

Lochan Basyal
Machine Learning Engineer | Data Scientist

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PROFESSIONAL SUMMARY

- 5+ years of professional experience in the Machine Learning domain working on statistical analysis, data mining, deep learning, computer vision, natural language processing, and Large Language Models (LLMs)
- Led the analytics and machine learning team to develop solutions for business problems in computer vision and crowd-counting models
- Developed RAG-based conversational chatbot to explore PDF documentation with Meta's Llama 2 7b chat model from hugging face integrating with Llama Index's query engine
- Experience in developing different statistical Machine Learning solutions, text summarizations, sentiment analysis, recommendation systems, forecasting models, fraud detection models, object detection, and segmentation to various business problems
- Experience in Machine Learning (ML), Predictive Modeling, Natural Language Processing (NLP), and Deep Learning algorithms
- Knowledgeable in a wide range of Machine Learning algorithms, including Ensemble Methods (Random Forests), Linear and Logistic Regression, Support Vector Machines (SVM), Deep Neural Networks, Extreme Gradient Boosting, Decision Trees, K-Means, K-NN, Gaussian Mixture Models, Naive Bayes, Convolutional Neural Networks (CNN), and Long Short-Term Memory (LSTM)
- Experience in data visualization using Python and Tableau software to design dashboards for presentation and publication
- Utilized GCP resources namely Big Query, cloud composer, compute engine, Kubernetes cluster, Vertex AI, and GCP storage buckets for building the production ML pipeline
- Developed and executed inference pipelines for LLMs including Llama-2-7b, mpt-7b, falcon-7b, and ChatGPT on open-source datasets, assessing performance using metrics such as ROUGE, BERT, and BLEU Score for NLP tasks encompassing text generation, summarization, and translation
- Hands-on experience/understanding of vector databases and Generative AI

EXPERIENCE

Associate Data Scientist

Infosys Ltd.

Sep 2024 – Present

- Working on developing an ambitious project for my client, Walmart Inc.

Machine Learning Engineer

MavenCode LLC, Southlake, Texas

Aug 2023 – Jul 2024

- Implemented a machine learning-based system for classifying intent-based user instructions in electric automation, enhancing robotic automation systems' efficiency and adaptability
- Worked on the multimodal, developing a visual question-answering system utilizing hugging face and Streamlit
- Lead the creation of advanced object detection and segmentation models, fine-tuning YOLO pre-trained models with diverse Roboflow datasets for an exceptional 97% accuracy
- Drove the development of intricate crowd-counting models, collaborating across teams to seamlessly integrate cutting-edge computer vision solutions. Achieved a remarkable 95% accuracy rate, solidifying project success
- Developed RAG-based conversational chatbot to explore PDF documentation with Meta's Llama 2 7b chat model from hugging face integrating with Llama Index's query engine
- Spearheaded a YouTube video summarization project using OpenAI's ChatGPT, resulting in an engaging web app with Streamlit
- Designed the Machine Learning data pipeline for regular monitoring and performance evaluation of the deployed ML models
- Leveraged advanced machine learning techniques to develop predictive models and algorithms for financial data analysis, risk assessment, and fraud detection with Python programming and its associated libraries, i.e., pandas, NumPy, scikit-learn, TensorFlow
- Conducted data preprocessing, cleaning, and feature engineering to prepare datasets for modeling, ensuring data quality and integrity
- Applied advanced statistical analysis techniques, such as regression, time series analysis, and clustering, to extract meaningful insights and identify patterns in financial data
- Owned the complete MLOps lifecycle, including data monitoring, code refactoring, and the development of robust model monitoring workflows for efficient model lifecycle management
- Applied strong knowledge of data structures, algorithms, and software engineering principles to create robust AI solutions
- Engineered prompts and optimized few-shot techniques to improve the performance of language models for personalized recommendations

- Collaborated with cross-functional teams to define AI project requirements and objectives, ensuring alignment with overall business goals
- Conducted ongoing research to stay updated with the latest advancements in generative AI, machine learning, and deep learning techniques, identifying opportunities for integration into products and services

