Vibhhu Sharma

vibhhus@cs.cmu.edu vibhhusharma vibhhusharma.github.io vibhhu-sharma

Education

Carnegie Mellon University, ***Pittsburgh*** *Aug 2023 - Dec 2024*
Master of Science in Machine Learning; CGPA: 4.0/4.0

Indian Institute of Technology (IIT), Madras , ***Chennai, India*** *Aug 2019 - June 2023*
Bachelor of Technology; ***Major:*** *Electrical Engineering, CGPA: 9.35/10*
Key Courses: Advanced Intro to ML, Deep Reinforcement Learning and Control, Statistics, Linear Algebra, Probabilistic Graphical Models

Skills

- **Languages**: Python, Java, Bash, C++, MATLAB, C, Octave
- **Web Development**: HTML5, CSS3, Javascript
- **Data Analysis**: MATLAB, Octave, NumPy, Pandas, Matplotlib, Keras, TensorFlow, PyTorch
- **Other Libraries and Tools**: ROS, Eagle, Arduino, LaTeX

Publications

- **Vibhhu Sharma**, Neham Jain, and Gaurav Sinha, **Counterfactual Explanations for Visual Recommender Systems**, The Web Conference 2024 (**WWW 2024**) [Paper] [Video]

Experience

Machine Learning PhD Engineer Intern | Instacart May 2024-Aug 2024
Manager: Shishir Kumar Prasad *San Francisco, CA*

- Reduced sequence recommendation latency by **29.6%** using approximate nearest neighbor search for candidate retrieval.
- Improved recall for tail end retailers by **3%** via retailer-specific candidate retrieval using exact nearest neighbor search.
- Boosted overall Recall@200 by **1.5%** after testing/implementing multiple approaches for pretraining item embeddings.

A Unified Causal Framework for Auditing Recommender Systems | Carnegie Mellon University Sep 2023- May 2024
Guide: Prof. Zachary Lipton, Submitted for publication and under review *Pittsburgh, PA*

- Developed a general causal framework for defining and categorizing recommender system auditing metrics.
- Proposed future and past **reachability** & **stability** as metrics to audit user agency in dynamic recommendation processes.
- Provided gradient-based and black-box approaches for computing proposed metrics under different access levels.

Using LLMs to enhance Graph Learning on Text Attributed Graphs Feb 2024-May 2024
Guide: Dr. Andrej Risteski [Link] *Pittsburgh, PA*

- Used LLMs to enhance node information in text attributed graphs, by using them for text augmentation and encoding.
- Benchmarked the method on 4 popular TAG datasets, beating standard TAG methods in both low and high label settings.

Targeting Interventions based on Baseline Risk vs Treatment Effect | Carnegie Mellon University Feb 2024- Present
Guide: Prof. Bryan Wilder *Pittsburgh, PA*

- Analyzed data from real world RCTs in varied settings to compare the efficacy of targeting interventions based on **baseline risk** vs **biased** estimates of **treatment effect** after artificially introducing different levels of confounding.

Natural Language Counterfactual Generation for Indic Languages | Bachelor Thesis, IIT Madras Jan 2023- May 2023
Guide: Prof. Mitesh Khapra *Chennai, India*

- Created a flexible counterfactual generator for Indic Languages with **customizable perturbations**.
- Proved **counterfactual augmentation**'s value in NLP tasks like sentiment analysis and paraphrase identification.

Research Intern | Adobe Research May 2022-Oct 2022
Guide: Dr. Gaurav Sinha *Bangalore, India*

- Devised a method to generate counterfactual explanations for a multimodal recommender system's recommendations.
- Developed an algorithm to identify the minimal change in an item's image to remove it from a user's recommended list and used CLIP to connect the perturbed image features to textual features in order to lend meaning to the perturbations.
- **Outperformed the existing state of the art** by 4% on **Explanation Fidelity** and 26.5% on **Explanation Number**.

Extra Curricular Activities

- Headed a team of 48 students as the **Executive Editor** of the official campus publication of IIT Madras May 2022-May 2023
- Conducted a public workshop on "**Python for Robotics**" as a part of IIT Madras' annual technical festival. Dec 2020-Jan 2021
- Won numerous **national level quizzes**, including Nihilanth 2023, as part of the IIT Madras quiz contingent. Apr 2020-May 2023
- **Mentored** 2 underprivileged students at **Avanti Fellows** in all aspects of their academics. Aug 2019-Sep 2020