

# VRINDA KOHLI

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## EDUCATION

**Bachelor of Technology**, Manipal University Jaipur  
Computer Science Engineering  
*Minor: Data Science*

2020 - 2024  
CGPA : 9.28

## EXPERIENCE

### Research Assistant

BITLab, Boston University

August 2023 - Dec 2023  
Supervisor: Dr. Dokyun (DK) Lee

- Contributed to a LangChain based multi-agent environment for experimentation on inter-agent interactions, using additional tools such as SerpAPI and OpenAI models.
- Imparted 6 demographic specific features to agents and studied their correlation with misinformation spread, observing emergence of real-world patterns in agent behavior.
- Reviewed 8+ papers on the usage of LLM backed Agent Based Modeling and Simulation.

### Undergraduate Researcher

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July 2023 - Current  
Supervisor: Dr. Niloofar Mireshghallah

- Developed experimentation pipelines for observing the correlation between Differential Privacy and hallucinations in language models for Q/A tasks. [Project on hold]

### Research Intern

Delhi Technological University

May 2023 - August 2023  
Supervisor: Dr. Rahul Katarya

- Implemented and validated 7 recent research papers on Deep Learning aided Metaphor Detection.
- Achieved 2% average accuracy improvement over existing methods during experimentation.
- Used transfer learning and transformer models for flash flood detection using geospatial raster imaging, improving performance by 8%.

### Undergraduate Researcher

Manipal University Jaipur

Jan 2023 - July 2023  
Supervisor: Mr. Harish Sharma

- Developed a lightweight algorithm agnostic to various JPEG compression techniques, enabling efficient detection of AI-generated art on social media platforms.
- Demonstrated exceptional performance in the detection of AI-generated art by achieving competitive results (over 95% accuracy) while utilizing less than 10% of the training data typically required, showcasing the effectiveness of the algorithm in resource-constrained environments.

### Research and Development Intern

Trish-i, IIT Mandi Catalyst

July 2022 - Nov 2022  
Supervisor: Mr. Lakshay Sharma

- Achieved up to 94% accuracy using Tensorflow and Keras on bone health condition analysis by using YOLO and VGG models, and deployed Flask applications.
- Finetuned aforementioned models, leading to an 11% performance spike.

### Machine Learning Intern

Gloroots, Bengaluru

Jan 2024 - Present

- Executing fine-tuning and prompt engineering strategies to optimize performance of both open-source and closed Language Models (LLMs) for downstream tasks, alongside developing custom Tavily and Langchain based agents.
- Contributing to development of recommender engines with a focus on scalable and low latency reranking algorithms.

## RESEARCH PROJECTS

### Cracking the Figurative Code: A Survey of Metaphor Detection Techniques

*Presented, ADCIS 2023*

[\[ Preprint \]](#)

- Survey paper on automated metaphor detection accepted for presentation and publication in the conference proceedings of ADCIS'23 (September, 2023).
- Analyzed and categorized 15 prevalent approaches into three categories, providing insights into the strengths and weaknesses of each, extracting findings to aid future research.

## JPEG-Compression Agnostic Identification of Generative Art

Under Review

- Achieved over 95% accuracy on the detection of art generated by StyleGAN2 and Stable Diffusion by using a novel combination of Image Processing and traditional Machine Learning techniques.
- Achieved exceptional performance combining ensemble models with CNNs, maintaining robust performance even in the presence of JPEG compression typically encountered on social media platforms.

## Forecasting Wind Turbine Power Generation

Under Review

- Performed a comparative analysis of time series forecasting using LSTM networks and hybrid Transformer models.
- Demonstrated the superior forecasting capabilities of attention augmented hybrid models in terms of both speed (25% faster) and reliability (similar accuracy).

## Observing the Privacy-Utility Tradeoff in Differentially Private Medical Text Classifiers

Under Review

- Benchmarked performance of transformer models (BERT, DistilBERT and RoBERTa) under varying epsilon privacy budgets.

## PERSONAL PROJECTS

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**ART-ViT** : *A vision transformer implementation for art classification.*

[GitHub](#)

- Used Python and PyTorch to implement ab initio the ViT model outlined in the original research paper.
- Finetuned Vision Transformers to gain a test accuracy of 92% .

**ShakespeareGPT** : *Generatively Pretrained Transformer for generating Shakespearean-style quotes.*

[GitHub](#)

- Developed a barebones PyTorch GPT model from scratch including components such as Multihead Attention.
- Experimented with various tokenizers to compare performances.

**PATE implementation** : *Semi-supervised Knowledge Transfer for DL from Private Training Data.*

[GitHub](#)

- Implemented the infamous PATE paper for Differentially Private training using PyTorch and PySyft.
- Comparison with DP-SGD on MNIST is underway.

## ACADEMIC ACHIEVEMENTS

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- Dean's List (Semesters 5 and 6)
- Received the Academic Excellence Award at Manipal University Jaipur.

## POSITIONS OF RESPONSIBILITY

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**Vice President**, The Music Club, MUJ

June 2022 - May 2023

- Lead a student organisation of 350+ students, organised 7 large scale events, helped conduct workshops to boost the music culture of the university.

**Writer's Society Head**, LITMUS, MUJ

May 2021 - May 2022

- Conducted 8 workshops and feedback sessions which helped 50+ students improve their writing skills.

## TECHNICAL SKILLS

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|-------------------|---|
| <b>Languages</b>  | Python, C/C++, JavaScript, SQL            |
| <b>Frameworks</b> | PyTorch, PyTorch Lightning, Flask, Django |
| <b>Databases</b>  | PostgreSQL, MongoDB                       |
| <b>Tools</b>      | Git, Linux, Figma, GCP                    |