

## EDUCATION

### International Max Planck Research School for Intelligent Systems (IMPRS-IS)

2021-Present

Ph.D in Computer Science

### International Institute of Information Technology, Hyderabad

2016-2021

B.Tech. (Honors) + M.S. by Research in Computer Science and Engineering

Cumulative GPA: 8.44/10 | [MS Thesis](#)

## WORK EXPERIENCE

### Research Intern — NAVER LABS Europe

Jan '21 - Jul '21

*Technologies: Python, Deep Learning, Computer Vision, Optimization Methods, Semi-Supervised Learning*

- Mentored by Dr. Boris Chidlovskii and Dr. Jerome Revaud in the 3D vision group at NAVER LABS Europe.
- Work on self-supervised methods for learning from noisy labels in class-imbalanced settings leading to a publication and a patent filing.

### Research Assistant — Center for Visual Information Technology, IIIT-Hyderabad

May '18 - Dec '20

*Technologies: Deep Learning, Computer Vision, Optimization Methods, Python, Matlab, PyTorch, OpenCV, ffmpeg*

- Worked with Dr. Vineet Gandhi on developing various pipelines related to accurately tracking objects in videos.
- Collaborated with Dr. Puneet K. Dokania on Hierarchy-Aware Classification leading to a publication at ICLR 2021.
- Proposed an unsupervised algorithm for person re-identification in videos and used it to obtain state-of-the-art results on the popular Multi-Object Tracking benchmarks.
- Developed novel analyses to highlight and understand the failure cases and limitations of various single-object tracking models.

## PUBLICATIONS

### No Cost Likelihood Manipulation at Test Time for Making Better Mistakes in Deep Networks

ICLR 2021

Shyamgopal Karthik, Ameya Prabhu, Puneet K. Dokania, Vineet Gandhi

[Paper](#) | [Code](#)

### Revisiting Visual Product for Compositional Zero-Shot Learning

NeurIPS-W 2021

Shyamgopal Karthik, Massimiliano Mancini, Zeynep Akata

### Learning from Long-Tailed Data with Noisy Labels

ICCV-W 2021

Shyamgopal Karthik, Jerome Revaud, Boris Chidlovskii

[Paper](#) | [Slides](#)

### Simple Unsupervised Multi-Object Tracking

Arxiv

Shyamgopal Karthik, Ameya Prabhu, Vineet Gandhi

[Paper](#)

### ViNet: Pushing the limits of Visual Modality for Audio-Visual Saliency Prediction

IROS 2021

Samyak Jain, Pradeep Yarlagadda, Shreyank Jyoti, Shyamgopal Karthik, Ramanathan Subramanian, Vineet Gandhi

[Paper](#) | [Code](#)

### Bring Generalization to Deep Multi-View Detection

Arxiv

Jeet Vora, Swetanjal Dutta, Shyamgopal Karthik, Vineet Gandhi

[Paper](#) | [Code](#)

### Exploring 3 R's of Long-term Tracking: Re-detection, Recovery and Reliability

WACV 2020

Shyamgopal Karthik, Abhinav Moudgil, Vineet Gandhi

[Paper](#) | [Slides](#)

## RELEVANT TEACHING EXPERIENCE

### Statistical Methods in AI — Teaching Assistant, IIIT-Hyderabad

Jan '20 - May '20

- Handled assignment setting and evaluations for the course.

### Computer Programming — Teaching Assistant, IIIT-Hyderabad

Aug '19 - Dec '19

- Handled assignment and examination evaluations, and examination invigilation for the course.
- Took weekly labs explaining various concepts of C programming language and clarifying doubts.

### Discrete Structures — Teaching Assistant, IIIT-Hyderabad

Aug '18 - Dec '18

- Handled regular tutorial sessions, problem settings, and examination evaluations for the course.

