# VISHWAS PRABHAKARA

**MACHINE LEARNING ENGINEER | APPLIED AI | MLOPS**

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## PROFESSIONAL SUMMARY

Machine Learning Engineer with 2+ years of applied ML experience across research and internships, building forecasting, computer vision, GenAI, and MLOps systems. At IISc Bengaluru, solely own a groundwater forecasting workflow developed with BWSSB, covering data integration, leakage-safe evaluation, model selection, and stakeholder communication. Build deployed AI applications with Python, FastAPI, Docker, Google Cloud Run, MLflow, DVC, and production-oriented validation and monitoring.

## TECHNICAL SKILLS

**Machine Learning:** Time-series forecasting, regression, ensembles, deep learning, EDA, feature engineering, temporal backtesting, model evaluation
**MLOps & Deployment:** FastAPI, Docker, Google Cloud Run, MLflow, DVC, GitHub Actions, model registry, drift monitoring, retraining pipelines
**GenAI & Data:** Gemini, LangChain, Google ADK, RAG, embeddings, FAISS, BM25, SQLAlchemy, sqlglot, PySpark, SQL
**Programming & Tools:** Python, Pandas, NumPy, Scikit-learn, TensorFlow, LightGBM, XGBoost, Plotly, Streamlit, Git, MySQL
**Computer Vision & GIS:** OpenCV, image segmentation, connected components, YOLOv5, ArcGIS Pro, QGIS

## EXPERIENCE

**Project Assistant, Artificial Intelligence & Machine Learning** | **Indian Institute of Science (IISc)**, Centre for Sustainable Technologies — **Oct 2025 - Present**

- Solely own a six-month groundwater forecasting workflow for 37 Bengaluru wards, producing 222 final-test predictions with aggregate $R^2$ of 0.606 and $R^2$ up to 0.907 at shorter horizons.
- Built the complete ML workflow for 3,552 ward-month records spanning 2016-2023, from multi-source data integration and feature engineering through model training, evaluation, and Plotly visualization.
- Implemented three fixed-origin development backtests and an untouched January-June 2023 test, preventing temporal leakage and selecting Ridge over XGBoost, stacking, and statistical baselines.
- Communicate model behavior, horizon-level limitations, and operational assumptions to technical and non-technical stakeholders in collaboration with BWSSB.

**Project Intern, Artificial Intelligence & Machine Learning** | **Indian Institute of Science (IISc)**, Centre for Sustainable Technologies — **Oct 2024 - Sep 2025**

- Built a gap-free monthly groundwater target series by reconciling CGWB manual readings, six-hourly CGWB DWLR measurements, and Karnataka Groundwater Directorate records without target-value imputation.
- Designed a computer-vision pipeline for microplastic detection from micro-FTIR images using Otsu thresholding, morphological refinement, and connected-component analysis.
- Generated particle and fiber measurements including size, aspect ratio, circularity, and RGB values; the resulting research abstract was accepted at MPRiSIM 2025, IISER Kolkata.

**Machine Learning Intern** | **Varcons Technologies Pvt. Ltd.** — **Mar 2022 - Sep 2022**

- Improved a lip-to-speech synthesis workflow through TensorFlow model tuning and inference-stage refinements, contributing from data preparation and training through evaluation and client-pipeline integration.

## SELECTED ENGINEERING PROJECTS

**AquaOps - Urban Water-Demand MLOps Platform** | Python, Extra Trees, MLflow, DVC, FastAPI, Docker | GitHub

- Built a production-style forecasting platform spanning public-data ingestion, validation, leakage-safe features, rolling backtests, model registry, containerized inference, monitoring, and conditional retraining.
- Trained on 7,271 monthly records across 44 Austin ZIP-code zones; achieved 11.84% sMAPE and 9.46% WAPE, beating the best baseline in three of four backtest windows.
- Implemented quality-gated candidate-to-champion promotion, PSI drift detection, MLflow tracking, DVC reproducibility, FastAPI prediction endpoints, and a Streamlit monitoring dashboard.

**Sutra - Multi-Agent AI Chief of Staff** | FastAPI, Gemini, React, TypeScript, SQLite, Cloud Run | GitHub

- Built and deployed an orchestrator with five tool-using agents plus a pattern-learning agent, integrating Google Calendar, Gmail, weather, web search, tasks, and multi-turn memory.
- Streamed agent lifecycle and tool events through Server-Sent Events and added human-in-the-loop confirmation before email and calendar writes.

**DataLens - Natural-Language Database Analytics** | Gemini, FAISS, BM25, SQLAlchemy, sqlglot, Streamlit | GitHub

- Developed a text-to-SQL pipeline with hybrid schema retrieval, constrained generation, read-only validation, EXPLAIN checks, bounded correction retries, and automated visualizations.
- Achieved 93.3% executable-query success and 80.0% exact-result match across a 15-question Chinook benchmark while capping result sets at 1,000 rows.

## SELECTED ENGINEERING PROJECTS, CONTINUED

**PaperLens - Citation-Aware PDF RAG** | Gemini, FAISS, BM25, Cross-Encoder, Streamlit | GitHub

- Implemented hybrid dense and sparse retrieval with Reciprocal Rank Fusion, cross-encoder reranking, page-level metadata, and answer-linked citation filtering for up to five PDFs and 200 pages per session.

**MatchLens - Resume and Job-Market Matching** | Gemini Embeddings, Scikit-learn, SciPy, SQLite, Streamlit | GitHub

- Built four-facet semantic matching across full document, role summary, skills, and experience, with normalized skill-gap analysis and evidence-bullet ranking.
- Added longitudinal job-description drift analysis using centroid distance, KS tests, skill-frequency trends, and local SQLite and Parquet persistence.

**SmartText Agent - Google ADK Tool-Calling Agent** | Gemini, Google ADK, Docker, Cloud Run | GitHub

- Developed and deployed five deterministic text-processing tools with validated inputs, Gemini function calling, offline unit tests, GitHub Actions CI, and a non-root container image.

## EDUCATION

**M.E. in Artificial Intelligence and Machine Learning** | MAHE, Manipal School of Information Sciences | CGPA: 9.09/10 **2023 - 2025**

**B.Tech in Computer Science and Engineering** | VTU, KS School of Engineering and Management | CGPA: 8.23/10 **2019 - 2023**

## RESEARCH, CERTIFICATIONS & LEADERSHIP

- Co-author, “Artificial intelligence for microplastic detection and classification,” MPRiSIM 2025, IISER Kolkata.
- Google Cloud Gen AI Academy APAC 2026, Cohort 1; TensorFlow Developer Professional Certificate, DeepLearning.AI; 30 Days of Google Cloud.
- Community Service Director, Rotaract Club of KSSEM (2021-2023): coordinated volunteers, outreach programs, logistics, partnerships, and reporting.