Navlika Singh

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Professional Summary

MSc student in Computing (Artificial Intelligence and Machine Learning) at Imperial College London, with research interests in Generative AI, Large Language Models(LLMs), and Multi-Modality. Experienced in developing Vision-Language models, Real-time surveillance pipelines, and Deep Learning systems, with publications and reviewer experience in top-tier venues like EMNLP and CVPR.

Education

- **Imperial College London** — London, United Kingdom
  MSc in Computing (Artificial Intelligence & Machine Learning) — *Sep '25 - Sep '26*
- **Indian Institute of Technology Jodhpur** — Jodhpur, India
  B.Tech. in Artificial Intelligence & Data Science; CGPA: 8.42 / Top 10 — *Nov '20 - May '24*

Publications

- **BLADE: Bias-Linked Adaptive DEbiasing**: (paper)
  Navlika Singh, Piyush Arora, Vasubhya Diwan, Pratik Mazumder
  2025. In arXiv
- **When Big Models Train Small Ones: Label-Free Model Parity Alignment for Efficient Visual Question Answering using Small VLMs**: (Accepted - paper)
  Navlika Singh, Piyush Arora, Abhirama Subramanyam Penamakuri, Anand Mishra
  2025. In EMNLP Main Track
- **Dataset Selection is Critical for Effective Pre-Training of Fish Detection Models for Underwater Video**: (Accepted - paper)
  Devi Ayyagari, Talukder Wasi Alavi, **Navlika Singh**, Joshua Barnes, Corey Morris, Christopher Whidden
  2025. In ICES Journal of Marine Science
- **UniPreCIS: A data pre-processing solution for collocated services on shared IoT**: (Accepted - paper)
  Anirban Das, **Navlika Singh**, Suchetana Chakraborty
  2024. In Journal of Future Generation Computer Systems

Work Experience

- **Metafusion** — Noida, India
  Computer Vision Research Engineer - Computer Vision Department — *May '24 - Aug '25*
  - **Lightweight VLMs for Surveillance**: Built an end-to-end pipeline for analyzing vehicles and pedestrians in CCTV footage. Localized subjects with YOLOv11, and used lightweight VLMs (256M) to generate attribute labels and natural language summaries in real time (under 1 sec).
  - **Safe-City Applications**: Optimized Vision-Language Models (VLMs) for real-time, low-resource city surveillance, achieving 90% F1 score on action-based applications.
  - **Intelligent Traffic Management Systems (ITMS) Applications**: Built a helmet and triple-riding violation detection system, achieving +12% overall and +17.5% accuracy improvement for triple-riding detection. Also, re-designed License Plate Detection (LPD) from a bounding box to a keypoint-based approach.

Research Internships

- **Dalhousie University** — Halifax, Canada
  Visiting Student Researcher, Supervisor: Prof. Christopher Whidden — *May '23 - Aug '23*
  - Researched machine learning for marine ecosystem monitoring, evaluating the effectiveness of pre-trained models for fish detection across diverse underwater datasets.
  - Analyzed multiple datasets and demonstrated that pre-training with OzFish led to faster convergence and comparable accuracy, while other datasets sometimes degraded performance.
  - Highlighted the importance of dataset diversity and quality in improving model generalization for real-world marine ML applications. This work was published in the **ICES Journal of Marine Science** in 2025.
- **Bosch Global Software Technologies** — Remote
  ML Engineering Intern - Research & Development Department — *May '22 - Aug '22*
  - Studied Bosch's real-world traffic sign dataset (90 classes) with severe class imbalance, used StarGAN-generated synthetic samples, and a custom ConvNeXt-L variant to improve recall by 1.2%, outperforming previous deployment with EfficientNet-B2.

Research Projects

- **Imperial College London** — London, United Kingdom
  Student Researcher - iBUG Labs, Supervisors: Dr. Antoni Bigata and Dr. Stavros Petridis — *Sep '25 - Present*
  - Personalization of Lip-Sync models.

