MONA GANDHI

mona09@seas.upenn.edu
https://monagandhi09.github.io

Education

2022-Present **MS CIS at University of Pennsylvania**, *GPA: 3.88*.
Masters in Computer and Information Science
- *Coursework*: Artificial Intelligence, Natural Language Processing, Machine Learning, Analysis of Algorithms, Database Management Systems, Computer Vision, Network Systems.

2018-2022 **B.Tech CS at Veermata Jijabai Technological Institute**, *GPA: 9*.
Bachelors in Computer Science
- *Coursework*: Operating System, Machine Learning, Database Management Systems, Data Interpretation and Analysis, Web Technologies, Software Engineering, Cloud Computing, Wireless Networks, Network Security.

Publications

CVPR 2023 **CREPE: Can Vision-Language Foundation Models Reason Compositionally?**, Zixian Ma*, Jerry Hong*, Mustafa Omer Gul*, **Mona Gandhi**, Irena Gao, Ranjay Krishna.
IEEE conference on Computer Vision and Pattern Recognition, 2023

CVPR 2022 **Measuring Compositional Consistency for Video Question Answering**, **Mona Gandhi***, Mustafa Omer Gul*, Eva Prakash, Madeleine Grunde-McLaughlin, Ranjay Krishna, Maneesh Agrawala.
IEEE conference on Computer Vision and Pattern Recognition, 2022

Research Experience

2023-Present **Interpretable Radiology**, *University of Pennsylvania*.
- *Mentor*: Prof. Mark Yatskar
- *Domain*: Computer Vision and Natural Language Processing
- *Work*: Building an interpretable concept bottleneck model inspired by LaBo for the medical domain, specifically chest X-rays for assisting radiologists in analyzing an X-ray with natural language concepts (explanations) for the final model output.

2023 **Extracting Features learnt by Deep Neural Networks**, *University of Washington*.
- *Mentor*: Prof. Ranjay Krishna
- *Domain*: Computer Vision and Natural Language Processing
- *Work*: Extracted the features that a pre-trained model has learned while training and deriving their various use cases. One of the ideas was to train a hyper-network to learn the importance of each concept for a given label.

2022-2023 **Compositionality of Vision Language models**, *University of Washington*.
- *Mentor*: Prof. Ranjay Krishna
- *Domain*: Computer Vision and Natural Language Processing
- *Publication*: IEEE CVPR 2023, **Highlight paper**
- *Work*: Examined huge vision-language models (CLIP) on two major aspects of systematicity and compositionality by introducing a new benchmark called CREPE, to find that these huge models fail to understand compositionally.

2022 **DNN to Interpretable by Design**, *University of Pennsylvania*.

- *Mentor*: Prof. Mark Yatskar
- *Domain*: Computer Vision and Natural Language Processing
- *Work*: Experimented using an end-to-end system to find concepts associated to different layer using MILAN, through CLIP find correlated image-concept pair and finally use these concepts to build an interpretable by design model. Found that the extracted concepts focused a lot on the background rather than main features of the image.

2021-2022 **Question Decomposition**, *Stanford University*.

- *Mentors*: Prof. Maneesh Agrawala, Prof. Ranjay Krishna
- *Domain*: Computer Vision and Natural Language Processing
- *Publication*: IEEE CVPR 2022
- *Work*: Developed a question decomposition engine that deconstructs a compositional question from AGQA into a subquestion hierarchy, a directed acyclic graph. Evaluated the performance of HCRN and HME models using consistency metrics on subquestion hierarchies for the AGQA dataset and learned that easier subquestions are incorrect while complex questions are answered correctly.

2021-2022 **Improving Network Intrusion Detection System using Imbalance Reduction Techniques**, *Veermata Jijabai Technological Institute*.

- *Mentors*: Prof. Vaibhav D. Dhore
- *Domain*: Machine Learning and Network Security
- *Course*: Final Year Project
- *Work*: Comparing different imbalance reduction techniques including undersampling techniques such as ENN, Tomek links, Cluster Centroids, IHT, and Random undersampling, oversampling techniques such as SMOTE, borderlineSMOTE, Adasyn, and random oversampling, and ensemble techniques on improving Network Intrusion systems (NIDS). Inferred that the ensemble of some techniques helped NIDS to perform better.

Teaching Experience

Graduate Teaching Assistant

2023 **CIS 5300: Natural Language Processing**.

2023 Fall: instructed by Prof. Mark Yatskar
2023 Summer: instructed by Prof. Chris Callison-Burch

2023 **CIS 4000/4010: Senior Design Project**.

