Curriculum Vitae

◇ *Name:* Siddhartha Gairola ◇ *E-mail*: sgairola@mpi-inf.mpg.de ◇ *Website:* https://sidgairo18.github.io

Education

MPI for Informatics & Saarland University — Saarbrücken, Germany

Ph.D. Student, Computer Science — Oct, 2022 - present

- Advisors: Prof. Bernt Schiele, Prof. Francesco Locatello

International Institute of Information Technology, Hyderabad — Hyderabad, India

MS by Research in CSE — 2018 - 2020

- Advisor: Prof. P. J. Narayanan
- Thesis: *Image Representations for Style Retrieval, Recognition and Background Replacement Tasks*
- CGPA: **9.75/10**

BTech with Honours in CSE — 2014 - 2018

- CGPA: **8.91/10**

Work Experience

Microsoft Research, India - *Research Fellow* — Aug 2020 - Aug 2022

· Advisors: Dr. Mohit Jain, Dr. Nipun Kwatra
· Developed a low-cost smartphone-based corneal topographer for keratoconus detection in collaboration with Sankara Eye Hospital. Published at ACM IMWUT/Ubicomp 2021.
· Worked on training DNN models for abnormality detection in limited data settings. Published at EMBC 2021.

Microsoft Research, India - *Research Intern* — Jan 2020 - Jul 2020

· Advisors: Dr. Mohit Jain, Dr. Nipun Kwatra
· Worked on building smartphone based diagnostic solutions for eye diseases using mobile computing, computer vision and machine learning.

Adobe Systems, India - *Product Intern* — Jun 2019 - Jan 2020

· Advisors: Balaji K., Mayur Hemani
· Worked at the Media and Data Science Research lab.
· Worked on Guided Few-shot Image Segmentation, improved on the prior state-of-the-art by 6%.
· Published at IJCAI 2020 and filed a patent.

IIIT Hyderabad - *Research Assistant* — May 2016 - May 2019

· Advisor: Prof. P. J. Narayanan
· Research assistant at the Center for Visual Information and Technology (CVIT)
· Worked on representation learning for image style search and retrieval. Published at WACV 2020.
· Also worked on task of color-consistent background replacement. Published at MMM 2018.

Google Summer of Code (GSoC) - *Student Developer* — May 2018 - Aug 2018

· Was accepted as a developer for the Google Summer of Code Program for the 2^{nd} time with Scilab.
· Implemented a demo in C/C++ and Scilab as a working example for the MEX Library in Scilab.

Google Summer of Code (GSoC) - *Student Developer* — May 2017 - Aug 2017

· Was accepted as a developer for the Google Summer of Code Program with the organization Scilab.
· Implemented a C/C++ wrapper for Matlab MEX-API on current API Scilab.

Patents

· **S. Gairola**, M. Hemani, A. Chopra, J. Dahl, Balaji K. Improved Similarity Propagation for One-Shot and Few-Shot Image Segmentation **(US 16/906,954)**, *2020.*

Peer-Reviewed Publications

(10.) **S. Gairola**, M. Böhle, F. Locatello, B. Schiele. How to Probe: Simple Yet Effective Techniques for Improving Post-hoc Explanations. *In International Conference on Learning Representations (ICLR), 2025.*

(9.) V. Ganatra, **S. Gairola**, P. Joshi, A. Balasubramaniam, K. Murali, A. Varadharajan, B. Mallikarjuna, N. Kwatra, M. Jain. SmartKC++: Improving Performance of Smartphone-Based Corneal Topographers. *In IEEE Winter Conference on Applications of Computer Vision (WACV), 2025.*

(8.) **S. Gairola**, P. Joshi, A. Balasubramaniam, K. Murali, N. Kwatra, M. Jain. Keratoconus Classifier for Smartphone-based Corneal Topographer. *44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC) (2022).*

(7.) A. Aggarwal, **S. Gairola**, U. Uppadhyay, A. P. Vasishta, D. Rao, A. Goyal, K. Murali, N. Kwatra, and M. Jain. Towards Automating Retinoscopy for Refractive Error Diagnosis. *In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 6, Issue 3, 2022.*

(6.) **S. Gairola**, M. Bohra, N. Shaheer, N. Jayaprakash, P. Joshi, A. Balasubramaniam, K. Murali, N. Kwatra, and M. Jain. SmartKC: Smartphone-based Corneal Topographer for Keratoconus Detection. *In Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 5, Issue 4, 2021.*

(5.) **S. Gairola**, F. Tom, N. Kwatra, and M. Jain. RespireNet: A Deep Neural Network for Accurately Detecting Abnormal Lung Sounds in Limited Data Setting. *43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2021.*

(4.) **S. Gairola**, A. Chopra, M. Hemani, Balaji K. SimPropNet: Improved Similarity Propagation for Few-Shot Image Segmentation. *International Joint Conference on Artificial Intelligence (IJCAI), 2020.*

