AAYAN YADAV

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Education

Indian Institute of Technology, Roorkee **Oct. 2022 – May 2026**
Bachelor of Technology in Data Science and Artificial Intelligence *Uttarakhand, India*
CGPA : 8.9/10.0 ($\sim$ 3.71/4.0)

Experience

AuraML | *Research Intern (Hybrid)* **April 2025 - Present**
- Using a combination of VLMs and Diffusion based techniques to generate 3D scenes from text.

Proteus | *Research Intern (Remote)* **July 2024 - February 2025**
- Built a classifier for detecting AI generated images. Improved upon SoTA classifier by finetuning contrastive language-image based encoder. Also experimented with some few shot techniques and adversarial training.

University of Michigan | *Research Collaboration (Remote)* **September 2023 - March 2025**
- Worked on refining instance segmentation masks of MS-COCO dataset and analysed its impact by training and benchmarking models. I also wrote and presented a full paper accepted at ECCV 2024 with my amazing coauthors.

Publications

Benchmarking Object Detectors with COCO: A New Path Forward
*Shweta Singh$^{\hat{*}}$, **Aayan Yadav**$^{\hat{*}}$, Jitesh Jain, Humphrey Shi, Justin Johnson, Karan Desai* **ECCV 2024**
[Website][Preprint][GitHub]
- Created refined annotations for the COCO-2017 dataset to mitigate imperfections by leveraging the Segment Anything model and LVIS dataset in a semi-automatic pipeline.
- Benchmarked and trained object detectors on the new dataset, results aligned better with human judgement.

StegaVision: Enhancing Steganography with Attention Mechanism (Student Abstract)
*Abhinav Kumar, Pratham Singla, **Aayan Yadav*** **AAAI 2025**
[Preprint][GitHub]
- Explored the impact of various attention mechanism i.e. channel and spatial and their permutations on encoder-decoder architecture for steganograpy.

Provenance Detection for AI-Generated Images: Combining Perceptual Hashing, Homomor- -phic Encryption, and AI Detection Models **Under Review**
*Shree Singhi$^{\hat{*}}$, **Aayan Yadav**$^{\hat{*}}$, Aayush Gupta, Shahriar Ebrahimi, Parisa Hassanizadeh*
[Preprint][GitHub]
- A content provenance system to detect AI generated images. I worked on training adversially robust binary classfier for the task. I leveraged embedding space of large self supervised vision-language models.

Projects

Sirius | *Pathway, OpenAI Swarm* [GitHub] **November 2024**
* Build an agentic RAG system using SoTA techniques like AdaRAG, PlanRAG, HyDE, SPLADE, MetRAG, RRF etc.

MedMatcher | *Google Colab, Pytorch, Hugging Face* [GitHub] **December 2023**
* Similar Document Template Matching for Medical Dataset. Fine-tuned LayoutLMv3 model on custom medical document dataset using weighted cross entropy loss and minibatch gradient descent.

Technical Skills

Languages: Python, C++, SQL, HTML
Technologies/Frameworks: PyTorch, Numpy, Blender, Pandas, Matplotlib, Detectron2, Jekyll, ReactJS

Achievements

All India Rank 1353, JEE Advanced 2022 *150k+ students in India take this for admission in IITs.*
All India Rank 1962, JEE Main 2022 *1M+ students in India take this for JEE Advanced eligibility.*
All India Rank 993, KVPY(SX) 2022 *KVPY is a highly prestigious national fellowship awarded by the Indian Institute of Science to students showing high aptitude in research.*
All India Rank 84, WBJEE 2022 *150k+ Indian students take this for admission to colleges in West Bengal.*
Recipient of NTSE Scholarship given by NCERT, 2021 *NTSE is a national-level examination for the secondary school level to identify and recognize students with high intellect and skills.*

Extracurricular

Vision and Language Group, IIT Roorkee | *Co-President*   **March 2023 − Present**
Deep learning group on campus that organizes open discussions and projects related to deep learning.[Website]

Data Science Group, IIT Roorkee | *Joint Seceretary*   **April 2023 − Present**
Data Science and Machine Learning Group on campus that organizes workshops, talks and projects.[Website]

Geek Gazette, IIT Roorkee | *Editorial Member*   **November 2023 − Present**
Write articles in biannual magezine[Website]

References

Prof. Justin Johnson | *Email: justincj@umich.edu*   **United States**

Assistant Professor at University of Michigan | Co-founder at World Labs

Dr Karan Desai | *Email: kdexd@umich.edu*   **United States**

Ph.D. in CSE at Universtiy of Michigan | Member of Technical Staff at World Labs

Prof. Sanjeev Kumar | *Email: sanjeev.kumar@ma.iitr.ac.in*   **India**

HOD of Mehta Family School of Data Science and Artificial Intelligence, IIT Roorkee