SHULAV KARKI

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Highly motivated and detail-oriented Machine Learning Engineer with 2+ years of experience in implementing and deploying machine learning models(Recommendation, Computer vision, Fraud Detection models) for various applications. Proficient in Python, PyTorch, PySpark, Pandas, Numpy, Scikit-learn and AWS cloud services. Skilled in building pipelines for data preprocessing, feature engineering, model building and model evaluation. Strong communicator and team player with a passion for learning and innovation.

EDUCATION

FUSEMACHINES **Kathmandu**

Artificial Intelligence Fellowship *March 2022 - Present*

- Awarded a competitive full scholarship.
- Learned the intuition and mathematics behind various supervised, unsupervised learning algorithms including classification, regression, clustering and dimensionality reduction.
- Gained an understanding about the different parameters and hyperparameters of each ML algorithm.
- Used advanced data preprocessing techniques such as data cleaning, outlier handling.
- Built Parkinson's Disease Classification using various supervised learning algorithms like SVM, Ensemble, Naive Bayes, and Logistic Regression and used Dask to parallelize the computation for hyperparameter tuning.
- Deep Learning and Paper Reading Sessions.

INSTITUTE OF ENGINEERING, IOE **Dharan**

Bachelor of Computer Engineering *May 2017 - April 2022*

- Awarded a prestigious Full scholarship for all semesters.
- Achieved an unwavering grade **"A"** across all semesters.
- Assisted the professor in conducting lectures, grading assignments, and guiding students through challenging concepts related to data structures and algorithms.
- Held office hours to provide one-on-one assistance to students, addressing questions and clarifying doubts.
- Contributed to the development of course materials, including assignments and exam content.
- **Relevant Coursework**: AI, Data Mining, Operating System, Big Data, Database Management System, SQL, Data Structures and Algorithm, Probability and Statistics

PROFESSIONAL EXPERIENCE

Fusemachines **New Baneshwor, Kathmandu**
Machine Learning Engineer Dec *2022–Present*

- Implemented different models, including NFM, DeepFM, DeepFFM and time-series approach for click-through rate applications.
- Conducted data analysis tasks using PySpark for clients to extract insights.
- Developed and deployed different sequential models, such as NextItNet and SRGNN, for next item recommendation for POC, which helped acquire clients for the company.
- Designed and implemented context-aware and sequential models for general recommendation and next item recommendation to enhance user experience and engagement.
- Deployed contextual aware recommender for exploitation and reinforcement Learning techniques like Thompson sampling for exploration for the internal product recommender system.
- Implemented Multi-task recommendation algorithm like ESM2 for fashion-ecommerce clients.
- Implemented robust fraud detection models for single and multi-transactions using unsupervised algorithms (autoencoder, Isolation Forest) and weakly supervised models (DevNet). Achieved superior performance compared to rule-based approaches, identifying novel fraud transactions for clients.
- Worked with a research team to build a machine learning model for an internal product.
- Implemented different Fraud Detection algorithms like Autoencoders, DevNet, PreNet.,etc for clients.
- Worked on Speech Separation on Multi channel mixed audio for speaker identification project.
- Worked Model optimization(quantization, pruning, low-rank matrix factorization, knowledge distillation) to infer model in edge devices.
- Interviewed candidates for Machine Learning Intern Positions, evaluating their technical skills and potential contributions to the team. Additionally, provided mentorship and guidance to interns throughout the entirety of various projects, ensuring successful project completion and a positive learning experience.

Chulo Solutions **Kumaripati, Lalitpur**
Machine Learning Intern May *2022–Aug 2022*

- Built various machine learning algorithms ,ANN and optimizers from scratch.
- Image Classifier, Object Detection and Research paper reading session.
- Worked on a project to count people and make a log of each profile in a video using YOLOv3.
- Teamwork, Communication and Idea sharing session.

PROJECTS

RAG HealthCare Chatbot

- Used Mistral quantized model for llm.
- Used Selenium for scraping health related issues and diseases from Cleveland Clinic.
- Streamlit for chatbot interaction.

Contextual and Sequential Food Recommendation | Fusemachines

- Used different Context Based Algorithm like DeepFM, FibiNet, AFM and Sequential Based recommender like DSIN, DIN, SRGNN, NextItNet, etc
- Implemented Multi-task algorithms like ESM2.

Question Answering in Document

- Chabot in given documents/papers using Falcon 7B LLM.

Thompson Sampling for Recommender System

- Implemented Thompson sampling techniques for less interactive products for exploration in recommender systems.
- Built a visual demo of how each product updates its distribution on feedback.

Landslide Detection From Remote Sensing Imagery Using Autoencoder And Attention boosted CNN

- Used Pretrained encoder with CNN to classify satellite images which gives 20% better accuracy than pre-trained CNN.
- Used Squeeze and excitation attention with CNN which gives 5% boost in accuracy than autoencoder with CNN.

Food Detection using YoloV2

- Built Classifier and the whole pipeline for Object Detection from scratch using Pytorch.

Image Caption Generator

- Used pre-trained CNN for encoding and LSTM for decoder.

Other Projects:

- Content and Collaborative Filtering for Movie Recommendation
- Built PCA from Eigen Decomposition and SVD from scratch for classification
- Built Image classifier for custom datasets.
- Built different algorithms like Linear Regression, Logistic Regression, SVD, ANN, etc from scratch
- Built different optimization algorithms like Gradient Descent, GD with momentum, AdaGrad, etc from scratch for classification task

SKILLS

Programming Language: Python, SQL, C, C++
Libraries: Tensorflow, Keras, Scikit-Learn, Pandas, cuDF, Dask cuDF, NumPy, Matplotlib, Searborn
Framework: PyTorch, PySpark, Flask, FastAPI
Database: MySQL, PostgreSQL
Cloud Deployment: AWS(EC2, Redshift, S3, Athena, EMR, Lambda), GCP(Big Query, Cloud Storage), IAM
Version Control System: Git, BitBucket
Deep Learning Models: CNN, RNN, LSTM, Transformer, BERT, MLP
Recommendation Models: Candidate Generation, lambdaMART, ranking models, contextual models like DeepFM, DSIN, DIEN and sequential models like NextItNet, SRGNN., etc
Fraud Detection System: Autoencoders, Isolation Forest(, DevNet, PreNet, etc
NLP: SpaCy, NLTK, Gensim, LLM, Chatbot, Prompt Engineering
Model Optimization: Quantization, Pruning, Low-rank Matrix Factorization, Knowledge Distillation
Ops: MLFlow, Weights & Biases, Evidently,

CERTIFICATIONS

- Machine Learning by Stanford University
- Machine Learning and Deep Learning Fellowship by Fusemachines
- Machine and Deep Learning Fundamentals by IBM

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

- Workshop on Git and Python for Freshmen
- Workshop on Machine Learning with Python for Sophomores
- Volunteering and Organizing Internal Hackathons Within Campus

AWARDS AND HONORS

Runner up - Internal Hackathon
Fusemachines, 2022
- Built Personnel counting and tracking system

Artificial Intelligence Fellowship by Fusemachines
- Full scholarship, 2022

Winner, Baby Learning App Hackathon
Institute of Engineering, Nepal, 2019
Developed a pioneering mobile application allowing babies to practice letter recognition by drawing. The app successfully detected entered letters and presented corresponding animal outlines for an engaging and educational learning experience. Awarded first place for innovation and usability in the hackathon competition.

LANGUAGES

- English (Fluent)
- Nepali (Fluent)
- Hindi (Conversational)