(3.) **S. Gairola**, R. Shah, P. J. Narayanan. Unsupervised Image Style Embeddings for Retrieval and Recognition Tasks. *IEEE Winter Conference on Applications of Computer Vision (WACV), 2020.*

(2.) V. Kumar*, D. Khattar*, **S. Gairola***, Y. K. Lal*, V. Varma. Identifying Clickbait: A Multi-Strategy Approach Using Neural Networks. *The 41st International ACM SIGIR Conference on Research & Development in Information Retrieval, 2018.*

(1.) S. Rawat*, **S. Gairola***, R. Shah, P. J. Narayanan. Find Me a Sky: A Data-Driven Method for Color-Consistent Sky Search and Replacement. *International Conference on Multimedia Modeling (MMM), 2018.*

*equal contribution

Academic Services

Organizer: Computer Vision for Developing Countries Workshop at ACCV 2024

Reviewer: ICML 2023-25; NeurIPS 2022-23; ICLR 2022-24; CVPR 2024-25; ECCV 2024; ICCV 2025; IHCI 2021

Volunteer: ICVGIP 2018

Talks & Conference Presentations

Intriguing Applications and Overlooked Pitfalls of XAI in Visual Models, at the GMUM Workshop, Jagiellonian University, October 2024.

A DNN for Accurately Detecting Abnormal Lung Sounds in Limited Data Setting, *EMBC 2021* (video).

Improved Similarity Propagation for Few-shot Image Segmentation, *IJCAI 2020* (video).

Unsupervised Image Style Embeddings for Retrieval and Recognition Tasks, *WACV 2020* (video).

Selected Research Projects

Smartphone-based Corneal Topographer Nov 2020 - Oct 2021
Developed a low-cost smartphone-based corneal topographer. It provides a portable and scalable solution for the mass screening of keratoconus. Built the entire system: an AI powered smartphone app, the 3D printed attachment, and the processing software. [*Android, Python, PyTorch*; project page]

Abnormality Detection in Respiratory Signals Aug 2020 - Nov 2020
Developed a 'ResNet34' based model along with a suite of novel augmentation and fine-tuning techniques to effectively utilize small-sized datasets. The method improved upon the state-of-the-art for 4-class classification on the ICBHI dataset by 2.2%. [*Python, PyTorch*; code]

Similarity Propagation for Few-Shot Image Segmentation Jun 2019 - Jan 2020
Developed a deep learning system that leverages background-foreground similarity to perform few-shot image segmentation. The method achieved state-of-the art results on the PASCAL-5i, COCO-20i and FSS datasets. [*Python, PyTorch*]

Unsupervised Image Style Representation Learning Jan 2019 - Jun 2019
Developed a deep learning model to learn robust style representations without supervision. Achieved state-of-the-art results across six datasets and it was published as a paper. [*Python, PyTorch*; code]

Sketching with Style Aug 2018 - Dec 2018
Implemented the ICCV 2017 paper "Sketching with Style" (link). Was able to reproduce the results provided in the paper and open-sourced the code. [*PyTorch, Python*; code]

Neural Clickbait Detection Engine May 2017 - Aug 2017
Developed a system to robustly identify clickbait social media posts. The system comprises of a siamese-network that fuses visual and textual information to learn a neural embedding used to detect clickbaits. [*Python, Keras*; code]

Color Consistent Background Replacement Jan 2017 - Apr 2017
Developed a data driven method for color-consistent sky search and replacement. A diverse set of skies consistent in color and illumination are retrieved from a curated dataset, and used to generate composites. The composites are re-ranked based on realism and diversity. [*MATLAB*; project page]

Awards & Achievements

- Awarded the **Dean's Research Award** for a paper published at an international conference while in undergraduate, 2018.
- Awarded the **Dean's List Award** for 6 semesters straight: Monsoon'15, '16, '17 & Spring'16, '17, '18
- Qualified for the **ACM ICPC Asia Onsite Regionals** twice (2015, 2016).
- **98.5** percentile in **JEE Advanced (2014)** examination among 150,000 students.
- **99.7** percentile in **JEE Main (2014)** examination among 1.2 million students.

Teaching Experience

Saarland University: Elements of Data Science and Artificial Intelligence (Winter 2023, 2024)

IIIT Hyderabad: Computer Graphics (Spring 2019), Digitial Image Processing (Monsoon 2017, 2018), Computer Vision (Spring 2018), Artificial Intelligence (Spring 2017), Digital Logic and Processors (Monsoon 2016)

The duties as a TA involved taking regular tutorials, setting up assignments and conducting evaluations.

Technical Skills

Working Knowledge	Bash, C/C++, Python, MATLAB, Octave, OpenCV, Android-SDK
Software & Tools	GNU/Linux, HTML, CSS, JavaScript, LaTeX, Excel
Deep Learning Frameworks	PyTorch, TensorFlow, Keras, Caffe
Past Experience	Java, OpenGL, WebGL, Django, Web2py