ATHARV GOEL

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EDUCATION

• **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** *December 2023 - July 2025*
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, P=PREPRINT, T=THESIS

[S.1] Sharat Agarwal*, **Atharv Goel***, Saket Anand, Chetan Arora. (2026). **NCAL: Neural Collapse-Guided Active Learning for Robust and Generalizable Representations**. *Under Review at WACV 2026*.

[P.1] **Atharv Goel**, Mehar Khurana. (2025). **Just Add Geometry: Gradient-Free Open-Vocabulary 3D Detection Without Human-in-the-Loop**. arXiv preprint. *DOI: arXiv:2507.13363*

[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.

PROFESSIONAL EXPERIENCE

• **TBO.COM** *June 2025 - Present*
Software Engineer Gurugram
◦ Building a travel distribution platform for serving flight & hotel bookings to travel agencies internationally. Developing with **NextJS and Amazon Web Services.**

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++, JavaScript, TypeScript, SQL
- **Technologies:** Amazon AWS, Linux, Git, GitHub, Docker, PyTorch, OpenCV, OpenGL, Numpy, Scikit-Learn, fastAI, NextJS

COURSEWORK

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

AWARDS

- **Dean's List Award (2024-2025)**: for excellent academic performance (9.5 GPA in final year)
- **Amazon ML Summer School 2024: Top 3% out of 85,000** selected candidates.
- **Distinguished top-ranker:** (A+) in advanced AI courses (*Meta-Learning, Explainable AI, Computer Vision*). Only awardee from my batch!
- **Best TA Award (2025)**. Head TA for Computer Vision, taken by M.Tech and PhD students.
- **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
  ◦ Facilitated operations between industry and students for placements. Hosted 30 startups at the IIITD Startup Fair.

- **Founder** *Dec 2020 - Aug 2025*
  The DASA Community
  ◦ Built and maintained a community of **2,000+** foreign students from **15+** countries.
  ◦ Wrote wikipages 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*