Harshit Kumar

Boston, MA
kHarshit.github.io | kumar.hars@northeastern.edu | +1(857)693-9361
github/kHarshit | linkedin/kHarshit | stackoverflow/6210807

Education

Northeastern University, Khoury College of Computer Sciences, Boston, MA — *Sep 2022 - Present*
MS in Artificial Intelligence — *GPA:* 3.8/4.0
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/Markup Languages: Python, C++, C, SQL, Java, R, JavaScript, CSS
Machine Learning: PyTorch, Tensorflow/Keras, OpenCV, scikit-learn, pandas, numpy, matplotlib, AWS SageMaker
Tools & Frameworks: Nvidia TensorRT, DeepStream, ONNX, MLFlow, Intel OpenVINO, Docker, Django, Flask, GStreamer

Experience

Deep Learning Research Co-op - The Jackson Laboratory, Bar Harbor, Maine — *Jul 2023 - Dec 2023*
- Applied ***Explainable AI*** methods: *Saliency Maps, Integrated Gradients* on DNA sequence data using *PyTorch Captum*.
- Researched on model interpretability methods for ***Graph Neural Networks*** such as *GNNExplainer, GraphSVX*.
- Generated ***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 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, traffic estimation, license plate recognition, leading to acquisition of ***4 new Smart City contracts*** within a year.
- ***Optimized*** end-to-end pipeline *(GPU DL inference + CPU process)* by ***1.5 times*** 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*
- Integrate pre-trained Visual Transformer (ViT) for image understanding and LLMs (BERT, GPT) for generating answers.
- To fine-tune VQA model on VQAv2 dataset, employing techniques like transfer learning and data augmentation.
- Conduct a comprehensive performance comparison between ViT combined with GPT/BERT and the CLIP model

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 2, focusing on usability, and accessibility. Evaluated DALL-E 3's responsiveness to user inputs, feedback mechanisms, and adaptability to user preferences.
- Investigated ethical challenges in AI-generated content, addressing issues of bias, transparency, and accountability.

Image colorization of historical paintings using deep learning [github] — *Feb 2023 - Apr 2023*
- Leveraged U-Net and pix2pix Convolutional Generative Adversarial Network, to colorize grayscale historical paintings.

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**).