

ATHARV GOEL

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EDUCATION

- **Indraprastha Institute of Information Technology, Delhi (IIIT-Delhi)** 2021 - 2025
B.Tech in Computer Science & Engineering CGPA: 8.83/10.00
- **Indian Community School, Kuwait** 2017 - 2021
High School Class XII: 96.6%

RESEARCH EXPERIENCE

- **Vision Lab, IIIT Delhi | Prof. Saket Anand** Jan 2024 - present
Undergrad Researcher New Delhi, India
 - Formulated a semi-supervised active learning framework for object detection that combines foundation models with human-in-the-loop annotation.
 - Designed a novel acquisition function with neural collapse, enabling efficient training with limited data.
- **Datalab, IIIT Delhi | Prof. Gautam Shroff** Jan 2025 - Jun 2025
Research Associate New Delhi, India
 - Explored training deep RL agents to acquire core knowledge priors via demonstration learning in procedurally generated 2D grid environments.
 - Investigated meta-learning, TTA, inverse RL, pretraining, model compression, and open-ended learning to allow agents to construct and transform symbolic objects.
- **Wildlife Institute of India** June 2024 - Aug 2024
Research Intern New Delhi, India
 - Designed algorithms for Wildlife Reidentification under incomplete data with graph registration, subgraph matching, 3D vision and domain knowledge.
- **Theoretical Computer Science Lab, IIIT Delhi | Prof. Supratim Shit** June 2023 - Aug 2023
Research Intern New Delhi, India
 - Implemented and benchmarked core-set construction algorithms for feature selection in high-dimensional regression tasks. Conducted theoretical analyses of core-set algorithms.

PUBLICATIONS

C=CONFERENCE, S=IN SUBMISSION, T=THESIS

- [S.1] **Atharv Goel, Mehar Khurana. (2025). Just Add Geometry: Gradient-Free Open-Vocabulary 3D Detection Without Human-in-the-Loop.** *arXiv preprint.*
- [T] **Atharv Goel. (2024). Active Learning for Object Detection: From Foundation Models to Geometric Insights.** *IIIT Delhi.* DOI: 10.13140/RG.2.2.33274.61127.

SELECTED PROJECTS

- **OV3D: Open Vocabulary 3D Object Detector Without 3D Supervision** Mar 2024
Tools: Python, PyTorch [[Paper](#) | [Code](#)]
 - Proposed a training-free, annotation-free pipeline for open-vocabulary 3D detection, built on 2D vision-language foundation models and classical geometric reasoning. Competitive performance to training-based baselines.
 - Contributed a novel dataset for evaluating under adverse weather conditions and absence of depth information, featuring pseudo-LiDAR from ring cameras and realistic fog injected to NuScenes.
- **ARC: Neural Analogical Reasoning for Artificial General Intelligence** Sep 2024 - Nov 2024
Tools: Python, PyTorch, transformers [[Paper](#)]
 - Collection of techniques for tackling the ARC-AGI benchmark for general intelligence.
 - Investigated Neurosymbolic AI, designing algorithms using discrete program search, meta-learning, and LLMs.
 - Features a custom LLM inferencing method, and performs self-supervised test-time adaptation with LoRA.
- **Explainable Neural Networks for Computer Vision** Apr 2025
Tools: Python, PyTorch
 - Made computer vision models **interpretable** by generating spatially localized concept heatmaps, using LLMs to generate concepts for each class.
 - Built a spatial bottleneck module for concept classification, providing both spatial heatmaps and global concept explanations.

• **VXGI: 3D Graphics Rendering Engine**

Oct 2023 - Dec 2023

Tools: C++, OpenGL

[\[Paper\]](#) | [\[Code\]](#)

- Rendering engine from scratch in pure OpenGL, featuring **real-time global illumination** and interactive GUI.
- Implemented a dynamic voxelization scheme combined with voxel cone tracing for indirect lighting, achieving interactive performance (**50-60 FPS**) even in complex dynamic mesh blocks.

• **Distributed Hash Table: Raft Algorithm**

Apr 2024

Tools: Python, gRPC

[\[Code\]](#)

- Implemented a **Distributed Key-Value Store** using a custom **Raft Consensus algorithm** implementation to ensure fault tolerance and consistency, operating through leader election and log replication.
- Integrated **leader lease** mechanism to reduce the time complexity of read operations, demonstrating significant gains for geo-distributed databases.

SKILLS

- **Programming Languages:** Python, C, C++, C, Java, JavaScript, SQL
- **Technologies:** Linux, Git, GitHub, Docker, PyTorch, OpenCV, OpenGL, Numpy, Scikit-Learn, fastAI, .NET

COURSEWORK

- **Graduate:** Meta-Learning, Reinforcement Learning, Explainable AI, Computer Vision, Linear Optimization, Distributed Systems; **Undergrad:** Computer Graphics, Game Theory, Statistical Machine Learning

AWARDS

- **Distinguished top-ranker:** (A+) in advanced AI courses (*Meta-Learning, Explainable AI, Computer Vision*). Only awarded once in a few years.
- **Best TA Award (2025).** Head TA for Computer Vision, taken by MS and PhD students.
- **Dean's List Award (2024-2025):** for excellent academic performance (9.4 GPA in final year)
- **Amazon ML Summer School 2024: Top 3% out of 85,000** selected candidates.
- **World Cube Association 2022:** Ranked **top-100 among 20+ million** candidates for competitive speedcubing in India. Ranked **#1** all over Kuwait for a record-breaking 8.55 second solve.

RESPONSIBILITY & VOLUNTEERING

• **Head Teaching Assistant – Computer Vision**

Jan 2025 - May 2025

IIIT Delhi

- Managed a team of 7 TA's; mentored student teams on various research projects; designed tutorials, assignments and exams; conducted office hours for 1-to-1 tutoring.

• **Placement Cell Coordinator**

Feb 2023 - Mar 2024

IIIT Delhi

- Coordinated operations between companies and students for campus hiring.
- Organized the IIITD Startup Fair 2023, hosting over 30 startups.

• **Founder**

Dec 2020 - present

The DASA Community

- Built and maintained a community of **1,500+** foreign students from **15+** countries.
- Wrote wikispaces and articles to help students navigate the process. Established a mentorship system, holding Q&A and AMA sessions for college guidance and exam prep help.

• **Organizer, ESYA 2023**

Jun 23 - Aug 23

IIITD Tech Fest

- Independently conducted one of **India's largest Speedcubing contests**, affiliated with the **World Cube Association**, featuring **160+ competitors** from **3 countries** competing for **Rs. 2.5L+** in prizes.

• **Founding Member and Mentor, Undergraduate Research Council (URC, IIITD)**

Sep 2023 - May 2025

• **Freshman Student Mentor, Student Council**

Aug 2023

CERTIFICATIONS

- **GPU Programming Specialization:** [Certificate](#) Nov 2024
- **Amazon ML Summer School 2024:** [Certificate](#) Aug 2024
- **Machine Learning Engineering for Production (MLOps)** [Certificate](#) May 2024
- **Generative Adversarial Networks (GANs)** [Certificate](#) May 2024