Hafza Noor

Mathematics Graduate | Specialization in Machine Learning & Optimization
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Skills:

Mathematical & Statistical Skills:
Probability & Statistical Inference, Linear Algebra, Regression Analysis, Hypothesis Testing, Optimization Theory
Mathematical Programming & Linear Programming:
Linear Programming (LPP), Non-linear Integer Programming (NLIP), Transportation Problems, Network Flow Optimization, Metaheuristic Algorithms (Simulated Annealing, Genetic Algorithms) for solving optimization problems.
Machine Learning & AI:
Regression & Classification Models, Clustering, Model Evaluation Metrics, Optimization-Based ML, Metaheuristic Algorithms (Artificial Bee Colony, PSO, GA)
Programming & Data Tools:
Python (NumPy, Pandas, Scikit-learn, Matplotlib, Seaborn), SQL, Advanced Excel, Power BI, GitHub
Data Analysis & Visualization:
Data Preprocessing, Feature Engineering, Exploratory Data Analysis (EDA), Data Cleaning & Transformation, Statistical Reporting
Research & Optimization Skills:
Algorithm Design, Feature Optimization, Research Documentation, Experimental Design, Reproducible Research
Project Management & Collaboration Tools:
JIRA, Zoho CRM, GitHub

Education:

BS Mathematics (3.25/4 CGPA) September 2021-June 2025 Graduate in Mathematics.

Specialized in computational and applied mathematics with an emphasis on **data analysis**, **optimization**, and problem-solving. Studied courses in **Machine Learning**, Business Analytics, Python Programming, and Statistical Modeling. Gained practical experience in **data preprocessing**, exploratory data analysis, and visualization using **Python**, SQL, and Power BI.

Developed strong analytical, mathematical, and programming skills applicable to data science and research.

Projects:

1. Image Enhancement and Feature Detection using Python and OpenCV

Developed a computer vision project applying key image processing techniques to facial images for pattern recognition and visual enhancement. Implemented histogram equalization, edge detection (Canny), Gaussian filtering, and feature extraction (ORB algorithm) to improve feature visibility and matching accuracy. Designed a Brute-Force feature matcher to compare and detect similarities between multiple images.

- Enhanced image brightness and edge clarity through preprocessing.
- Extracted and matched key features using ORB with improved detection accuracy.
- Demonstrated practical applications of mathematical concepts in computer vision (matrix operations, gradient computation, and spatial filtering).

Tools & Technologies: Python, OpenCV, NumPy, Matplotlib

Image Processing Project on GitHub

2. Feature Selection using Artificial Bee Colony (ABC) Algorithm

Implemented a metaheuristic optimization approach using the Artificial Bee Colony (ABC) algorithm to perform feature selection and dimensionality reduction for supervised learning datasets. The algorithm optimized the subset of input features by minimizing error rate and maximizing model accuracy. Conducted feature engineering, data preprocessing, and comparative analysis with traditional feature selection methods to validate efficiency improvements.

- Applied mathematical optimization concepts for efficient feature subset selection.

- Reduced model complexity and enhanced accuracy by selecting the most relevant features.
- Demonstrated practical integration of swarm intelligence and machine learning.
- Evaluated algorithm performance through accuracy, convergence rate, and computational cost.

Tools & Technologies: Python, NumPy, Pandas, Scikit-learn, Matplotlib

Feature Selection using ABC Algorithm

3. Economic Growth Prediction using Multiple Linear Regression

Developed a research-oriented project analyzing global economic indicators to model and predict Gross Domestic Product (GDP) across countries. The study integrated mathematical regression theory with practical data science techniques to identify key economic drivers of GDP. Conducted data preprocessing, exploratory data analysis (EDA), correlation study, and multiple linear regression modeling to quantify the impact of factors such as Population, GNI, Imports, Exports, and Capital Formation on GDP.

- Applied linear regression concepts including residual analysis, model evaluation (R^2 and MSE), and multicollinearity assessment.
- Demonstrated statistical interpretation through residual diagnostics and feature importance visualization.
- Combined mathematical understanding of regression with Python-based implementation for real-world economic modeling.
- findings through correlation heatmaps, QQ plots, and coefficient analysis for interpretability.

Tools & Technologies: Python, Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn

Multiple Linear Regression

4. Data Analytics and Interactive Dashboard Development (Excel, SQL, Power BI)

Designed and developed multiple interactive dashboards to visualize key business and performance metrics. Created data pipelines integrating Excel, SQL, and Power BI for automated reporting. Applied DAX functions and data modeling to generate KPIs, trend analyses, and comparative insights. Built dashboards covering domains such as sales performance, resource utilization, and educational analytics to support data-driven decision-making

Tools & Technologies: Power BI, SQL, Advanced Excel, DAX, Power Query

- Designed data models and relationships across multiple data sources.
- Created interactive visuals and summary reports with drill-down insights.
- Automated data refresh and transformation workflows using Power Query and SQL integration.
- Delivered measurable improvement in reporting efficiency and trend visualization accuracy.

Sales Dashboard

Trade Dashboard

EXPERIENCE

1) Freelance Data Analyst

Remote – Jan 2024 – Present

Tools & Techniques: Excel, SQL, Power BI, DAX, Data Modeling

- Designed and maintained data pipelines for automating data collection, transformation, and reporting.
- Built interactive dashboards and data models in Power BI for client reporting and performance monitoring.
- Utilized SQL queries for data extraction, cleaning, and integration across multiple sources.
- Applied DAX formulas for advanced calculations and custom KPIs.
- Collaborated with clients to translate business requirements into data-driven insights.

2) Teaching Experience

Teaching Instructor (Mathematics & Programming) Private Academy /

Freelance – 2022 – 2024

Subjects: Mathematics, MATLAB, Maple, Python Programming

- Taught advanced mathematics and programming to intermediate (F.Sc) students.
- Guided students through problem-solving, algorithmic thinking, and implementation of small Python projects.
- Introduced basic data analysis and visualization concepts using Python libraries.
- Designed and graded assignments, conducted assessments, and provided one-on-one academic support.
- Helped students connect mathematical theory with computational applications.

2) Executive Member – CASPAM Youth Development Council (CAYDEC)

Department of Computational & Applied Mathematics, BZU Multan – 2022 – 2024

- Served as an executive member of the departmental student council.
- Organized academic and extracurricular events, workshops, and seminars to promote student engagement.
- Acted as a liaison between students and faculty, assisting in resolving academic and administrative concerns.
- Contributed to initiatives aimed at enhancing student development and departmental communication.

Coursework:

- Linear Algebra
- Calculus & Analytical Geometry
- Probability & Statistics
- Numerical Analysis
- Differential Equations
- Operations Research
- Optimization Techniques
- Discrete Mathematics

Certifications

- Data Science Professional Certificate **(IBM)**
- Introduction to Structured Query Language (SQL) **(University of Michigan)**
- Business Analytics for Decision Making**(University of Colorado Boulder)**
- ETL and Data Pipelines with Shell, Airflow and Kafka **(IBM)**