

# Ibrahim Hussain

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## Quantitative Data Scientist | Systems Modelling | Risk & Decision Analytics

Quantitative Data Scientist specialising in statistical modelling of complex systems and high-dimensional analytics. Experienced in extracting structural patterns from large, messy datasets to build interpretable models for economic forecasting, healthcare AI, and risk analysis. Skilled in time-series modelling, feature engineering, and multi-source data fusion. Passionate about applying rigorous quantitative methods to inform decision-making under uncertainty in finance, healthcare, and strategic analytics.

## Experience

### SMARTFORUM

#### AI Engineer Intern

June – September 2025

- Optimised RAG pipelines for a AI application, reducing retrieval latency by ~20% by implementing optimised search pipelines(PostgreSQL), improving response accuracy and system scalability.
- Engineered modular AI agents using LangChain and LangGraph, automating a core workflow and reducing manual intervention in the data processing pipeline.
- Enhanced real-time interaction capabilities by integrating Automatic Speech Recognition (ASR) with a multi-model orchestration system through efficient indexing and query optimisation.

## Projects & Technical Experience

### INFLATION DYNAMICS IN PAKISTAN

#### Statistical Researcher

May 2025

- Analysed 43 years (1980-2023) of macroeconomic data to model inflation dynamics.
- Developed and compared ARIMA, Ridge, Lasso, and Elastic Net models to forecast inflation.
- Identified exchange rate volatility and money supply growth as the primary determinants of inflation through hypothesis testing and correlation analysis, providing actionable insights for economic strategy.

### WRITER'S BLOCK

#### AI Engineer

December 2025

- Architected a resilient, multi-agent LLM system for automated, SEO-optimised content generation in the legal and healthcare sectors, reducing per-article cost to ~\$0.04.
- Engineered a production-grade content pipeline coordinating six parallel AI agents with auto-fallback models and retry logic, achieving a 85.5% success rate on generation tasks.
- Developed guardrails and a compiler agent to synthesise disparate LLM outputs into cohesive narratives and ensuring content quality.
- Built the full-stack application with Flask, REST APIs, and a Supabase/PostgreSQL database layer for real-time job tracking and data management.

## Education

### FAST UNIVERSITY

Bachelor of Science in Data Science

Islamabad, Pakistan

September 2023 – Present

**Relevant Coursework:** Machine Learning, Deep Learning, Data Mining, Big Data Systems, Database Systems & Warehousing, Advanced Statistics, Operating Systems, Software Engineering.

## Technical Skills

**Programming Languages:** Python (Pandas, NumPy, Scikit-learn, Flask), R, C++, SQL (PostgreSQL, MySQL, SQLite), x86 Assembly.

**Data Engineering & Big Data:** Data Cleaning, Missing Data Imputation, Outlier Detection, Multi-source Data Fusion, Vector Databases (Pinecone), PostgreSQL.

**Statistical & Quantitative Modelling:** Time-Series Forecasting (ARIMA), Regularised Regression (Ridge, Lasso, Elastic Net), Hypothesis Testing, Feature Engineering, Model Diagnostics, Econometric Analysis.

**Machine Learning & AI:** Supervised Learning, Multi-label Classification, Deep Learning (CNNs, RNNs), NLP, Hugging Face Transformers, RAG Systems, LangChain, LangGraph.

**Visualisation & Analytics:** High-Dimensional Visual Analytics, Parallel Coordinates, Choropleths, Correlation & Density Analysis.

**Systems & Tools:** Git, GitHub, Linux, Windows, REST APIs.

**Interests:** Quantitative Systems Thinking, Economic Modelling, Tech Leadership, Digital Marketing Analytics.

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