ANANYAE KUMAR BHARTARI

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Education

2023-present **M.S.E. (Scientific Computing), University of Pennsylvania**
Relevant courses:- Machine Learning*, Principles of Deep Learning* *Ongoing

2019-2023 **B.S. (Mathematics and Scientific Computing), IIT Kanpur(Distinction)** **8.8/10.0**
Relevant courses:- Statistical Simulation and Data Analysis, Advanced Topics in Machine Learning, Artificial Intelligence, Machine Learning, Deep Learning and Its Applications, Statistical Techniques in Data Mining

Internship

- **Solving Quantile Crossing For Interval Forecasting**
  ORACLE Summer Intern — Was offered a PPO (Pre Placement Offer) *May'22-July'22*
  - Completely eliminated the problem of Quantile Crossing in Quantile regression.
  - Implemented a **Seq-2-Seq** model using LSTM in encoder and decoder on a standard data set.
  - Trained the model on various loss functions such as **pinball loss, multi-pinball loss, Continuous Rank Probability Score** and penalized crossing to reduce the number of Quantile crossings.
  - Implemented approach such as **Incremental Quantile Functions and Distributional Output** and evaluated the performance on **Weighted Quantile loss, Mean Squared Error, Mean Absolute Error**.
  - Recommended using IQF layer with multi-pinball loss to train the model.

Projects

- **Computational Mechanobiology**
  (under the supervision Professor Vivek B Shenoy of UPenn) *July'23-Ongoing*
  - Processed multiple Hi-C files for IMR 90 cell lines, and converted them into **cooler** format.
  - Utilized eigenvector decomposition to identify and visualize A/B compartmentalization in the genomic data and plotted the result to obtain spatial organization of the genome.
  - Identified and plotted CTCF loops, which are crucial for understanding chromatin structure.
  - Performing Hypothesis Testing using the processed data.
- **Image Segmentation using Clustering Algorithms**
  (under the supervision of Professor Nishchal Verma of IIT Kanpur) *Feb'23-May'23*
  - Used **scikit-learn and matplotlib, seaborn** library in Python 3 for data analysis and visualization.
  - Applied Clustering Algorithms to perform **Images Segmentation**.
  - Used **GIS (Global Silhouette Index)** to evaluate the performance of each clustering and showed Improved Mountain Clustering performed the best giving a GIS of 0.647 for 2 numbers of clusters.
- **Application of Firefly Algorithm for optimizing of cost function.**
  (under the supervision of Professor Shaktipad Ghorai of IIT Kanpur) *August'22-Nov'22*
  - Implemented gradient-free algorithms like **Firefly Algorithm, Bat Algorithm, Particle Swamp Optimization**, to solve them for minima of Eggcrate function having a continuous domain.
  - Applied 1-D Discretize Firefly Algorithm to loss function of **M/M/m/-/m** and **M/M/m/FIFO/m+N** Queuing systems, benchmarking the results obtained by naive approach.
  - Showed that **FA** performed 27.3 times better than naive approaches to solve **Flow Shop Scheduling**.
- **Mathematical Finance and Stochastic Process(under Stamatics Society)** *May'21-June'21*
  - Studied Finance and equity market and how to make and manage portfolios using **Markowitz theory**.
  - Plotted efficient frontier for a portfolio of **10 stocks** on python using **Numpy and matplotlib** library and found the Market Portfolio using Capital Market Line.

Technical Skills

Languages and Tools:	C, C++, R, Python, react-native, MATLAB, HTML, CSS, Javascript
Utilities and Softwares:	LaTeX, AutoCAD, MongoDB, Comsol Multiphysics, React, Illustrator
Operating Systems:	Linux, Windows

Leadership and Extra Curricular

- **Manager , Team 20-21, Unmukt IITK** *2020-2021*
  - Worked in a team of **3** members and led **50+** volunteers for the effective conduction of meme and story writing competitions and pride month events in which eminent speakers took part from all over India.
  - Monthly conduction of promotional activities, competitions and group talks to help students facing problems with gender-related issues.