

# Ehtisham Afzal

## Data Scientist

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## Summary

Data Scientist with a strong foundation in statistics, machine learning, and end-to-end data solutions. Proven ability to build predictive models, perform deep EDA, and automate pipelines using Python, SQL, and Flask. Experienced in client-focused freelance work, delivering robust and insight-driven analytics across domains. Passionate about transforming raw data into actionable decisions through analytical thinking and modern AI tools. Skilled in hypothesis-driven experimentation, statistical modeling, and interpreting results with precision and clarity.

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## Technical Skills

- Programming Language:
  - Python
- Machine Learning & AI:
  - Model Development (Regression, Classification, Forecasting)
  - Model Evaluation & Validation
  - Hyperparameter Tuning (Grid Search, Random Search)
  - Model Deployment (Flask APIs, Docker, Streamlit)
  - TensorFlow, scikit-learn
- Version Control
  - GitHub
- Data Science & Analytics
  - Data Preprocessing & Cleaning
  - Feature Engineering & Selection
  - Exploratory Data Analysis (EDA)
  - Data Visualization (Matplotlib, Seaborn)
  - Statistical Analysis & Hypothesis Testing
  - Predictive Analytics & Business Intelligence
- Database
  - SQL (MySQL, PostgreSQL)
  - Data Modeling & Schema Design

## Project Management & Software Engineering Skills

- Software Development Practices
    - Software Design Principles
    - Software Design patterns
    - Full SDLC Understanding (Requirement Analysis → Deployment)
  - Project Management
    - Agile Methodologies (Scrum)
    - Sprint Planning & Stand-ups
    - Task Management (clickUp)
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# Projects

## Python Projects

### Medical Checkup Appointment Web Application

Created a responsive web platform for scheduling and managing doctor appointments with authentication and admin dashboards. Integrated CRUD operations with a clean UI.

*Technologies: Python, Streamlit, SQL*

### Event Booking and Ticketing System

Designed a full-stack event management platform with real-time seat availability and secure ticketing flow using role-based access control. Integrated SQLite for persistent bookings and dynamic event listings.

*Technologies: Python, flask, SQL, OOP, HTML/CSS*

### Bike Rental Application

Developed a bike rental solution enabling users to book, track, and return bikes with cost calculation and time logging. Implemented inventory control and session-based authentication.

*Technologies: Python, flask, My SQL*

### Inventory Management System

Created a scalable inventory tracking app for retail operations featuring CRUD operations, restock alerts, and real-time stock updates. Incorporated relational database and modular OOP design.

*Technologies: Python, flask, PostgreSQL, OOP, Pandas*

## MACHINE LEARNING PROJECTS

### Demand Forecasting for Retail Store

Developed a time series forecasting model using XG Boost to predict item-wise sales and optimize stock levels. Achieved a 20% reduction in overstock incidents.

*Technologies: Python, flask, PostgreSQL, Pandas, Matplotlib*

### AI-Powered Supply Chain ERP for Retail Chain

Engineered an end-to-end ML pipeline integrated into a supply chain ERP system to forecast demand, recommend restocking, and optimize warehouse utilization.

*Technologies: Python, flask, PostgreSQL, Pandas, Matplotlib*

### Medical Diagnosis Classification

Built a classification model for early disease detection based on patient vitals and historical records, improving diagnostic accuracy through feature engineering and tuning.

*Technologies: Python, flask, Classification Algorithm, Matplotlib*

### Prediction System (Flight Price / Loan Default)

Implemented dual-use prediction systems: one to forecast dynamic flight pricing using regression, and another to classify loan default risk using supervised learning.

*Technologies: Python, flask, Scikit-Learn, Pandas*

## DEEP LEARNING PROJECTS

### Brain Tumor Detection Using MRI Scans

Built a CNN-based classifier to detect brain tumors from MRI images with 95% accuracy, using data augmentation.

*Technologies: Python, CNN, TensorFlow, Matplotlib*

### Speech Emotion Recognition System

Trained a hybrid CNN-LSTM model to classify spoken emotions using MFCC features from audio inputs, with real-time voice input support.

*Technologies: Python, flask, Librosa, TensorFlow*

### Generative AI in Multimedia and Computer Graphics

Experimented with generative adversarial networks (GANs) to synthesize new images and textures, and applied style transfer on videos and graphics.

*Technologies: Python, GANs, CUDA*

### Age and Gender Prediction from Images

Designed a multi-output deep learning model to simultaneously predict a person's age and gender from facial images, deployed via a live webcam demo.

*Technologies: Python, TensorFlow, CNN*

## Experience

### Freelance Data Scientist/Python developer

2024-Present

Remote | Project-based via Digital Agencies

- Performed **Exploratory Data Analysis (EDA)** on structured datasets to uncover trends, identify outliers, and inform feature engineering decisions using Pandas, Seaborn, and Matplotlib.
- Conducted **statistical hypothesis testing** and applied descriptive/inferential statistical techniques to validate assumptions and improve data quality.
- Built and evaluated **predictive models** using Linear Regression, Logistic Regression, Decision Trees, and Ensemble methods for both regression and classification problems.
- Developed and compared models using **performance metrics** such as accuracy, precision, recall, F1-score, RMSE, and AUC-ROC.
- Tuned hyperparameters using **GridSearchCV** and **RandomizedSearchCV** to optimize model performance across multiple cross-validation folds.
- Created **modular and reusable scripts** for data preprocessing, feature scaling, encoding, and train-test splitting to streamline experimentation.
- Documented entire project workflows, including assumptions, model selection rationale, and evaluation results for stakeholders and team sharing.
- Assisted clients by debugging Python code, enhancing academic assignments, and developing small-scale machine learning and data analysis projects.

## Education

Bachelor of science in Information Technology

2021-2025

**University:** Quaid-i-Azam University, Islamabad

**CGPA:** 3.2

## Certifications

- Project Management (Coursera)
- Pak Finland Capacity Building Project on Microsoft Technologies (MUXBAY)