

Adhiraj Ghosh

Tübingen, Germany

[LinkedIn Profile](#)
[GitHub Profile](#)

Email : [Bethgelab](#) / [Personal](#)
Mobile : +49-17679828923(DE)/+91-8017958529(IN)

EDUCATION

- [ELLIS](#) / [University of Tübingen](#) Tübingen, Germany
PhD in Machine Learning Feb 2025 – Present
- [University of Tübingen](#) Tübingen, Germany
MSc in Machine Learning Oct 2022 – Nov 2024
Thesis : Holistic Understanding of Vision-Language Models
- [Manipal Institute of Technology](#)/[Singapore Management University](#) Manipal/Singapore
B.Tech in Electrical and Electronics Engineering Aug 2016 – Aug 2020
Thesis: Towards the Analysis of High Dimensional Data in Computer Vision

WORK EXPERIENCE

- **Research Intern, Tübingen AI Centre** Mar 2023 - Sep 2023
Tübingen, Germany
 - Worked under the supervision of Dr. Hendrik PA Lensch on the project - **Visualising Figurative Speech**.
 - The goal of the project was to create an ensemble of lightweight models that expresses any arbitrary piece of text into a visualisable description, enabling meaningful and high-quality image generation.
 - Created **LyricCanvas**, a supervised dataset of 10 million song lyrics with corresponding visual elaborations and conducted knowledge distillation to train robust language models that generalise to all forms of figurative speech.
- **Computer Vision Researcher, Zürich University of Applied Sciences** May 2021 - Aug 2022
Zürich, Switzerland
 - Worked in the **Center of Artificial Intelligence** under the supervision of **Dr. Thilo Stadelmann**.
 - Created a **Connected-Components-enabled Semantic Segmentation** network to tackle noisy labels for **Food Waste Analysis**, in collaboration with **Kitro AG**. Achieved state-of-the-art with a mean IoU score of **0.5219**.
 - Responsible for designing a novel adversarial learning system utilising discriminator-learned features for **Unsupervised Domain Adaptation** for Optical Music Recognition on the DeepScores dataset (synthetic) to real data, improving baseline results by **36%**. In collaboration with **ScorePad AG**.
- **Research Assistant, Singapore Management University** Jan 2020 - Dec 2022
Singapore
 - Worked under the supervision of **Dr. Wen-Yan Lin** on the project - **Robust Compute-Efficient Re-Identification and Object Tracking for Surveillance Systems**.
 - Theorised and spearheaded a new Triplet Mining approach based on pixel-level **Image Feature Matching and Correspondence** models, termed as **Relation Preserving Triplet Mining (RPTM)**.
 - Achieved state-of-the-art results(**October 2021-Present**) on multiple public benchmarks and produced the first transferable and scalable algorithm for generalised re-identification tasks.

PUBLICATIONS [[Google Scholar](#)]

1. **Adhiraj Ghosh**, Vishaal Udandarao*, Thao Nguyen*, Matteo Farina*, Mehdi Cherti, Jenia Jitsev, Sewoong Oh, Elisa Ricci, Ludwig Schmidt, Matthias Bethge, **Concept-Aware Batch Sampling Improves Language-Image Pretraining**, *preprint 2025* [[paper](#)]
2. **Adhiraj Ghosh***, Sebastian Dziadzio*, Ameya Prabhu, Vishaal Udandarao, Samuel Albanie, Matthias Bethge, **ONEBench to Test Them All: Sample-Level Benchmarking Over Open-Ended Capabilities**, *ACL 2025* [[paper](#)] [[project page](#)]
3. Vishaal Udandarao*, Ameya Prabhu*, **Adhiraj Ghosh**, Yash Sharma, Philip HS Torr, Adel Bibi, Samuel Albanie, Matthias Bethge, **No “Zero-Shot” Without Exponential Data: Pretraining Concept Frequency Determines Multimodal Model Performance**, *NeurIPS 2024* [[paper](#)] [[code](#)]
4. Hassan Shahmohammadi, **Adhiraj Ghosh** and Hendrik P. A. Lensch, **ViPE: Visualise Pretty-much Everything**, *EMNLP 2023* (**Outstanding Paper**) [[paper](#)] [[code](#)]

5. Adhiraj Ghosh, Kuruparan Shanmugalingam and Wen-Yan Lin, **Relation Preserving Triplet Mining for Stabilising the Triplet Loss in Re-identification Systems**, *WACV 2023* [[paper](#)] [[code](#)]
6. Adhiraj Ghosh*, Lukas Tuggener*, Raphael Emberger*, Pascal Sager* *et al.* **Real World Music Object Recognition**, *TISMIR 2023* [[paper](#)] [[code](#)]
7. Adhiraj Ghosh and Kamal Sarkar, **Irony Detection in Bengali Tweets: A New Dataset, Experimentation and Results**, *ICCIDS 2020* [[paper](#)] [[dataset](#)]

RESEARCH EXPERIENCE

- **Research Student, Tübingen AI Centre** Jan 2024-Jan 2025
Supervisor: Dr. Matthias Bethge Tübingen, Germany
 - Master Thesis student working on the **Holistic Understanding of Vision Language Models**.
 - Created the largest benchmark to evaluate foundation models, called **ONEBench** and developed a pipeline for **compositionality-aware data curation** to improve the text-image alignment problem during pretraining and foster the next generation of data-efficient CLIP models.
- **Research Associate, Jadavpur University** Jun 2018 - Dec 2019
Supervisor: Dr. Kamal Sarkar Kolkata, India
 - Worked on **Irony Detection and Classification** in Bengali Tweets, funded by the Science and Engineering Research Board, Government of India.
 - Created the first published dataset for irony detection and classification in Bengali, devising a computational linguistics foundation for 3 classes of irony.

ACADEMIC HIGHLIGHTS AND RESPONSIBILITIES

Highlights

- Extensive media coverage for the No “Zero-Shot” publication. Highlight: full feature on [Computerphile](#).
- **Outstanding Paper Award** at EMNLP 2023, Language Grounding to Vision, Robotics and Beyond track.
- RPTM taught in [Graduate Innovation Demonstration Course](#) at Shenzhen University.
- Best Undergraduate Seminar Presentation: **Implementation of Deep Learning in Medical Imaging and the Detection, Classification and Segmentation of Diseases**, 2019
- One of four students(selection rate 1.6 %) in Electrical and Electronics selected to be part of a Cisco India-Manipal University Software Development Project, 2019.

Student Mentoring

- **2025**
 - **Lukas Demey**, Ghent University (co-supervised with Dr. Karel D’Oosterlinck)
- **2024**
 - **Suhardiman Agung**, Singapore Management University (co-supervised with Dr. Wen-Yan Lin)

Reviewer Responsibilities

- **Journals:** Transactions of Image Processing
- **Conferences:** CVPR 2026, ICLR 2026, NeurIPS 2023, ECCV 2022

TECHNICAL SKILLS

- **Topics of Interest** Data-centric Machine Learning, Vision and Language, Multimodal Pretraining, Evaluation and Benchmarking
 - **Languages** Python, MATLAB, Java
 - **Tools/Frameworks** Docker/Singularity, PyTorch, Tensorflow, OpenCV, Gym, ParaView, OpenCLIP
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