Graduate Student Researcher

Stevens Institute of Technology, Hoboken, New Jersey

Jan 2022 - May 2023

- Developed an end-to-end machine learning solution on GCP Vertex AI, encompassing data ingestion, model training, validation, testing, and deployment, fostering collaboration across teams, and ensuring scalability, security, and continuous improvement
- Leveraged LangChain and OpenAI to extract insights from PDF documents, using LangChain's PyPDFLoader for efficient page handling, and applied generative AI for succinct text summarization, streamlining information extraction and enhancing accessibility
- Scraped over 2000 Tweets from Twitter API to fetch the sentiment type using NLTK's Sentiment Intensity Analyzer and Text Blob, pre-processed the text to eliminate unwanted elements from tweets for extracting the new features and generate the word cloud to visualize the common words in positive and negative tweets
- Conducted comprehensive data pre-processing and visualization on wine review datasets, revealing invaluable insights into the underlying patterns and trends. Implemented a powerful multi-label classification model leveraging a BERT pre-trained model, enabling accurate classification of diverse wine varieties and achieved an impressive 84% overall accuracy with hyperparameter tuning
- Analyzed the PatchCamelyon benchmark datasets to train in the different models, multilayer perceptron, convolution, ResNet50, InceptionV3, and ensemble to achieve the model's performance with 95% accuracy
- Worked with big data technologies, SQL, and data science tools
- Developed and implemented predictive models using machine learning algorithms such as linear regression, classification, Random Forests, K-means clustering, KNN, PCA, and regularization for data analysis
- Utilized PySpark to preprocess and analyze large-scale alarm data datasets, enabling efficient data cleaning and feature engineering
- Conducted exploratory data analysis (EDA) and data visualization using PySpark, leading to an improved decision-making process

Machine Learning Engineer

BigO Information Technology Pvt. Ltd. Kathmandu, Nepal

Sep 2017 – Dec 2021

- Spearheaded a recommendation system project aimed at enhancing online ordering and customer engagement in the hospitality sector, utilizing customer feedback, ratings, purchase history, and demographic data
- Functioned as a Machine Learning Engineer within a cross-functional team of 5 members, including software engineers and data analysts, to drive project success
- Conducted Exploratory Data Analysis (EDA) and data visualization using Pandas, Matplotlib, NumPy, and scikit-learn to uncover insights and patterns within available datasets
- Developed a machine learning solution that combined collaborative filtering and content-based filtering to address the identified problems and effectively resolved the cold-start issue through a hybrid approach
- Conducted model training and validation, evaluating model performance using metrics like accuracy, precision, recall, and F1-score, resulting in an impressive model accuracy of 95%
- Successfully integrated and deployed the recommendation system into the client's software infrastructure, leading to a remarkable 50% increase in sales within a single quarter, translating to a total revenue boost of \$800,000
- Used scikit-learn in modeling various classification, regression, and clustering algorithms including support vector machines, random forests, gradient boosting, k-means
- Performed data integrity checks, data cleaning, exploratory analysis, and feature engineering using Python libraries
- Involved in developing and testing SQL scripts for report development, Tableau reports, dashboards, and effectively addressed performance issues
- Participated in all phases of data mining including data collection, data cleaning, model development, training, validation, testing, and visualization of performance metrics for model evaluation
- Demonstrated strong thought leadership by advising product and business stakeholders on the development, scaling, and deployment of machine learning solutions

TECHNICAL SKILLS

- **Programming:** Python, SQL, NumPy, Pandas, scikit-learn, TensorFlow, PyTorch, Matplotlib, Tableau
- **Cloud Platforms:** AWS, Google Cloud Platform (GCP), Azure
- **ML/DL:** Linear Regression, Logistic Regression, Decision tree, Random Forest, XGBoost, SVM, PCA, CNN, RNN, LSTM, GAN, Transformers, Generative AI, LLMs, RAG, LlamaIndex, Langchain, Prompt Engineering

RESEARCH

- **Basyal, L.** and Sanghvi, M., Text Summarization Using Large Language Models: A Comparative Study of MPT-7b-instruct, Falcon-7b-instruct, and OpenAI Chat-GPT Models. arXiv preprint arXiv:2310.10449.
- **Basyal, L.**, Voice Recognition Robot with Real-Time Surveillance and Automation. arXiv preprint arXiv:2312.04072.
- Rohila, V.S., Lalwani, N. and **Basyal, L.**, Histopathologic Cancer Detection. arXiv preprint arXiv:2311.07711.
- **Basyal, L.**, & Gaudel, B., Augmenting Automation: Intent-Based User Instruction Classification with Machine Learning. *arXiv preprint arXiv:2403.01242*.

AWARDS AND LEADERSHIP

- **KaggleX Career Development Scholarship**
Granted by Kaggle, Cohort 3 of the KaggleX mentorship program. (Aug. 2023 - Dec. 2023)
- **Graduate Peer Leader - Stevens Institute of Technology, Hoboken, NJ**
Mentored incoming graduate students, guiding them to foster academic excellence. (Aug. 2022 - May 2023)
- **Provost's Masters Fellowships**
Accorded by Stevens Institute of Technology for MS in Computer Engineering. (Jan. 2022)
- **ISTE Best Student Award**
Awarded by the Indian Society for Technical Education (ISTE) for recognition of undergraduate research. (Sept. 2018)

EDUCATION

- Master of Science in Computer Engineering, Concentration: Artificial Intelligence (AI)
- Bachelor of Technology in Electronics and Communication Engineering
- Diploma in Engineering