STAT 680 Course Project under Prof. Ranjan Maitra, ISU Aug 2021 – Dec 2021

- Hidden message can be stored in the least-significant-bits (LSBs) of images, called *Steganography*.
- Developed two nonparametric tests based on the counts of $k_1 \times k_2$ blocks to detect the existence any hidden structure in the LSBs.
- Assessed the performance of these tests on simulated datasets with empirical power analysis.
- Applied these tests on a set of 1800 digital camera images of different scenes over 18 devices from 5 camera models.

Parsimonious Classification using Higher Order Markov Chains
Masters Project at IIT Kanpur under Prof. Subhajit Dutta Jan 2020 – Jun 2020

- Worked on Classification problem with categorical feature variables, which can be found in the domains of Biology, Computer Science, Finance, etc.
- Formulated 3 different classifiers - Maximum likelihood estimates based, Conditional Probability Mixture probability model based, LASSO regularized logistic regression on counting statistics based.
- Applied the classifiers on simulated datasets to assess the performance with their error rates and time efficiency.

OTHER TERM PROJECTS

Analysis and Forecasting of Gold Price Data
Course Project for 'Time Series Analysis' under Prof. Amit Mitra, IIT Kanpur Aug 2019 – Nov 2019

- Data Preparation including handling missing values, estimation and elimination of trend and seasonal component.
- Tested stationarity of the data and built a suitable model through ARIMA and analyzed with forecasting.

Some Exploratory Issues in Statistical Computing
IASc - INSA – NASI Science Academies' Summer Research Fellowship Program 2019 May 2019 - Jul 2019

· **Project Guide** : Prof. Saurabh Ghosh, Human Genetics Unit, Indian Statistical Institute Kolkata
· Reviewed the efficiency of likelihood-based and k-Means clustering in context of Iris dataset.
· Studied the application of EM algorithm for the estimation allele proportion estimation in blood type data.
· Applied the methodologies to analyze dataset on the effect of physical and genetic properties on Coronary Artery Disease.

A Study on Car Pricing based on Automobile Market Data
Course Project for 'Regression Analysis ' under Prof. Sharmishtha Mitra, IIT Kanpur Jan 2019 - May 2019

· Preparation of raw data by the imputation of missing values and dummification of categorical variables.
· Used multiple linear regression to model the car prices on specifications
· Checking for multicollinearity and validity of the model assumptions through tests and Visualizations.
· Determination of best possible subset model through variable selection method.
· Using confidence intervals for predicted car prices detection of overpriced cars.

TEACHING EXPERIENCE

Graduate Teaching Assistant Aug 2020 - Present
Iowa State University

· Worked as a lab instructor for undergraduate level Probability and Statistics courses - STAT 101, STAT 326, STAT 342.
· Worked as a grader for undergraduate and graduate level Probability and Statistics courses - STAT 231, STAT 322, STAT 542, STAT 587, and graduate level Measure-theoretic Probability course - STAT 642.

RELEVANT COURSEWORK

At Iowa State University -

· **Theory** : Measure Theory, Adv. Probability Theory, Adv. Theory of Statistical Inference.
· **Methods** : Linear Models and Design of Experiments, Adv. Statistical Modelling.
· **Other Electives** : Applied Modern Multivariate Statistical Learning, Nonparametric Methods, Adv. Statistical Computing.

At IIT Kanpur, India -

· **Statistics** : Probability Theory, Sampling Theory, Regression Analysis, Statistical Inference, Analysis of Variance, Time Series Analysis, Stochastic Process, Statistical Simulation and Data Analysis, Probabilistic Theory of Pattern Recognition, Multivariate Analysis, Nonparametric Inference, Bayesian Analysis, Statistical and AI Techniques in Data Mining.
· **Mathematics** : Linear Algebra, Real Analysis, Complex Analysis, Convex Optimization.
· **Computer Science** : Computer Programming and Data Structures.

SCHOLASTIC ACHIEVEMENTS

- Selected under IASc - INSA – NASI Science Academies' Summer Research Fellowship Program 2019.
- Secured All India Rank 33 in IIT Joint Admission Test for M.Sc. 2018 among 2926 candidates from all across India.
- Recipient of INSPIRE-SHE Scholarship awarded by Department of Science and Technology, Govt. of India to meritorious students pursuing an undergraduate degree in sciences at India's premier institutes.

TECHNICAL SKILLS

Programming Languages: R, RCpp, C++, Python, SQL. **Other Tools**: LaTeX, JMP, Minitab.

EXTRA-CURRICULAR ACTIVITIES

Worked as a Volunteer in National Service Scheme, India during the undergraduate days.