## MACHINE LEARNING AND COMPUTER VISION PROJECTS

### Min-Cost Flow Networks for Multi-Object Tracking

[github](#)

*Technologies: Python, networkx, tensorflow*

- Implemented a min cost flow network model within the tracking-by-detection paradigm to track pedestrians in a video.
- Achieved state of the art results after extensive hyperparameter searching using parallelized grid searching.

## Pegasos SVM Solver

[github](#)

*Technologies: Python, Optimization Methods, C++, MPI*

- Implemented a solver to train a Support Vector Machine for a classification task from scratch.
- Extended the implementation to support kernelized SVMs as well as multi-class classification.
- Parallelized the implementation on MPI achieving significant speedups.

## Shadow Removal in Images

[github](#)

*Technologies: Python, scikit-image*

- Image processing module to perform shadow detection and removal of three forms: documents-only, interactive shadow detection, and automatic shadow removal.

## GrabCut: Graph Cut Based Image Segmentation

[github](#)

*Technologies: Python, networkx, scikit-learn*

- Implemented graph cuts for interactive image segmentation using Gaussian Mixture Models to estimate probabilities.
- Used Gaussian Mixture Models to model the foreground and background probabilities

## Panorama Stitching

[github](#)

*Technologies: Computer Vision, Digital Image Processing*

- Implemented a pipeline to obtain feature matching between various input images to obtain homography estimations between them.
- Using these, we stitch together all other images around a fixed image to get the panorama and then use image blending techniques to get rid of the image boundaries.

## PROGRAMMING PROJECTS

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### Linux Shell

[github](#)

*Technologies: Operating Systems, Unix System Calls, C*

- Built a Bash like shell environment which interacts with the kernel using appropriate system calls.
- This is used to perform various user-defined and inbuilt tasks based on predefined commands.
- The shell also supports piping, input-output redirection, and foreground-background processes.

### Distributed Solvers

[github](#)

*Technologies: Java, RMI, MPI*

- Implemented Gaussian Elimination and Conjugate Gradient based solvers in MPI.
- Implemented Shortest Path Computation in a Graph using Java RMI.

## TECHNICAL STRENGTHS

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### Languages

C/C++, Python, MATLAB, Java, HTML, CSS, Javascript

### ML/DL/CV

PyTorch, Keras, OpenCV, scikit-learn, scikit-image, ffmpeg

### Software, Libraries & Tools

Git, LaTeX, OpenMP, MPI, SQL, Bash

## RELEVANT COURSES COMPLETED

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**Core Science:** Distributed Systems, Database Systems, Operating Systems, Introduction to Parallel and Scientific Computing, Computer Graphics, Computer Networks, Algorithms Analysis and Design, Data Structures, Linux Tools and Scripting.

**ML/AI Courses:** Statistical Methods in AI, Computer Vision, Artificial Intelligence, Optimization Methods, Mobile Robotics, Machine Learning for Natural Science.

**Other Courses:** Digital Image Processing, Digital Signal Analysis, Linear Algebra, Probability Theory, Discrete Mathematics.

## WORKSHOPS, CONFERENCES AND SUMMER SCHOOLS ATTENDED

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Presented my work on visual object tracking at WACV 2020 in Aspen, Colorado and R&D Showcase, IIIT-H

Completed the 2 week long CVIT summer schools on Advances in Computer Vision and Machine Learning.

Attended Google Research India's 3 day long AI Summer School.

Attended ECCV 2020, NeurIPS 2020 and ICLR 2021 virtual conferences.

## PAST ACHIEVEMENTS AND AWARDS

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Served as a reviewer for WACV 2020, WACV 2022, BMVC 2020, BMVC 2021, and ICLR 2021 workshop on Rethinking ML papers

Qualified for ACM-ICPC Asia Amritapuri Onsite Regionals in 2019

Included in Deans Merit List IIIT-Hyderabad '19 for academic excellence.

Received the Huawei Scholarship of Excellence for the year 2020-21.

Honourable Mention in Indian National Olympiad for Informatics(2016)