Vellore Institute of Technology
Vellore, TN 400705
rajatsahay.github.io

RAJAT SAHAY

(+91) 77159-92081
rajat.sahay2018@vitstudent.ac.in

EDUCATION

Vellore Institute of Technology — **Vellore, India** — **Jul 2018 – May 2022 (Expected)**

- **Bachelor of Technology in Computer Science and Engineering**
- **Undergraduate Coursework:** Design and Analysis of Algorithms, Operating Systems, Object-Oriented Design and Development, Database Management Concepts and Systems, Software Engineering, Internet Protocols, High Performance Computing.

PACE Junior Science College — **Mumbai, India** — **Aug 2016 – May 2018**

- Senior Secondary Certificate

PROFESSIONAL EXPERIENCE

Visiting Student Researcher — **NASA Jet Propulsion Laboratory, USA** — **Sep 2021 – Nov 2021**

Guide: Dr. Glenn Orton, Planetary and Exoplanetary Atmospheres Department

- Analyzing images by the JunoCam aboard the Juno spacecraft, currently orbiting Jupiter.
- Developing image analysis method to study wind patterns on Jupiter's high northern latitudes near the polar region and using time-series methods to determine region and degree of the wind-flow.

Mitacs Globalink Research Intern — **ÉTS Montréal, Canada** — **May 2021 – Jul 2021**

Guide: Prof. Eric Granger, ÉTS-LIVIA Laboratory

- Working towards recognition of real world objects in complex, unconstrained environments through video surveillance footage.
- Results submitted and currently under review at WACV'22.
- This research is supported by a scholarship from Mitacs and the All India Council for Technical Education (AICTE).

Research Fellow — **Princeton University, USA** — **Mar 2021 – Aug 2021**

Guide: Dr. Savannah Thais, IRIS-HEP Software Institute

- Working on incorporating machine learning methods to help solve High Energy Physics problems.
- Currently in the process of adapting Graph Neural Networks to map trajectories of emitted particles in the Conformal space.

Research Intern — **Université de La Rochelle, France** — **Dec 2020 – Apr 2021**

Guide: Prof. Mickaël Coustaty, Prof. Jean-Loup Guillaume, L3i Laboratoire

- Currently in the process of developing and improving panoptic segmentation methods using community detection techniques.
- Engaged in this assignment remotely due to the COVID 19 pandemic.

Research Intern — **Université de La Rochelle, France** — **Jun 2020 – Nov 2020**

Guide: Prof. Mickaël Coustaty, L3i Laboratoire

- Developed an intelligent character recognition system for non-Latin languages that works with constrained datasets, constructing novel methods for few-shot learning.
- Engaged in this assignment remotely due to the COVID 19 pandemic.

Computer Vision Intern — **CamCann Smart Systems, India** — **Jan 2020 - Jun 2020**

Guide: Mr. David Velho

- Provided development and testing support to create end-to-end vision based solutions having applications in retail-tech.
- Contributed to the development of a video analytics software subsystem to gain insights on shopping patterns, customer interests and duration-of-interest.
- Facilitated communication as a release coordinator to ensure effective and timely delivery of changes.

Machine Learning Associate — **Ignitus LMS Inc.** — **May 2019 - Jun 2020**

- Helped develop and curate machine learning content for the upcoming MOOC by Ignitus.
- Contributed to the development and creation of interactive software subsystems and Jupyter notebooks for machine learning tutorials.

Research Intern — **Indian Institute of Technology Indore, India** — **May 2019 - Jun 2019**

Guide: Prof. Surya Prakash, Pattern Analysis and Machine Intelligence Laboratory

- Developed solutions for visual odometry problems in unconstrained environments.
- Applied image processing and optical flow solutions like Kalman Filtering and EKF for accurate probabilistic tracking approach.

Research Papers and Publications

Rajat Sahay, "Unrestricted Adversarial Attacks on Vision Transformers"
Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges, Conference on Computer Vision and Pattern Recognition (CVPR), 2021

Under Review
Rajat Sahay and Mickaël Coustaty, "Few Shot Learning for Handwritten Urdu Text Recognition"
Pattern Recognition, Springer

Under Review
Madhu Kiran, **Rajat Sahay** and Eric Granger, "Generative Target Update for Adaptive Siamese Tracking."

In Preparation
Rajat Sahay and Lydia Jane, "Cleaning Large Scale Image Datasets using Community Detection Methods"

Miscellaneous Technical Experience

Freelance Technical Content Writer **Oct 2019 - Present**
- Writing on research endeavours and ongoing developments in the fields of computer vision and conventional machine learning techniques.
- Published articles in various reputed publications like *Towards Data Science*, *Heartbeat (by Fritz AI)* and *GeeksforGeeks*.

Open Source Contributor **Ludwig AI - Uber ATG** **Aug 2020 - Present**
- Worked on improving performance of Ludwig AI by Uber ATG labs. Ludwig is a toolbox built on top of Tensorflow to allow easy training and testing of models.
- Currently working on adding new image encoders and support Ludwig functionalities.

Languages and Technologies

- C, C++, Python, HTML, CSS, JavaScript, LaTeX
- Tensoflow, Keras, PyTorch, OpenCV, OpenVINO, Git, Bash

Academic Projects

Estimating Visual Odometry in Constrained Environments
Guide: Prof. Surya Prakash, Pattern Analysis and Machine Intelligence Laboratory
- Worked on estimating cell motility and tracking the path of cells engaged in Brownian motion in constrained environments.

Implementing a Panoptic Segmentation Pipeline using Community Detection Methods
Guide: Prof. Mickaël Coustaty, Prof. Jean-Loup Guillaume, L3i Laboratoire
- Working on segmenting images using the Louvain algorithm on extracted superpixel nodes.

Honors and Awards

Mitacs Globalink Research Fellowship [*'21*]
SPLISYS Funding Award [*'21*]
Amazon Alexa Developer Forum [*'19*]
Google Assistant Developer Community [*'18*]