

# Akshat Baranwal

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## Education

### Arizona State University

M.S. in Computer Engineering

08/24 – 05/26

**CGPA: 3.4**

### Madhav Institute of Technology & Science-RGPV University

B.Tech. in Electrical Engineering

08/19 – 06/23

**GPA: 7.8/10 First Division With Distinction**

## Relevant Coursework

- Semantic Web Mining
- Foundation Of Algorithms
- Data warehousing
- Machine Learning with Deployment to FPGAs
- Digital Verification & Testing
- Probability and Random Processes

## Work Experience

### Larsen & Toubro Infotech

Data Engineer

01/24 – 08/24

Pune, India

- **Data Pipeline Engineering:** Engineered an automated **ETL pipeline** using Python to parse and load semi-structured XML datasets (200,000+ records) into **Snowflake** tables.
- **Performance Optimization:** Optimized data ingestion workflows, decreasing processing time by **90%** and significantly accelerating data availability for downstream analytics.
- **Data Visualization & Monitoring:** Developed internal dashboards to monitor pipeline health and track **data quality metrics**, providing stakeholders with real-time process insights.

### Energy Institute

Research Intern

01/23 to 05/23

Bangalore, India

- **Data Acquisition & HIL:** Engineered automated data collection workflows using **Hardware-in-the-Loop (HIL)** systems to capture **high frequency telemetry** from EV power converters.
- **Signal Processing:** Processed raw sensor data from **oscilloscopes and power analyzers**, implementing **noise filtering and feature extraction** to analyze system efficiency.
- **Data Validation:** Developed test procedures to validate experimental data against **EV powertrain simulations**, utilizing **statistical analysis** to identify and resolve discrepancies.
- **Pipeline Optimization:** Refined data driven simulation parameters by correlating hardware test results with digital models, improving powertrain predictive accuracy.

## Project Work

### Semiconductor Digital Twin & ETL Pipeline

Summer 2025

- **Cloud Infrastructure:** Architected a fully automated data pipeline on **Oracle Cloud (OCI)** to simulate 5nm fabrication process drift and environmental excursions. [\[Dashboard\]](#)
- **ETL Engineering:** Engineered a robust **ETL system** running via Cron to ingest continuous telemetry into a **MySQL** data warehouse, optimizing ingestion for high-frequency fab data.
- **Real-time Analytics:** Developed a **Streamlit** analytics suite featuring interactive SPC control charts and automated yield recovery tracking, achieving 24/7 observability.

### Hybrid RAG E-commerce Recommendation System

Fall 2025

- **Graph Modeling:** Designed a standalone graph retrieval agent using **Neo4j** to model complex relational product data and enhance recommendation explainability.
- **LLM Orchestration:** Developed an LLM-driven interface to autonomously translate natural language into optimized **Cypher queries** for high-performance graph traversals.
- **Hybrid Architecture:** Collaborated on a specialized agent architecture that interoperates with SQL and Vector search components to provide comprehensive relational insights.

### Smart Grid Energy Monitoring & Forecasting

2025

- **IoT Monitoring:** Developed a real-time dashboard using **Streamlit and Python** to monitor PV array health and visualize voltage sags across distributed sensors.
- **Time-Series Pipeline:** Architected a data pipeline utilizing **SQL** to aggregate sensor data, optimizing query performance for historical power generation analysis.
- **Machine Learning:** Engineered a Grid Load Forecasting model using **Random Forest**, utilizing lag features and rolling windows to reduce MAE by **12%**.

## Technical Skills

**Programming & Data Engineering:** Python, SQL, ETL Pipelines, Data Warehousing, MySQL, Snowflake, Cron Jobs, XML Parsing

**Cloud, Analytics & ML Systems:** Oracle Cloud Infrastructure (OCI), Streamlit, Neo4j, Vector Search, RAG Pipelines, Random Forest, Feature Engineering, SPC Control Charts, Yield Analytics, Forecasting Models

**Systems, Automation & Instrumentation:** Hardware-in-the-Loop (HIL), IoT Data Acquisition, Signal Processing, Data Validation, Dashboarding, Statistical Analysis, Monitoring & Observability

## Awards and Certificates

**Columbia+** Machine Learning [\[Link\]](#)