Harshit Kumar

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Education

Northeastern University, Khoury College of Computer Sciences, Boston, MA — *Sep 2022 - Present*
MS in Artificial Intelligence — *GPA:* 3.83/4.0
Courses: Foundations of AI, Algorithms, Machine Learning, AI for Human Computer Interaction, Large Language Models

Guru Gobind Singh Indraprastha University, Delhi, India — *Aug 2016 - Sep 2020*
BTech in Computer Science and Engineering, top-4 in class — *GPA:* 8.72/10.0

Skills

Programming Languages: Python, C++, C, SQL, Java, R, JavaScript
Machine Learning: PyTorch, Tensorflow, OpenCV, scikit-learn, xgboost, pandas, numpy, nltk, matplotlib, seaborn, plotly
Tools & Frameworks: Django, Flask, PySpark, GStreamer, Git, DVC, Docker, Kubernetes, Slurm, ONNX, Linux, HuggingFace
MLOps: AWS SageMaker, Azure AI, Nvidia DeepStream, TAO, Intel OpenVINO, MLFlow, GitHub Actions, CI/CD

Experience

Graduate Teaching Assistant - Khoury College of Computer Sciences, Boston, MA — *Jan 2023 - Present*
- Served as a teaching assistant for the CS62220 **Data Mining Techniques** course (Jan 2024 - Present) and the DS5010 Introduction to **Programming for Data Science** course (Jan 2023 - Apr 2023).
- Created assignments for 60+ students, covering topics like recommendation systems, clustering, ensemble methods.
- Conducted office hours and graded Python programming, statistics, and data science assignments and quizzes.

Deep Learning Research Intern - The Jackson Laboratory, Bar Harbor, Maine — *Jul 2023 - Dec 2023*
- Applied ***Explainable AI*** methods: *Saliency Maps, Integrated Gradients, Kernel SHAP* on DNA sequence data using *PyTorch Captum*, leveraging Slurm for job scheduling and model training on High Performance Computing (HPC) clusters.
- Researched 5+ model interpretability methods for ***Graph Neural Networks*** such as *GNNExplainer, GraphSVX*.
- Generated 12 ***benchmark synthetic datasets*** for graph classification tasks for biomedical networks using *PyTorch Geometric*.
- Conducted quantitative assessments with cross-entropy and AUC-ROC evaluate attribution scores against ground truth, optimizing 160+ model architecture configurations *(GCNConv, GraphConv, dropout, L2 regularization)* through *grid search*.

Machine Learning Engineer - Vehant Technologies, Noida, India — *Aug 2020 - Aug 2022*
- Implemented ***10+ People and Traffic Analytics*** solutions - line crossing, crowd counting, abandoned object detection, tracking, pose estimation, license plate recognition, leading to acquisition of ***4 new Smart City contracts*** within a year.
- ***Optimized*** *multi-GPU inference* end-to-end pipeline ***1.5 times*** for real-time surveillance with *Mixed Precision, Quantization*.
- Mentored 2 fellow teammates and gave technical sessions on ***Edge AI*** topics w.r.t. ***Video Analytics*** for Smart Cities.
- ***Deployed*** and trained ***8+ deep learning models*** *(YOLO, Faster R-CNN, Mask RCNN, ResNet, etc)* using *PyTorch, Tensorflow, Nvidia TensorRT, DeepStream SDK, TAO, Intel OpenVINO, ONNX, MLFlow, Docker*.
- Integrated MLFlow and DVC, Data Version Control, and Kafka to handle data handling ML pipelines.

AI (NLP) Intern - Arbunize Digital Media Pvt Ltd, Delhi, India — *Jun 2018 - Aug 2018*
- Leveraged ***text-processing*** techniques, including ***Named Entity Recognition*** (NER), to parse resumes with *nltk, scikit-learn*.
- Extracted skills from resume and applied ***random forest, gradient boosting*** with 0.89 F1-score to predict job title.
- Developed ***Multinomial Naive Bayes***, ***Support Vector Machine*** (SVM) classifiers with 0.85 R2 across 4 MBTI personalities, utilizing natural language processing techniques like word embeddings, TF-IDF, ***dimensionality reduction*** (PCA).

Projects

Visual Question Answering with Generative AI [github]
- Integrated Hugging Face pre-trained tokenizers, Visual Transformer for images, and LLMs for generating answers.
- Achieved 0.3 WUPS with RoBERTa and BEiT outperforming all 4 model combinations viz. ViT, DEiT with BERT, GPT.

Sentiment Analysis on Amazon SageMaker [github]
- Deployed sentiment analysis model on AWS Sagemaker using PyTorch, covering data processing, training using data on S3.
- Integrated custom inference code into web app using AWS Lambda, API Gateway, and IAM roles for seamless functionality.

Data Exploration and Visualization of Flights' Cancellation and Delay [github]
- Performed exploratory data analysis (EDA) of the flights cancellation and delay dataset using explanatory data visualization.
- Presented findings with the help of correlation plots, bar plots, box plots, and scatter plots using seaborn and Jupyter Slides.

Certifications

- **Conferences:** Computer Vision Summit'23, 22, NVIDIA GTC'22, GTC'21, GTC'20, PyData'22, Google Cloud Summit'18.
- **Hackathons:** Smart India Hackathon'18 finalist, Rajasthan Hackathon 5.0, Rajasthan Hackathon 4.0.
- **Certifications:** PyTorch Scholarship (**Deep Learning Nanodegree**), Deep Reinforcement Learning Nanodegree, and Bertelsmann Scholarship (**Data Analyst Nanodegree**) by being in **top 3% out of 10k** applicants.
- **Top-15 answerer** of all time on **Stack Overflow** in Python, PyTorch category (**10th** to earn **PyTorch Silver badge**).