Siddhartha Gairola

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Education

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 - Present

· 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

(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

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.

Academic Services

Reviewer: ICLR 2022, IHCI 2021
Volunteer: ICVGIP 2018

Selected 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]

Movie Genre Classification Jan 2018 - Apr 2018
Developed a deep learning model to predict the genres of a movie based on its poster and plot. Created a new movie poster dataset by scraping IMDB website for movies produced in the US and UK. Identified four key components in a movie poster: key graphic, background, title text, billing block. Annotated the dataset with these four components using an OCR and saliency model. [*Python, TensorFlow*]

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]

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).

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

References

Prof. P. J. Narayanan, Director, IIIT-Hyderabad, India (email)

Dr. Mohit Jain, Senior Researcher, Microsoft Research, India (email)

Dr. Nipun Kwatra, Principal Researcher, Microsoft Research, India (email)

Balaji Krishamurthy, Principal Scientist, Adobe Systems, India (email)

Mayur Hemani, Senior Research Scientist, Adobe Systems, India (email)