

# Vibhhu Sharma

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## 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,  $\text{\LaTeX}$

## 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 | 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