SAPTAM BAKSHI

Dedicated Machine Learning Engineer with 5 years of experience in Data Analysis, Statistical Modelling, and Data Visualisation. Adept at Image Processing, ML system building, workflow automation, and transforming data science prototypes to products providing value to clients.

SKILLS

Language

Python, C/C++, Java, R

Tools/Library

Snowflake, PyTorch, Tensorflow, Keras, Hugging Face, LLM, OpenCV, Scikit-learn, Scikit-image, Spark, SQL, AWS (S3, EC2, Lambda), Azure (AKS, Blob Storage), Docker, Kubernetes

Expertise

Test-Driven Development, SOLID Principles, Code Optimisation, Static Code Analysis, Deep learning, Image processing, NLP, Regression, Statistical modelling, Artificial Intelligence

EXPERIENCE

NextZen Minds, Kolkata — *Machine Learning Engineer* (August 2024 - Present)

AIngage Product Recommendation System

Designed and implemented the recommendation system for AIEngage, a product recommendation and data insights platform enabling personalised promotions and targeted messaging for brands.

- Use Snowflake to query, clean, and prepare datasets from large-scale customer transaction data.
- Implemented clustering and nearest-neighbour algorithms using Scikit-Learn to identify customer similarities and predict customer segments.
- Built a recommendation system using LightFM for both implicit and explicit feedback, achieving a precision-at-k of 85% for product recommendations.

- Automated data preprocessing and pipeline creation, reducing data preparation time by 30%.
- Deployed the recommendation model on AWS EC2 instances, ensuring scalable operations for real-time user interaction.

Retail Customer Segmentation and Demand Forecasting

Developed a customer segmentation system and a demand forecasting model for a retail chain to improve personalized marketing and inventory management.

- Performed exploratory data analysis (EDA) to identify trends and key features.
- Applied clustering algorithms (K-Means and DBSCAN) to group customers based on spending habits, purchase frequency, and product preferences.
- Developed a predictive model using Scikit-Learn to forecast customer churn based on engagement and transaction history.
- Visualised key insights and segmentation results to inform marketing strategies and improve personalisation.
- Built data pipelines with Snowflake and integrated segmentation insights into existing dashboards for stakeholder access.
- Integrated the forecasting model into an Azure-based cloud service to scale predictions and deliver real-time insights to marketing teams.

Intelgic Technologies, Kolkata — *Machine Learning Engineer* (May 2023 - July 2024)

Vision AEye Surveillance Platform

Contributed to the design and development of this large-scale, real-time surveillance system focused on crowd monitoring and anomalous behaviour detection, including violence, crowd rush, and suspicious activity.

- Collaborated with the backend development team to design and implement a highly scalable, multi-processing architecture to handle real-time video streams from 100+ cameras simultaneously.
- Implemented and trained the state-of-the-art CSRNet model for accurate crowd counting and analysis of congested scenes.
- Implemented and fine-tuned the X3D model for video classification, scene understanding, and activity recognition with an average accuracy of 89%.
- Utilised TorchServe for scalable model serving, ensuring low latency and high throughput.
- Deployed the models to a Kubernetes cluster on AWS, ensuring seamless scaling and fault tolerance for real-time video processing.

Linde VCA Application

Led the development of an end-to-end application for driver activity monitoring and anomaly detection for the multinational chemical company Linde plc, achieving 92% accuracy.

- Built an automated data ingestion pipeline using Snowflake and pre-processed large-scale dataset using Python.
- Developed computer vision pipelines using OpenCV and Pillow for image extraction and preparation from high-resolution video.
- Trained and fine-tuned YOLOv5 object detection model for driver activity classification.
- Designed and implemented the data pipeline using SQLAlchemy ORM to read data from and write results to the database.
- Deployed the application on Azure Kubernetes Service (AKS), enabling efficient scaling for processing large volumes of data.
- Generated and analysed detailed reports and visualisations to periodically improve model and algorithm logic..

TCG CREST, Kolkata — *Machine Learning Engineer* (October 2019 - April 2023)

Mining Site Prediction

Designed and implemented a machine learning pipeline for predicting probable mining sites for extracting ores from high-resolution satellite images and geological data (includes chemical composition, average density, temperature etc.).

- Utilised OpenCV and Scikit image libraries to pre-process high-resolution satellite imagery, improving feature extraction by 23%.
- Trained and evaluated various machine learning models, including Support Vector Machines (SVM) and Random Forests, achieving a prediction accuracy of 73% for potential mineral and ore extraction sites.
- The ensemble model achieved an accuracy of 79% in identifying potential mineral and ore extraction sites, leading to a 19% reduction in exploration time compared to traditional methods.

Workflow Scheduling Optimisation

Investigated Machine Leaning algorithms for efficient workflow management for constrained resources.

- Analysed the limitations of traditional workflow scheduling methods on resource-constrained environments.
- Explored the potential of deep learning to optimise workflow scheduling by researching existing approaches.
- Designed and implemented a deep learning model using PyTorch to automate task allocation and resource assignment.

- Conducted performance evaluations, demonstrating a 37% reduction in average workflow processing time compared to traditional methods.

EDUCATION

Ramakrishna Mission Vivekananda Educational And Research Institute – *M.Sc. (Computer Science)*

Specialisation: Reinforcement Learning and its application to Robotic tasks.

University Of Calcutta – *B.Sc. (Computer Science)*