# Jal Patel

Software Engineer | Machine Learning Engineer | Backend + ML Systems Developer
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## Technical Skills

**Languages:** Python, C++, Java, SQL, Bash, JavaScript, TypeScript, HTML/CSS
**ML Frameworks:** PyTorch, TensorFlow, Scikit-learn, MLFlow, XGBoost, Keras, Transformers, BERT, LangChain
**Research Areas:** Recommendation Systems, Semantic Ranking, Causal Inference, Graph-based Learning, A/B Testing
**Data  Big Data:** Apache Spark, Kafka, Hadoop, Airflow, Databricks, Neo4j
**Experimentation:** MAP, NDCG, Precision/Recall, Confusion Matrix, Hypothesis Testing, RCT Design
**DevOps/Cloud:** Docker, Kubernetes, FastAPI, REST APIs, GitHub Actions, AWS (EC2, S3, Lambda), GCP, Azure
**Tools:** Git, Jupyter, Linux CLI, LaTeX, Tableau, Power BI, D3.js, Matplotlib, Seaborn

## Academic Projects

**Book Recommender System using User-Based Collaborative Filtering** January 2025 – April 2025
*Arizona State University | link* *Tempe, Arizona*
- Built a personalized book recommendation engine using user-based collaborative filtering with cosine similarity on the Book Crossing dataset.
- Designed a modular pipeline for preprocessing, LIBSVM conversion, collaborative filtering, and visualization.
- Generated top-5 book recommendations per user; visualized score distributions, user coverage, and most recommended titles.

**Land Use Land Cover Segmentation in Central Phoenix** April 2025 - May 2025
*Arizona State University | link* *Tempe, Arizona*
- Performed pixel-wise LULC segmentation on Sentinel-2 imagery for Central Phoenix (2022–2025) using a custom U-Net model.
- Trained with 4-band input patches and Dynamic World composite labels (9 classes), achieving 95.95% pixel accuracy and 92.79% mean IoU.
- Handled underrepresented classes via preprocessing and evaluated with weighted F1 score and confusion matrix.
- Visualized patch-wise and stitched predictions; implemented full pipeline in TensorFlow with training callbacks and Jupyter integration.

**Scalable Real-Time Analysis of NYC Taxicab Data** October 2024 – November 2024
*Arizona State University* *Tempe, Arizona*
- Built a distributed real-time pipeline using Apache Kafka and Spark Streaming to process 1,500+ records per batch from the NYC Taxi dataset.
- Applied PageRank and connected component analysis on Neo4j to detect traffic bottlenecks and identify flow hubs.
- Containerized services using Docker and deployed fault-tolerant clusters via Kubernetes to ensure scalable and resilient performance.

## Experience

**Plexusnet Services** January 2024 – May 2024
*Software Engineering Intern* *Ahmedabad, India*
- Built a full-stack expense tracking app using Django (backend) and React (frontend), boosting feature usability by 40%.
- Containerized services with Docker and set up CI/CD pipelines via GitHub Actions to streamline deployment.
- Developed REST APIs and collaborated with design and QA teams, reducing integration bugs by 25%.

**Vardhan Insys** June 2023 – July 2023
*Software Engineering Intern* *Ahmedabad, India*
- Led the development of a responsive PHP/MySQL web platform, boosting page responsiveness by 30% and ensuring mobile compatibility.
- Revamped UI design to improve user engagement and intuitive navigation, leading to a 20% increase in session time.
- Created a real-time analytics panel for tracking user interactions, aiding in behavioral pattern discovery and optimization.

## Education

**Arizona State University** Arizona, United States
*Master of Science in Data Science, Analytics and Engineering (GPA: 3.78/4)* *Expected May 2026*
- Coursework: Data Processing at Scale, Statistical Machine Learning, Software Security, Analyzing Big Data

**Nirma University** Gujarat, India
*Bachelor of Technology in Computer Science and Engineering (GPA: 3.2/4)* *June 2024*
- Coursework: Data Structures  Algorithms, Database Management, Machine Learning, NLP, Cloud Computing

## Certifications

AWS Cloud Foundation (2023) | Stanford Machine Learning Specialization (2022) | HackerRank Advanced SQL (2025)