

Prabhat Ale

ML Engineer

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Personal Profile

Passionate and accomplished ML Engineer with a track record of delivering impactful POC for Fortune 500 companies, with 3+ years of expertise in predictive analytics, machine learning, time series, NLP, and computer vision. Proficient in finetuning open-source LLMs and integrating OpenAI's GPT-3.5 and GPT-4 APIs for building products to empower business, as well as demonstrating expertise in object detection, image segmentation, and image classification models. Fueled by curiosity and eagerness to contribute my skills, collaborative spirit, and passion for designing cutting-edge ML systems to drive success in an innovative and progressive organization.

Education

Indreni College, Tribhuvan University

Sept 2016 - Oct 2021

B.Sc.Cs.IT

Grade: First Division with 79.6% overall,

A distinction in 4 semesters, with an average of 82.65% in the last 4 semesters

Courses: Artificial Intelligence, Image Processing, Data Mining, Linear Algebra, Calculus, Probability Theory and Statistics, Numeric Methods, Data Structures And Algorithms, Design Analysis and algorithms

Smart Attendance Management System (Final Year Project)

- Created an attendance management system utilizing face recognition technology, which incorporated anti-spoofing measures to safeguard against fraudulent attendance marking, including defenses against replay attacks and mobile-based threats under the supervision of **Ram Binay Gupta** and **Ravi Tiwari**.
- Employed a custom-built dataset for training a liveliness detector, integrated a face detection algorithm, harnessed pre-trained FaceNet weights for facial feature extraction, and implemented SVM classification for automated attendance management.

Pneumonia Detection Using Chest X-Ray Images (Final Year Internship Project)

- Leveraged the power of transfer learning with InceptionNetV3 to develop a binary classifier, enabling highly accurate classification of pneumonia from chest X-ray images.
- Utilized Streamlit to deploy a pneumonia detection app tailored for chest X-ray images, delivering remarkable performance with a recall score of 0.95 in accurately identifying pneumonia cases.

Work Experience

ML Engineer, FuseMachines

Oct 2021 - Present

- Experimented with finetuning of Large Language Model (Mistral) using conversational data sourced from diverse dating apps, to provide context-based advice emulating the role of a personalized dating coach. Implemented advanced techniques including information extraction from screenshot images, to compile and parse data in both instruction-based and ChatML formats essential for training a model.
- Worked on a propensity modeling project for identifying potential customers for all-flash storage solutions for the next 3 to 6-month timeframe using telemetric data. Employed data science skills to clean and simplify data, reducing over 400 features to a concise 250 features, through hypothesis testing and feature selection techniques. Conducted feature engineering to derive new features correlated with the target feature. Trained tree-based models like Random Forest, Decision Trees, and XGboost and achieved an impressive 90% accuracy rate on the test data set. Presented stakeholders with feature importance scores and identified the key features influencing customer propensity.
- Implemented an autoencoder-based fraud detection system utilizing mean squared error (reconstruction loss) as a performance metric, which rapidly decreased once the transactions were confirmed as normal, ensuring precise identification and prevention of suspicious transactions. Developed a 3D Tensorboard Projector Plot using AWS EC2 as a visualization and analysis tool for fraud experts, to help them identify suspicious transactions and prevent fraud.
- Developed a job search engine for an HR consulting firm, incorporating a custom NER model for extracting keywords and named entities, which were subsequently processed by a rule-based data retrieval engine connected to a MongoDB database for efficient data retrieval. Additionally, a query recommender system was implemented to enhance the user's job search experience by providing intelligent query recommendations using semantic search and FAISS in cases where data was not found in the database.

- Conducted data-driven marketing initiatives by performing exploratory data analysis, implementing KMeans Clustering for customer segmentation, and applying a KNN approach to identify potential customers with similar traits, leading to targeted marketing strategies within a challenging 3-week timeframe and securing a 6-month project extension post a successful proof-of-concept demonstration.
- Designed a powerful information extraction system for invoices and receipts, merging rule-based and machine-learning techniques. Leveraged rules for precise item extraction from vendor documents, and applied Camelot for tabular data extraction, ensuring data accuracy. Integrated this system into an API for convenient access to consolidated item and cost details.
- Researched various time series forecasting models, including the ARIMA model, and SARIMA model as well as modern approaches such as RNN, with a focus on employing XGBoost to improve forecasts through feature engineering in challenging time series data for demand forecasting.

