



# 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<sup>†</sup>, Artificial Intelligence, Foundations of Data Science, Applied Statistical Methods

**Computer Science Coursework:** Operating Systems<sup>†</sup>, Object Oriented Programming<sup>†</sup>, Compiler Construction, Data Structures and Algorithms

<sup>†</sup> = 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.

## Publications

### Large Content And Behavior Models To Understand, Simulate, And Optimize Content And Behavior

[Adobe Research](#)

[ARXIV PREPRINT](#) - SUBMITTING TO ICLR 2024

Sep 2023

- **Shannon's communication theory** comprises three levels: **technical, semantic, and effectiveness**. While the technical and semantic levels have made substantial progress, the effectiveness levels, involving **receiver behavior, has been largely unaddressed**.
- The paper introduces **Large Content and Behavior Models (LCBMs)** to bridge this gap by reintroducing **behavior tokens** into LLM training data. These models demonstrate generalization capabilities in **simulating and explaining receiver behavior**, understanding content, and **adapting to various behavior domains** using the Content Behavior Corpus (CBC).

## Selected 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 - May 2023*

- 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.

## 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.

## Courses and Schools

2022 **CS231n: Deep Learning for Computer Vision**, Stanford

*Online*

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

*Online*

## 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*