

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.

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.
- Fine-tuned multimodal VQA model on 7k DAQUAR dataset, employing transfer learning and data augmentation.
- Achieved 0.3 WUPS with RoBERTa and BEiT outperforming all 4 model combinations viz. ViT, DEiT with BERT, GPT.

Transformer Architecture Implementation and Machine Translation [\[github\]](#)

- Developed the Transformer architecture from scratch, incorporating attention mechanisms, greedy decoding, beam search.
- Conducted training of the Transformer model on the Multi30k dataset for translating German to English.

ML Roleplay using CustomGPT [\[github\]](#)

- Developed custom GPT 4, a versatile language model capable of assuming roles such as Archaeologist, Private Investigator, Explainer, Diagrammer, Industrial Researcher, and NeurIPS reviewer, utilizing Deep Learning class projects dataset.

Certifications

- **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**).