

Adhiraj Ghosh

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EDUCATION

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| University of Tübingen | Tübingen, Germany |
| • <i>MSc in Machine Learning</i> | Oct 2022 – Sep 2024 |
| <i>Relevant Coursework</i> : Deep Learning, Fairness in Machine Learning | |
| Manipal Institute of Technology | Manipal, India |
| • <i>B.Tech in Electrical and Electronics Engineering</i> | Aug 2016 – Aug 2020 |
| <i>Relevant Coursework</i> : Data Structures, Image Processing, Probability and Statistics | |
| <i>Thesis</i> : Singapore Management University | |

WORK EXPERIENCE

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| Computer Vision Researcher, Zürich University of Applied Sciences | May 2021 - Aug 2022 |
| • <i>Zürich, Switzerland</i> | |
| ◦ Working 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 . 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% . | |
| Research Assistant, Singapore Management University | Jan 2020 - Nov 2020, Sep 2021-Sep 2022 |
| • <i>Singapore</i> | |
| ◦ Worked under the supervision of Dr. Wen-Yan Lin on the project - Robust 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 on multiple public benchmarks and produced the first transferable and scalable algorithm for generalised re-identification tasks. | |
| Research Intern, Tübingen AI Centre | Mar 2023 - Sep 2023 |
| • <i>Tübingen, Germany</i> | |
| ◦ 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 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 figurative speech, evidenced through rigorous evaluation. | |

PUBLICATIONS [\[Google Scholar\]](#)

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- Hassan Shahmohammadi, **Adhiraj Ghosh** and Hendrik P. A. Lensch, **ViPE: Visualise Pretty-much Everything EMNLP 2023 (Outstanding Paper)** [\[paper\]](#) [\[code\]](#)
 - Adhiraj Ghosh**, Kuruparan Shanmugalingam and Wen-Yan Lin, **Relation Preserving Triplet Mining for Stabilising the Triplet Loss in Re-identification Systems WACV 2023** [\[paper\]](#) [\[code\]](#)
 - Lukas Tuggener*, Raphael Emberger*, **Adhiraj Ghosh***, Pascal Sager* *et al.* **Real World Music Object Recognition Transactions of the International Society for Music Information Retrieval 2023** [\[paper\]](#) [\[code\]](#)
 - Adhiraj Ghosh** and Kamal Sarkar, **Irony Detection in Bengali Tweets: A New Dataset, Experimentation and Results International Conference on Computational Intelligence in Data Science, 2020** [\[paper\]](#) [\[dataset\]](#)

RESEARCH EXPERIENCE

- **Research Student, Tübingen AI Centre** Nov 2023-Present
Supervisor: Dr. Mathias Bethge Tübingen, Germany
 - The goal of this project is to develop a **compositionality benchmark for large-scale image-text datasets** by creating the next generation of Data Filtration Networks(DFNs).
 - We wish to contrastively make Vision-Language models learn correct and precise textual representations of visually-descriptive language and improve performance on spatial relationships.
- **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 linguistic foundation for 3 classes of irony.
 - Achieved baseline State of the Art results (**67.47% accuracy for binary classification and 48.31% for multi-label classification**) for the dataset, using word embedding models and TFIDF Vectorisation.

TECHNICAL SKILLS

- **Topics of Interest** Computer Vision, Deep Learning, Vision and Language
- **Languages** Python, MATLAB, Java
- **Tools/Frameworks** Docker/Singularity, PyTorch, Tensorflow, OpenCV, Gym, ParaView, wandb, VisualSFM, LabelImg

RELEVANT PROJECTS

- **Face Mask Detection on Human Face Datasets** [\[Code\]](#) Feb 2020
Guide : Dr. Wen-Yan Lin Singapore Management University
 - Worked on creating a simple and effective Histogram of Oriented Gradients(HOG) image descriptor and a Linear Support Vector Machine (SVM) to train an object detection network.
- **Robust Instance Segmentation using Mask RCNN** [\[Code\]](#) Jun 2020 -Jul 2020
Guide : Dr. Wen-Yan Lin Singapore Management University
 - Establishing a segmentation mask on large image data with multiple objects in one image.
 - Using instance segmentation trained on MS COCO Dataset to isolate the detected objects based on the bounding box coordinates and the segmentation mask.

ACADEMIC HIGHLIGHTS AND REVIEWER RESPONSIBILITIES

Highlights

- **Outstanding Paper Award** at EMNLP 2023, Language Grounding to Vision, Robotics and Beyond track.
- Bachelor Thesis: **Towards the Analysis and Robust Representation of High Dimensional Data**, 2020.
- 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.

Reviewer Responsibilities

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