

Priyabrat Mishra

Machine Learning Engineer

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PROFESSIONAL EXPERIENCE

Machine Learning Engineer (Internship)

Mar 2025 – Present

VanaciPrime

Lisbon, Portugal

- Building a Minimum Viable Product (MVP) for predicting employee attrition – an AI native, modular and cloud-ready **Multi-Agent System** targeting 85%+ prediction accuracy.
- Trained 13 models using **AutoGluon** on an open-source HR attrition dataset, achieving 76% test accuracy.
- Designing a 5 agent based Multi-agentic workflow consisting of UI, Prediction, LLM based Response Agents using **LangChain**, **FastAPI**, and **Kubeflow** notebooks for scalable orchestration.
- Planning integration of **FAISS** and **Pinecone** for semantic search over HR documents, targeting 85%+ recall and less than 1s query latency for document grounding.
- Aiming to support HR analysts with AI-assisted decision-making, with a long-term goal to reduce manual analysis time by up to 30% post-MVP.

Graduate Student Machine Learning Researcher

Jul 2022 – Jan 2025

Fraunhofer Institute for Mechanics of Materials IWM

Freiburg im Breisgau, Germany

- Spearheaded the development of Deep Learning based Proof-of-Concept (PoC) using **PyTorch** and **PyTorch-lightning** for automating a manual material testing process using a 7-layered CNN, achieving a 80% model accuracy.
- Built a new dataset of 120 images from raw data, employing image processing, data annotation and augmentation techniques using **OpenCV**, **Pillow**, **Numpy** and **Pandas**, for downstream Machine Learning application.
- Integrated data in collaboration from 3 partner simulation engines and 6 databases into an in-house data platform using **Python**, **Pydantic** and **Docker**, within a **GitLab CI/CD** pipeline.
- Collaborated with 2 research scientists to develop automated data pipelines for an internal data platform by leveraging the platform's SDK, which accelerated SDK adoption across 5 teams.
- Implemented **Git-based version control** and enforced clean code practices using **GitHub** and **pre-commit hooks** (Black, Flake8, isort, MyPy, whitespace removal), ensuring 100% reproducibility across 3 project stages.

Assistant Systems Engineer

Mar 2018 – Apr 2019

Tata Consultancy services

Pune, India

- Revamped a SWIFT payment system based pipeline in collaboration with 4 different teams, implementing automation and data integration solutions using **Python** and **Pandas**, reducing project storage needs by 20%.
- Optimized software maintenance tasks across 12 ETL servers using Python and improved algorithms, leading to a 10% reduction in data processing time and improved system optimization.
- Led the development of a **Confluence-based** knowledge base, improving training and onboarding efficiency by 30% due to centralized access to documents and workflows.
- Implementation of Software documentation for 3 modules using **Sphinx**, **ReadTheDocs** and **Markdown**, improving internal team developer efficiency.

Software Development Intern

Jan 2017 – Apr 2017

BNY Mellon Technologies

Pune, India

- Co-ordinated with **IBM Mainframe** developers to provide software support in process improvement relevant for a financial trading project.
- Developed a batch processing ATM system on **IBM mainframes** with 18 core functionalities, capable of handling around 100 transactions per batch as part of final internship evaluation.

EDUCATION

University of Freiburg Master of Science in Embedded Systems Engineering (AI Specialisation)	Oct 2019 - Sep 2024 Freiburg im Breisgau, Germany
Institute of Technical Education and Research Bachelor of Technology in Electronics and Communication Engineering	Aug 2013 – Sept 2017 Bhubaneswar, India

TECHNICAL SKILLS

Programming & Development - Python, FastAPI, Pydantic, PyTest, HTML, CSS, Docker
ML & CV- PyTorch, PyTorch-Lightning, TensorFlow, OpenCV, NumPy, Pandas, Pillow, Matplotlib, Optuna
LLMs & Generative AI - LangChain, Prompt Engineering, Transformers (BERT, GPT, LLaMA), RAG, Model Fine-tuning
Vector Search & Retrieval: FAISS, Pinecone, Vector DBs, Retrieval-Augmented Generation (RAG)
DevOps & Tooling: Git, GitHub, GitLab CI/CD, Linux, Jupyter, Anaconda, virtualenv, JIRA
Documentation & APIs: Sphinx, ReadTheDocs, OpenAPI/Swagger, API Optimization
Cloud & MLOps - AWS (S3, EC2, Lambda, SageMaker), Kubeflow, GitLab CI/CD, GCP

SOFT SKILLS

English (C2)	Technical Documentation	Collaborative	Teamwork
German (A2)	Continuous Learning	Adaptability	Agile

PROJECTS

Agentic AI based Technical Support Assistant	In-Progress
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- Architecting an autonomous IT support system using LangChain Agents + OpenAI GPT, targeting 40% reduction in manual ticket resolution time.
- Developing a FAISS-backed RAG pipeline for real-time context retrieval from Stack Overflow, GitHub, and ITSM docs, targeting a 30% increase in resolution accuracy.
- Designing multi-agent workflow: Ticket Classifier, Reasoning Agent, Self-Improver, and Context-Aware Responder.
- Implementing query refinement, tool-calling, feedback loops for self-learning & L1 escalations reduction by 20%.
- Deploying via AWS SageMaker for inference, Kubeflow for AutoML retraining; integrating FastAPI for scalable APIs with a 35% reduction in operational overhead as the primary target.

Deep Learning based Glass Fractural Analysis for Double Ring Bending Test	Completed
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- Built a 76-image dataset from high-res double ring bending fracture tests, with augmentation (20x) using OpenCV, Pillow, NumPy.
- Trained 3-layer and 7-layer CNNs in PyTorch-Lightning for crack origin & radial distance regression (MAE: 1.31mm).
- Applied TPE-based HPO via Optuna on a 4D search space (batch size, LR, dropout, kernel), improving generalization.
- Evaluated using MSE/MAE via TensorBoard and integrated Grad-CAM for spatial saliency and model explainability.
- Reduced manual annotation time by 70% and improved prediction stability through dataset balancing and augmentation.

AI Based Image Recreation using Stable Diffusion (text-to-image model)	Completed
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- Leveraged Stable Diffusion + ControlNet for prompt-to-image and image-to-image synthesis with ThinkDiffusion & Flux 1.0.
- Tuned CFG scale, denoising strength, and samplers (Euler, DDIM, DPM-Solver) to optimize output fidelity and structure match.
- Applied inpainting, attention guidance & composition control for reconstructing resolution-accurate visual outputs.
- Benchmarked reconstruction quality by comparing resolution, symmetry & spatial features with reference images.