

Anshul Singh

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 [Google Scholar](#)

Education

June 2025	Panjab University	Chandigarh, India
Sep 2021	Bachelor of Engineering in Information Technology CGPA: 9.17/10.00 (Rank: 03/119)	

Experience

Present	IACV Lab, IISc Bangalore 	Bangalore, India
Aug 2025	<i>Research Associate Advisor: Prof. Soma Biswas</i> Working on a data-efficient active learning framework for multimodal fake news detection using a hybrid method based on entropy-based uncertainty and LLM-guided disagreements. Currently working on adversarial robustness of MLLMs and Diffusion models via activation steering.	
June 2025	LT Research Group, University of Hamburg 	Hamburg, Germany
Jan 2025	<i>Research Intern Advisor: Prof. Chris Biemann</i> Worked on vision-language models for multi-tabular reasoning. Implemented post-training techniques like GRPO to handle multiple table images for multi-hop reasoning. Created the MTabVQA benchmark to evaluate VLMs and built a synthetic QA generation pipeline producing the MTabVQA Instruct dataset.	
Sep 2024	Dalhousie University	Nova Scotia, Canada
June 2024	<i>Visiting Research Intern (MITACS) Advisor: Prof. Ghader Manafiazar</i> Analyzed animal vocalizations to predict calving time and assess pre- and post-weaning behavior using MFCC spectrograms and hybrid ViT-ResNet models. Applied Attention-Guided CAM to identify key spectro-temporal features driving classifications, achieving 83% accuracy.	
July 2023	Virtual Labs, IIT Roorkee	Roorkee, India
June 2023	<i>Machine Learning Intern Advisor: Prof. R.S. Anand</i> Designed a high-performance ML pipeline for fault detection in induction motors using advanced feature extraction and dimensionality reduction techniques. Developed analysis tools and visualization platforms that accelerated research, supporting three related publications.	
May 2023	Panjab University	Chandigarh, India
Jan 2023	<i>Undergraduate Research Assistant Advisor: Prof. Veenu Mangat</i> Conducted comparative analysis of machine learning classifiers for network intrusion detection, evaluating statistical feature selection and genetic algorithms. Explored provenance-based detection approaches using graph neural networks to enhance detection accuracy.	

Publications

[* = Equal Contribution]

[2025]	MTabVQA: Evaluating Multi-Tabular Reasoning of Language Models in Visual Space [PDF] <u>A. Singh</u> , C. Biemann, J. Strich <i>Findings of EMNLP, 2025</i>	[EMNLP]
[2025]	Lost in Translation and Noise: A Deep Dive into the Failure Modes of VLMs on Real-World Tables [PDF] <u>A. Singh</u> , R. Chaudhary, G. Singh, and A. Kumar <i>EurIPS 2025 Workshop on AI for Tabular Data</i>	[EurIPS-W (Oral)]
[2025]	M4-RAG: A Massive-Scale Multilingual Multi-Cultural Multimodal RAG <u>D Anugraha</u> , P. Irawan, <u>A. Singh</u> , ESA Lee, G. Winata <i>In submission, CVPR, 2025</i>	[Under Review]
[2023]	Comparative Analysis of State-of-the-Art Attack Detection Models [PDF] <u>P. Kumari</u> , V. Mangat, and <u>A. Singh</u> <i>14th International Conference on Computing Communication and Networking Technologies</i>	[ICCCNT]

Selected Projects

Cross-lingual Embedding Alignment for Indic Languages

Python, PyTorch, FastText, SciPy [Q]

- > Developed a cross-lingual (Hindi/English) word-level alignment pipeline using FastText embeddings trained on Wikipedia dumps.
- > Achieved a competitive Precision@1 score (0.3464 vs. 0.3513 for pre-trained models).
- > Implemented a generative adversarial training framework to enhance unsupervised alignment in low-resource Indic languages.

Aurelius: LLM For APIs

Python, PyTorch, Transformers, Peft, BitsandBytes [Q]

- > Fine-tuned suite of LLMs for API call generation, fine-tuned on LLaMA-7B and Mistral-7B with adapter-based techniques and quantization for efficient inference.
- > Built retrieval system using ColBERT's token-level embeddings for enhanced API generation accuracy.

Metal-FL: Cross-Platform Federated Learning

Python, Kafka, gRPC, Socket.IO, Protobuf, PyTorch [Q]

- > Developed decentralized federated learning architecture with Kafka and gRPC for real-time communication, utilizing Socket.IO and asynchronous programming for seamless client-server connections.
- > Designed cross-platform model aggregation mechanism integrating weight updates from multiple heterogeneous machine nodes for distributed ML training.

Technical Skills

Languages	Python, C++, Java, JavaScript, CUDA, SQL, HTML/CSS, L ^A T _E X
ML/DL Frameworks	PyTorch, TensorFlow, vLLM, veRL, DSPy, LangChain, Ray, MLflow
Cloud & Infra	AWS, Kubernetes, Docker, SLURM, PySpark
Web & Databases	FastAPI, Streamlit, Node.js, MongoDB, MySQL, Pinecone

Honours and Leadership Roles

MITACS Globalink Award	Awarded CAD \$9,000 competitive research fellowship for summer research internship at Dalhousie University, Canada (2024).
Co-founder & Director	Uniqus Edutech Solutions, startup incubated at RUSA Innovation Cell, Panjab University.
ML/AI Lead	Google Developer Students Club (GDSC), Panjab University. Led AI/ML initiatives and workshops.
Executive Core Member	IEEE Student Branch. Served as Content Writing Head & Webmaster.
Workshop Instructor	Conducted IEEE Workshop on Basics of Machine Learning for 100+ college students.
Organizer	IEEE National Conference of Women In Engineering, PEC Chandigarh (2022).