

Ashmit Khandelwal

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Final year undergraduate Computer Science student at [BITS Pilani](#), and Machine Learning Research Intern at [Adobe](#). Broadly interested in Vision, Language, and the relation between these media and their consumers. Previously worked on simulating human behavior using large language models, integrating vision into language models, neural network pruning, Bayesian networks, and mass data scraping and processing.

Education

Birla Institute of Technology and Science, Pilani

Goa, India

B.E. COMPUTER SCIENCE, WITH MINOR IN DATA SCIENCE

2020 - 2024 (expected)

Current CGPA: **9.44/10**

Data Science Coursework: Machine Learning[†], Artificial Intelligence, Foundations of Data Science, Applied Statistical Methods

Computer Science Coursework: Operating Systems[†], Object Oriented Programming[†], Compiler Construction, Data Structures and Algorithms

[†] = top student

Work Experience

Research Intern - Adobe

Noida, India

SUPERVISORS: [YAMAN KUMAR](#) - ADOBE, [CHANGYOU CHEN](#) - SUNY BUFFALO

Nov 2022 - Ongoing

- Simulating and optimizing for **behavioural aspects** of video/image content, such as memorability and rewatchability, using a **large language model**. The first work to **embed content and the elicited human response** in the same space.
- Successfully **embedded vision** into a [Vicuna-13B LLM](#) and **instruction fine-tuned** it to understand the relationship between human behavior and video content. **Beat few-shot GPT-4**, showing that current SoTA models do not understand behavior.
- Automated scraping and processing of **terabytes of data** for multiple projects.

Projects

Assessing the Aptitude of Language Models in Comprehending Advertisements

University of Pittsburgh

SUPERVISOR: [ADRIANA KOVASHKA](#)

June 2023 - Ongoing

- Advertisement media are **fundamentally different** from typical videos and images. They are more than just their content, **persuade users** to take certain actions, and often use **creative atypicalities** to deliver their message.
- Advertisement images from the [Kovashka Ads Dataset](#) were **textually verbalized**. These were presented to text-based language models like **GPT-3.5, GPT-4, and FLAN-T5**, which were evaluated on Action-Reason pair and Atypicality understanding tasks.
- As a comparison between text and vision, **Vision-Language models like BLIP2** were also evaluated on the advertisement images.

Semi-Supervised Segmentation and VQA on Aerial Flood Images

BITS Pilani

SUPERVISOR: [SRAVAN DANDA](#)

Sep 2022 - Ongoing

- Designed a **semi-supervised Image Segmentation** and **Graph based Visual Question Answering** system for the [FloodNet challenge](#).
- The Segmentation network is based on [CutMix](#) and [Cross Pseudo Supervision](#).
- The VQA system applies **geodesic dilation and morphological operations** on the segmentation maps. Connected component counts are performed on **4-adjacency graphs** made from the processed segmentation maps.

A Non-Chaotic Pruning Strategy for Neural Networks

APPCAIR, BITS Pilani

SUPERVISORS: [ADITYA CHALLA](#) - BITS PILANI, [SOMA S DHAVALA](#) - WADHWANI AI

March 2023 - Ongoing

- Pruning strategies such as L0, L1, Rank based pruning change the feature importance orderings of Neural Networks in chaotic manners.
- This project hypothesizes that Granger-Causality based pruning may be a non-chaotic neural network pruning strategy.

Bayesian Multi Layered Perceptron

[CODE AND REPORT](#)

Feb 2022

- A **Bayesian MLP** to classify a simple XOR dataset. The model can easily be extended to work with more complex datasets.
- Defined **posterior and likelihood functions**, and used Markov Chain Monte Carlo Sampling. Specifically used the **Metropolis-Hastings algorithm**, for **optimal weight sampling**. Produced a brief report of the results.

Courses and Schools

2022 **CS231n: Deep Learning for Computer Vision** [↗](#), Stanford

Online

2022 **Amazon ML Summer School 2022**, Amazon

Online

Teaching Experience

Introduction to ML and DL

BITS Pilani

INSTRUCTOR | CENTER FOR TECHNICAL EDUCATION

Nov 2022 - May 2023

- Co-instructed for the Introduction to Machine Learning and Deep Learning course.
- Teaching the mathematical theory and providing python implementations of Machine Learning algorithms and Deep Learning models.

QSTP 2022: Introduction to Deep Learning

BITS Pilani

INSTRUCTOR | QUARK, BITS PILANI - GOA

Jul - Aug 2022

- Co-instructing for the Introduction to Deep Learning course.
- The course provides introductory knowledge and assignments on Deep Learning, Computer Vision, Natural Language Processing, and Generative Models.

Skills

Programming Languages: Python, Javascript, Java, C/C++, SQL

Frameworks and Libraries: PyTorch, HuggingFace, DeepSpeed, Keras, Numpy, Pandas, MongoDB, ReactJS

Committees

2022 **Member**, Society for Artificial Intelligence and Deep Learning [↗](#)

BITS Pilani

2021 **Core Member**, Developer's Society, BITS Goa

BITS Pilani