Adhiraj Ghosh

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LinkedIn Profile
GitHub Profile

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Education

- **University of Tübingen** — Tübingen, Germany
  MSc in Machine Learning — Oct 2022 – Sep 2024
- **Manipal Institute of Technology** — Manipal, India
  B.Tech in Electrical and Electronics Engineering — Aug 2016 – Aug 2020

Work Experience

- **Computer Vision Researcher, Zürich University of Applied Sciences** — May 2021 - August 2022
  Winterthur, Switzerland
  - 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-Present(remote)
  Singapore
  - 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.

Internships

- **Research Associate, Jadavpur University** — Jun 2018 - Dec 2019
  Kolkata, India
  - Worked under the supervision of **Dr. Kamal Sarkar** 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.
- **Research Student, Manipal Institute of Technology** — Oct 2018 - Mar 2019
  Manipal, India
  - Worked under the supervision of Associate Professor, Dr. Chandrika BK on the project - **Just Noticeable Differences in Low Quality Video Samples**.
  - Applied Butterworth Filters to measure the Contrast Sensitivity Function of CCTV image frames, followed by Gaussian Smoothing for Video enhancement.

Publications [Google Scholar]

1. 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]**
2. 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] [code]**
3. Lukas Tuggener, Raphael Emberger, **Adhiraj Ghosh**, Pascal Sager *et al.* **Real World Music Object Recognition**, Submitted to *Transactions of the International Society for Music Information Retrieval*

Technical Skills

- **Topics of Interest** Computer Vision, Deep Learning, Vision and Language
- **Languages** Python, MATLAB, Java
- **Tools/Frameworks** Docker, PyTorch, OpenCV, Tensorflow, Keras, scikit-learn, wandb, NLTK, VisualSFM, LabelImg

Relevant Projects

- **Face Mask Detection on Human Face Datasets** Feb 2020
  Guide : Dr. Wen-Yan Lin, Sinagpore Management University **[Code]**
  - 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** Jun 2020 -Jul 2020
  Guide : Dr. Wen-Yan Lin, Sinagpore Management University **[Code]**
  - 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.
- **Emotion Recognition Using Physiological Data** Nov 2020 -Mar 2021
  Guide : Dr. Zakir Hossain and Dr. Tom Gedeon, Australian National University
  - Created an end-to-end trainable neural network for the detection of emotions in human face datasets and the generation of Electrodermal Activities (EDA) data.
  - Used Conditional GANs for improving the scale of recognition of 7 emotional categories.

Certifications and Courses

- **Relevant Coursework**:
  - Deep Learning
  - Self-Driving Cars
  - Data Literacy
  - Data Structures and Algorithms
  - Probability and Statistics
- **Relevant Certifications**:
  - Deep Learning Specialisation - **Coursera**
  - TensorFlow in Practice Specialisation - **Coursera**
  - Mathematics for Machine Learning - **Coursera**
  - Python for Data Science - **Coursera**
  - Deep Learning: Face Recognition- **LinkedIn Learning**

Academic Highlights and Responsibilities

Highlights

- Oral Presentation, WACV 2023: **Relation Preserving Triplet Mining for Stabilising the Triplet Loss in Re-identification Systems**
- Bachelor Thesis: **Towards the Analysis and Robust Representation of High Dimensional Data**, 2020.
- Undergraduate Seminar Presentation: **Implementation of Deep Learning in Medical Imaging and the Detection, Classification and Segmentation of Diseases**, 2019
- Oral Presentation, ICCIDS 2020: **Irony Detection in Bengali Tweets: A New Dataset, Experimentation and Results.**
- 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.

Responsibilities

- **Reviewer**: CVPR 2023
- **Emergency Reviewer**: ECCV 2022