Rajat Sahay

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Education

- **Rochester Institute of Technology** — Rochester, NY
  Master of Science, Data Science — *August 2022 - April 2024*
  GPA: 4.0 / 4.0
  Thesis: A Principled Approach Towards Finetuning Visual Foundation Models

- **Vellore Institute of Technology** — Vellore, India
  Bachelor of Technology, Computer Science and Engineering — *July 2018 - May 2022*
  Courses: *Operating Systems, Data Structures and Algorithms, Artificial Intelligence, Networking, Discrete Mathematics, Linear Algebra, Theory of Computation and Compiler Design*

Publications

Sahay, R., 2023. Data Poisoning is Hitting a Wall. In *International Conference for Learning Representations (ICLR). Blog Track.* **(Top 5%)**

Kiran, M., Nguyen-Meidine, L.T., **Sahay, R.**, Cruz, R.M.O.E., Blais-Morin, L.A. and Granger, E., 2022. Dynamic Template Selection Through Change Detection for Adaptive Siamese Tracking. In *2022 International Joint Conference on Neural Networks (IJCNN)* (pp. 1-8). IEEE. **(Selected for Oral Presentation)**

Kiran, M., Nguyen-Meidine, L.T., **Sahay, R.**, Cruz, R.M.O.E., Blais-Morin, L.A. and Granger, E., 2022. Generative Target Update for Adaptive Siamese Tracking. In *International Conference on Pattern Recognition and Artificial Intelligence* (pp. 502-513). Springer, Cham. **(Selected for Oral Presentation)**

Sahay, R. and Coustaty, M., 2022. An Enhanced Prototypical Network Architecture for Few-Shot Handwritten Urdu Character Recognition. *IEEE Access (In Press).*

Sahay, R. and Thais, S., 2021, December. Graph Segmentation in Scientific Datasets. In *NeurIPS Workshop on Machine Learning and the Physical Sciences.*

Sahay, R., 2021, June. Unrestricted Adversarial Attacks on Vision Transformers. In *CVPR Workshop on Adversarial Machine Learning in Real-World Computer Vision Systems and Online Challenges.*

Sahay, R., Suryawanshi, R., Jha, R., Rajkumar, R. and Nedunchezhian, P., 2021, May. A Community Detection based Approach Towards Annotating Large Scale Image Datasets. In *International Conference on Contemporary Engineering and Technology.*

Under Review

Sahay R., `DiffDet:`Detecting Images Generated by Diffusion Models. 2023. *Under Review.*

Sahay, R., and Savakis., A. GeoSAM: Finetuning Segment Anything for Remote Sensing Images. 2023. *Under Review.*

Sahay, R*., Thomas, G*., Jahan, S., Manjrekar, M., Popp, D., and Savakis, A. Pay Attention for Domain Generalization and Adaptation. 2023. *Under Review. (Presented at the UofR University Technology Showcase 2023)*

Experience

- **RIT Center for Human-Aware AI** — Rochester, NY
  Graduate Research Assistant — *September 2022 - Present*
  - **Mentors:** Zhe Yu, Andreas Savakis
  - Developed novel methods using TensorFlow to detect, evaluate, and mitigate biases in machine learning models, leading to a 1.8% improvement in model fairness and reducing the potential for harmful outcomes.
  - Optimized the learning mechanisms of visual models to improve domain adaptation performance, leading to improvement in accuracy and robustness in various real-world applications.
  - Conducted experiments to evaluate the effectiveness of different domain adaptation techniques, including adversarial learning, gradient alignment, and data augmentation.

- **NASA Jet Propulsion Laboratory** — Pasadena, CA (Remote)
  Visiting Student Researcher, Juno Science Mission — *September 2021 - June 2022*
  - **Mentor:** Glenn Orton, Planetary and Exoplanetary Atmospheres
  - Collated and analyzed multispectral data taken from NASA Infrared Telescope Facility, Gemini North Observatory, and the Hubble Space Telescope.
  - Developed efficient automation solutions using Python to streamline the data reduction pipeline, resulting in a 43% increase in productivity and faster data processing times
  - Provided functions for large-scale testing procedures, result evaluation, and modular extensibility.