- **Indian Institute of Technology Jodhpur** — Jodhpur, India
  Researcher - VL2G Labs, Supervisor: Prof. Anand Mishra — *Dec '24 - Aug '25*
  - Developed Model Parity Aligner (MPA) to enhance Small Vision-Language Models (S-VLMs) by systematically identifying and addressing knowledge gaps relative to Large Vision-Language Models (L-VLMs).
  - Designed three key modules (PA, PI, PL) to generate pseudo-annotations, isolate failure cases, and fine-tune S-VLMs on targeted samples, improving efficiency while reducing computational overhead.
  - Achieved notable performance improvements on VQA benchmarks, including +6.4% (TextVQA), +12.0% (ChartQA), and +4.0% (ST-VQA) on TinyLLaVA-2B. This work was published in the **EMNLP Main** in 2025.

- **Indian Institute of Technology Jodhpur** — Jodhpur, India
  Researcher, Supervisor: Prof. Pratik Mazumder — *April 2024 - Nov 2024*
  - Developed a bias translation approach to mitigate spurious correlations in neural networks without supervision via an adaptive multi-level latent feature interpolation strategy, dynamically adjusting feature mixup based on an image's bias level. Achieved a 20% absolute improvement over SOTA on C-CIFAR-10 and other benchmark datasets in bias-heavy settings.

- **Indian Institute of Technology Jodhpur** — Jodhpur, India
  Undergraduate Student Researcher -IAB Lab, Supervisor: Prof. Mayank Vatsa and Prof. Richa SinghAug 2023 - Feb 2024
  - Developed a novel bias mitigation framework to reduce neural networks' reliance on spurious correlations, in multiple-unknown-bias settings, using a two-step training strategy with modified KL divergence-based optimization. Achieved a 2% improvement over SOTA on Multi-Colored MNIST and Corrupted CIFAR-10, setting a new benchmark.

- **Indian Institute of Technology** — Jodhpur, India
  Undergraduate Student Researcher - UbiSys Lab, Supervisor: Prof. Suchetana Chakraborty — *Sep 2021 - Jan 2022*
  - Developed UniPreCIS, an innovative edge-based data pre-processing solution for shared sensing infrastructure in smart city applications.
  - Engineered it to dynamically select high-quality data sources through sensor ranking, optimizing resource consumption while meeting varied application QoS needs at the network edge.
  - Successfully deployed it on a campus testbed, demonstrating remarkable reductions in processing time and memory utilization for stakeholder services. Achieved up to 90% accuracy, surpassing existing sensing techniques. This work was published in **Future Generation Computer Systems** Journal in 2024.

Skills Summary

- **Languages**: Python, C++, SQL, MATLAB
- **Frameworks & Libraries**: PyTorch, TensorFlow, Keras, Scikit-learn, HuggingFace, OpenCV
- **ML & DL Expertise**: CNNs, RNNs, Transformers, Vision-Language Models, Multi-modal Learning
- **Tools & Deployment**: Docker, Kubernetes, Git, ONNX, TorchScript, TensorRT
- **Platforms & OS**: Linux, Windows, Web
- **Soft Skills**: Leadership, Writing, Public Speaking, Time Management, Event Management

Honors and Awards

- Awarded the prestigious J.N. TATA Endowment Scholarship 2025 for the higher education of Indians overseas.
- Awarded the MITACS GRI 2023 Research Internship.
- Second Position in Computer Vision Hackathon 2021 conducted by TIH iHub Drishti.
- Ranked in top 0.1 percentile in IIT-JEE Joint Entrance Examination 2020 out of 1.3 million applicants.

Teaching and Volunteering Experience

- **Reviewer Experience:** Served as a reviewer for ICES Journal of Marine Science 2024, and will be serving as a reviewer for the prestigious CVPR 2026 conference.
- **Teaching Assistant-ship:** Served as a Teaching Assistant at IIT Jodhpur for 250+ sophomore students, conducting weekly lab and viva sessions, preparing assessments, and grading them for the following course: Principles of Computer Systems and Pattern Recognition & Machine Learning.
- **Head of Student Wellbeing Committee:** Led a team of 55 students to organize mental health initiatives, working closely with college counselors and administration to create a supportive environment that promotes student wellbeing and resilience.