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 2nd 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

(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

Papers Under-Review

(8.) **S. Gairola**, M. Böhle, F. Locatello, B. Schiele. How to Probe: Simple Yet Effective Techniques for Improving Post-hoc Explanations. *(under review).*

Academic Services

Reviewer: ICML 2023, 2024; NeurIPS 2022, 2023; ICLR 2022, 2023, 2024; ECCV 2024; IHCI 2021
Volunteer: ICVGIP 2018

Talks & Conference Presentations

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

Computer Graphics, IIIT Hyderabad	Spring 2019
Digital Image Processing, IIIT Hyderabad	Monsoon 2018
Computer Vision, IIIT Hyderabad	Spring 2018
Digital Image Processing, IIIT Hyderabad	Monsoon 2017
Artificial Intelligence, IIIT Hyderabad	Spring 2017
Digital Logic and Processors, IIIT Hyderabad	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