Internship Experience

ML Intern, Leapfrog

July - Sept 2021

- Conducted EDA, formulated hypothesis tests, and developed a binary classification model with a recall of 0.78 for heart stroke prediction, addressing class imbalance using class weights and the SMOTE technique.
- Developed a Sentence Similarity-Based Question Recommendation System on the Quora Dataset by recommending the top 5 questions to users based on their search queries. This project involved text data preprocessing using the NLTK library, generating embedding vectors with a Hugging Face-based transformer model, and employing cosine similarity and ranking algorithms for question recommendations.

Computer Vision Intern, ASMI

May - July 2020

- Reconstructed 3d objects from two 2D images captured using stereo vision techniques by applying Camera Calibration and stereo 3d reconstruction algorithms.
- Conducted Experiments on various state-of-the-art object detection algorithms like Yolo and SSD on custom datasets.

Publications

- [A Comparative Study of Transfer Learning Approaches for Strengthening Face Antispoofing Security](#) [In Progress]
- [SMS Spam Detection using Relevance Vector Machine](#) [Paper Accepted]

SKILLS

Languages:	Python
ML/DL Tools:	Tensorflow, Keras, Scikit-learn, Pytorch
CV Tools/ Algorithms:	OpenCV, Scikit-image, Pillow, Yolo, Mediapipe
NLP Tools:	NLTK, HuggingFace, Transformer, LLM, OpenAI
EDA Tools:	Numpy, Pandas, Matplotlib, Excel, Embedding Projector, Plotly
Cloud Tools:	Amazon EC2, S3, RedShift
Databases/Servers:	SQL, NoSQL, Linux Server, Windows Server, Slurm
Version Controls:	Github, Gitlab, Bitbucket
Document Skills:	Word, Powerpoint, Xcel, Latex
Soft Skills:	Team Player, Presentation Skills, Communication Skills, Leadership

Projects

Fashion Recommendation Engine: Image Similarity-based Apparel Recommendations(2022)

- Developed a Fashion Recommendation Engine using image similarity search techniques, applying the preprocessing pipeline that involved resizing input images to 299*299 dimensions and extracting 2048-dimensional embeddings using a pre-trained-Xception net.
- Utilized PCA to reduce the dimensionality of the embeddings to 128, enabling efficient similarity matching based on cosine similarity.
- Implemented and deployed a Fashion Recommendation Engine on Streamlit, delivering an intuitive and interactive user interface for personalized fashion recommendations based on visual preferences in a production environment.

Question Recommendation System Quora(2021)

- Developed a question recommendation system on Quora Datasets utilizing sentence similarity to rank and recommend the top 5 questions based on user search.
- Implemented Nltk library for text data preprocessing and a Hugging Face-based transformer model to generate embedding vectors.
- Used cosine similarity and a ranking algorithm to determine similarity scores and display or predict the top 5 similar questions.

Volunteering

Volunteer Data Scientist FaunaWatch, Netherlands

May - Dec 2021

Problem: Faunawatch, a nonprofit organization dedicated to animal welfare and endangered species protection in the Netherlands, needed a solution to automate the time-consuming task of sorting images from camera traps to distinguish between actual animal presence and false alarms caused by factors like wind.

Solution: Developed an AI application leveraging transfer learning on the Xception Network, a variant of the CNN. Achieved a notable 93% accuracy in the classification of animal presence, significantly streamlining the labor-intensive task for Faunawatch researchers.

Awards and Recognitions:

- Accomplished a milestone on November 18, 2023, with 70,000 views and over 580 subscribers on my YouTube channel. The channel focuses on sharing academic content and tutorials related to projects in the fields of Artificial Intelligence (AI) and Machine Learning (ML).
- Recognized for remarkable contribution to the team at FuseMachines on June 30, 2023.
- Awarded a merit-based scholarship of NPR 250,000 for consistent academic excellence among a group of 36 students, distributed in NPR 31,250 installments each semester over 8 semesters (2016-2021).
- Awarded 20k cash prize and trophies as the winner of the National Level Hackathon out of 20 teams organized by CAN Infotech in Chitwan in Feb 2020.