2023 Fall: instructed by Prof. Boon Thau Loo
2023 Spring: instructed by Prof. Jonathan M. Smith

- Mentoring and managing 5 teams of undergraduate students for their senior design project, helping them plan their weekly goals and giving feedback and suggestions.

Outreach

2020 **Program in Algorithmic and Combinatorial Thinking**.

2020 Summer: instructed by Prof. Rajiv Gandhi

- Conducted recitations for beginners group and mentored a small group of students, while being part of the advance group.

2019 **Community of Coders**.

Volunteered at undergraduate level coding club, along with teaching at a few sessions.

Presentations

2023 **CREPE: Can Vision-Language Foundation Models Reason Compositionally?**, Zixian Ma*, Jerry Hong*, Mustafa Omer Gul*, **Mona Gandhi**, Irena Gao, Ranjay Krishna.
Poster, Proceedings of IEEE conference on Computer Vision and Pattern Recognition, 2023

2022 **Measuring Compositional Consistency for Video Question Answering**, **Mona Gandhi***, Mustafa Omer Gul*, Eva Prakash, Madeleine Grunde-McLaughlin, Ranjay Krishna, Maneesh Agrawala.
Poster, Proceedings of IEEE conference on Computer Vision and Pattern Recognition, 2022

Technical Skills

Languages	Python, C++, C, Java
DL Tools	Pytorch, Tensorflow, OpenCV, Hugging Face
Web-Dev	HTML, CSS, Javascript, PHP, React JS, SQL, NodeJS, Oracle DB
Others	Linux, Visual Studio

Achievements

2018 1^{st} rank among girls and 10^{th} rank overall in MHT-CET (state-level entrance exam) among 0.28 million students.

2008-2020 Pursued Visharath Pratham (highest level of degree in Indian Classical Dance) in Bharatnatyam (Indian Classical Dance) and performed Araangetram (first stage performance).

Course Projects

2023 **Live Poets Society**, *Goodreads clone*.
- *Technologies*: ReactJS, MySQL
- *Course*: Database Management System, CIS 5500
- *Description*: Created a social cataloging application specifically for poetry lovers, that enables users to explore the world of poetry through an extensive collection of books, series, authors, and reviews.

2023 **Sentiment Analysis for Amazon Food Reviews**.
- *Domain*: Natural Language Processing
- *Course*: Applied Machine Learning, CIS 5190
- *Description*: Implemented a Sentiment analysis system for Amazon Food Reviews. Examined various text vectorizations including Word2Vec, GLOVE, and Bag-of-Words while using models such as Naive Bayes, Logistic Regression, XGBoost, and LSTM, and evaluated BERT embeddings with LSTM.

2022 **Could this be any better?**, *Multimodal Sarcasm Detector*.
- *Domain*: Computer Vision and Natural Language Processing
- *Course*: Natural Language Processing, CIS 5300
- *Description*: Implemented a multimodal sarcasm detector using video, audio, and text features from the MUStARD dataset. Trained and analyzed the performance of LSTMs with different types of attention. Concluded that the best-performing model learns a bias towards labeling data as sarcastic, but it does very well in detecting non-sarcastic data.

2022 **Hostelite**, *Hostel Management System*.

- *Technologies*: Flask, HTML, CSS, Javascript
- *Course*: Human-Computer Interaction
- *Description*: Created a website for enabling the handler of the hostel to be very efficient or to be good at calculations. Included main features such as managing data of students, staff, students' representative, admission process, mess, and maintaining exit-entry records of students who stay in the hostel, visitors, and couriers delivered to them.

2021 **Alert!! False News!**.

- *Domain*: Natural Language Processing
- *Description*: Developed a Fake News Detector using a transformer-based model - BERT, with the help of the labeled LIAR dataset. Analyzed the performance of our model with confusion matrix to deduce on which examples it performs well. Inferred that the model does well classifying false statements, and does a poor job classifying true statements.

2020 **AlgoVisualizer**, *Visualizer for Basic Algorithms*.

- *Technologies*: HTML, CSS, ReactJS
- *Course*: Web Development Technologies
- *Description*: Developed a tool to visualize sorting algorithms like bubble sort, merge sort, and insertion sort. Created an interactive page that finds a path from the start node to the end node, using algorithms like Dijkstra, BFS, DFS, and visualizes it. Includes nodes with weights and walls as well.

Languages

Fluent	English, Hindi, Gujarati
Conversational	Marathi
Basic	French