

# Harshit Kumar

Boston, MA | [kHarshit.github.io](https://github.com/kHarshit) | [kumar.hars@northeastern.edu](mailto:kumar.hars@northeastern.edu) | +1 (857) 693-9361

 [github/kHarshit](https://github.com/kHarshit) |  [linkedin/kHarshit](https://www.linkedin.com/in/kHarshit) |  [stackoverflow/6210807](https://stackoverflow.com/users/6210807)

## Education

**Northeastern University**, Khoury College of Computer Sciences, Boston, MA

Sep 2022 - Present

**MS in Artificial Intelligence**

GPA: 3.83/4.0

Courses: Intro to Programming for Data Science, Foundations of AI, Algorithms, Programming Design Paradigm, Machine Learning, AI for Human Computer Interaction, Pattern Recognition and Computer Vision, 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/Keras, OpenCV, scikit-learn, pandas, numpy, matplotlib

**Tools & Frameworks:** Django, Flask, GStreamer, Git, DVC

**MLOps:** AWS SageMaker, Nvidia TensorRT, DeepStream, ONNX, Intel OpenVINO, MLFlow, Docker, GitHub Actions

## Experience

**Deep Learning Research Co-op - 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 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*.

**Graduate Teaching Assistant - Khoury College of Computer Sciences**, Boston, MA

Jan 2023 - Apr 2023

- Resolved queries from students in DS5010 Intro to Programming for Data Science course under Prof. Kylie Bemis.
- Graded Python programming and data science assignments and quizzes of 50+ students.

**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, traffic estimation, license plate recognition, leading to acquisition of **4 new Smart City contracts** within a year.
- Optimized GPU inference** end-to-end pipeline **1.5 times** for real-time surveillance with *Mixed Precision*, *Quantization*, *Pruning*.
- 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*.

**R&D Intern - Vehant Technologies**, Noida, India

Jun 2019 - Jul 2020

- Researched and fine-tuned models for 15+ multi-label *Pedestrian Attribute Recognition* i.e. clothing, age, gender, etc.
- Applied *Monocular Depth Estimation* methods for under-vehicle object detection with 90% accuracy.

**AI (NLP) Intern - Arbunize Digital Media Pvt Ltd**, Delhi, India

Jun 2018 - Aug 2018

- Adapted Satz sentence boundary detection using *decision trees* and *neural networks* reducing errors by 1/3.
- Extracted skills from resume and worked on classification models with 0.89 F1-score to predict job title.

## Projects

**Visual Question Answering with Generative AI** [\[github\]](#)

Dec 2023 - Present

- Integrated HuggingFace pre-trained Visual Transformer for image understanding and LLMs for generating answers.
- Fine-tuned VQA model on 7k DAQUAR dataset, employing techniques like transfer learning and data augmentation.
- Achieved 0.3 WUPS with RoBERTa and BEiT outperforming all 4 model combinations viz. ViT, DEiT with BERT, RoBERTa.

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

Dec 2023 - Dec 2023

- 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.

**HCI Analysis of DALL-E 2 and insights into DALL-E 3** [\[Doc\]](#)

Nov 2023 - Dec 2023

- Conducted an in-depth Human-Computer Interaction (HCI) study of DALL-E, focusing on usability, and accessibility.
- Investigated ethical challenges in AI-generated content, addressing issues of bias, transparency, and accountability.

## Events & Achievements

- 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.
- Received PyTorch Scholarship (**Deep 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 PyTorch category (**10th** to earn **PyTorch Silver badge**).