- **Princeton University** — Princeton, NJ (Remote)
  Research Fellow — *April 2021 - August 2021*

- **Mentor:** Savannah Thais, IRIS-HEP
- Incorporated non-deterministic graph clustering solutions as a precursor to deep learning pipelines, helping improve accuracy and increase efficiency of downstream tasks.
- Optimized performance metrics of previous models on multiple different benchmarks by over 37%.
- Communicated technical concepts and research findings effectively to diverse audiences through presentations, reports, and scientific publications, highlighting the potential value of the research for improving real-world outcomes.

• **ÉTS Montréal** — Montréal, QC (Remote)
Globalink Research Intern — *May 2021 - July 2021*

- **Mentor:** Eric Granger, ÉTS-LIVIA Laboratory
- Developed adaptive strategies to enhance precision of MOT applications through generation and selection of dynamic templates.
- Collaborated with Genetec Inc. to deploy research outcomes in real-world scenarios.

• **Université de La Rochelle** — La Rochelle, France (Remote)
Research Intern — *June 2020 - April 2021*

- **Mentors:** Mickaël Coustaty, Jean-Loup Guillaume, L3i Laboratoire
- Designed and developed an intelligent character recognition system to understand Indic languages using constrained datasets.
- Achieved significant improvements over state-of-the-art scores in zero-shot and few-shot learning, demonstrating the system's high level of accuracy and efficiency.
- Contributed to the advancement of multimodal media understanding, with potential applications in areas such as document processing and translation.

• **CamCann Smart Systems** — Vellore, India
Computer Vision Engineer — *January 2020 - June 2020*

- Deployed and maintained an advertising microservice to keep up with client business growth. Refactored the project, improving code maintainability and reducing server costs by 50%
- Provided development and testing support across cross-functional teams to deploy end-to-end software subsystems.
- Facilitated communication as a release coordinator to ensure effective and timely delivery of changes.

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

- **Mentor:** Surya Prakash, PAMI Laboratory
- Explored novel solutions for visual odometry tasks in constrained environments.
- Developed a probabilistic tracking paradigm to complement multi-object tracking frameworks.

Honors and Awards

• **NSF AWARE-AI Trainee Award** — 2023
Awarded to fund research on human-centered artificial intelligence at RIT.

• **RIT Graduate Scholarship** — 2022 - 2024
Awarded to incoming graduate students based on previous academic and research merits.

• **NASA JPL Visiting Student Research Program & SPLISYS Fellowship** — 2021
Awarded to fund research at NASA Jet Propulsion Laboratory from September 2021 to June 2022.

• **Mitacs Globalink Research Fellowship** — 2021
Awarded by Mitacs and AICTE to fund research at ÉTS Montréal from May 2021 to July 2021.

• **IRIS-HEP Fellowship** — 2021
Awarded to fund research at Princeton University from April 2021 to August 2021.

Volunteer Experience

Professional Service

ICML 2022 (Reviewer), AISTATS 2023 (Reviewer), ICLR 2023 (Tiny Papers Track Organizer), AAAI 2024 (Reviewer)

Freelance Writing

Selected Publications

• **Model Observability in Machine Learning**
Heartbeat (Comet ML) — *February 2022*

• **Learning to Learn More: Meta Reinforcement Learning**
Towards Data Science — *October 2020*

• **Statistical Pitfalls in Data Science**
Towards Data Science (Recommended by Medium curators) — *June 2020*

Miscellaneous

- **Open Source Contributor, Ludwig AI - Uber ATG** Remote
  Added support for new image and video encoders supporting Ludwig functionalities. *August 2020 - November 2020*

- **Machine Learning Associate, Ignitus LMS Inc.** Remote
  Developed interactive Jupyter notebooks for tutorials included in the Ignitus ML MOOC. *May 2019 - June 2020*

- **Computer Literacy Project, Citizens Association for Child Rights** Mumbai, India
  Provided computer education to over 3000 students from financially excluded backgrounds. *May 2018 - June 2018*