Subhajit Maity

Doctoral Researcher | University of Central Florida

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GitHub | Google Scholar | ORCID | LinkedIn

Education

University of Central Florida *Orlando, FL, USA*

***PhD** in Computer Science | **GPA:** 4.0/4.0* Aug. 2024 - Present

Advisor: Dr. Aritra Dutta | Research Area: Self-Attention, Transformers

Jalpaiguri Government Engineering College (Autonomous) *Jalpaiguri, India*

***BTech.** in Electronics & Communication Engineering | **GPA:** 8.47/10* Aug. 2014 - Jul. 2018

Courses: Linear Algebra, Calculus, Artificial Intelligence | Project: Infrared-based IOT for Domestic Consumer Grade Appliances

Experiences

University of Central Florida *Orlando, FL, USA*

Graduate Research Associate | Skills: Python, PyTorch, Deep Learning, Computer Vision Aug. 2024 - Present

Supervisor: Dr. Aritra Dutta | Projects: Fibottention, KArAt, View Agnostic Action Recognition with VLMs

- Worked on Visual Large Language Models, **Kolmogorov-Arnold Networks**, Sparse **Self-Attention**.
- Conducting pioneering research on **learnable attention** for improved interpretability and token interaction modeling.

Indian Statistical Institute, Kolkata — Technology Innovation Hub (IDEAS) *Kolkata, India*

Associate Research Engineer | Skills: Python, PyTorch, Deep Learning, Numpy, Matplotlib Jun. 2022 - Jul. 2023

Supervisor: Prof. Umapada Pal | Projects: Traffic Surveillance for Overspeeding Vehicles and License Plate Recognition

- Worked on **Object Detection**, Monocular Speed Estimation, License Plate Recognition, and **Scene Text Recognition**.
- Built a prototype with 30+ fps on NVIDIA RTX 3070 for vehicle speed tracking and identifying license plate registration for overspeed.

Tata Consultancy Services Limited *Kolkata, India*

Systems Engineer | Skills: Java, Linux, Oracle OCI, IAM, OAM, OID, FMW SOA Suite, FMW Service Bus Nov. 2018 - Jan. 2021

Roles: FMW Administrator & Developer, SSO Administrator & Architect, Linux Administrator, OCI Architect

- Designed a cloud server network architecture that **doubled the user load handling capacity** to 5,000+ requests per day.
- Implemented a streamlined role-based access and identity management system for a client with $15 billion annual revenue. Managed a **team of five people** for administration, development, support, migration, and upgrades in the IAM systems.
- Responded to **four** major incidents for two clients and oversaw recovery with **zero data and revenue loss**.

National Institute of Technology, Silchar *Silchar, India*

Research Intern | Skills: MATLAB, Computer Vision, Image Processing Jun. 2017 - Jul. 2017

Supervisor: Dr. Koushik Guha | Project: Word Sense Disambiguation for Ambiguous Words using Visual Supervision

- Worked on Image Processing, Natural Language Processing, Bayesian Classifier, and Image Caption Generation.
- Built a classical system for joint language-image correspondences.

Publications & Preprints

[1] **S. Maity**, A. K. Bhunia, S. Koley, P. N. Chowdhury, A. Sain, Y. Z. Song. "Doodle Your Keypoints: Sketch-Based Few-Shot Keypoint Detection," *IEEE/CVF International Conference on Computer Vision (**ICCV**)*, 2025. [Paper] [Project Page]

[2] A. Sain, **S. Maity**, P. N. Chowdhury, S. Koley, A. K. Bhunia, Y. Z. Song. "Sketch Down the FLOPs: Towards Efficient Networks for Human Sketch," *IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**)*, 2025. [Paper] [Project Page]

[3] **S. Maity**, K. Hitsman, X. Li, A. Dutta. "Kolmogorov-Arnold Attention: Is Learnable Attention Better For Vision Transformers?," *arXiv preprint arXiv:2503.10632*, 2025. [Paper] [Project Page]

[4] A. K. Rahimian, M. K. Govind, **S. Maity**, D. Reilly, C. Kümmerle, S. Das, A. Dutta. "Fibottention: Inceptive Visual Representation Learning with Diverse Attention Across Heads," *arXiv preprint arXiv:2406.19391*, 2024. [Paper]

[5] J. Van Landeghem, **S. Maity**, A. Banerjee, M. Blaschko, M. F. Moens, J. Lladós, S. Biswas. "DistilDoc: Knowledge Distillation for Visually-Rich Document Applications," *International Conference on Document Analysis and Recognition (**ICDAR**)*, 2024. [Paper]

[6] **S. Maity**, S. Biswas, S. Manna, A. Banerjee, J. Lladós, S. Bhattacharya, U. Pal. "SelfDocSeg: A Self-Supervised vision-based Approach towards Document Segmentation," *International Conference on Document Analysis and Recognition (**ICDAR**)*, 2023. **(Oral)** [Paper] [Project Page]

[7] **S. Maity**, R. K. Karsh. "Image Hash Minimization for Tamper Detection," *International Conference on Advances in Pattern Recognition*, 2017. [Paper] [Project Page]

Technical Skills

Programming	Python, C, MATLAB, Java
Frameworks	PyTorch, Numpy, Matplotlib, Seaborn, Pandas, Keras, Tensorflow, OpenCV
Typesetting	LaTeX, Beamer, Microsoft Office
Subject Expertise	Knowledge Distillation, Large Language Model (LLM), Multi-modal Large Language Model (MLLM), Attention, Dataset Distillation, Self-Supervised Learning, Contrastive Learning, Representation Learning, Generative AI, Agentic AI

Research Projects

Clouded Leopard Re-Identification, Tracking & Census *Kolkata, India*

Collaborators: Dr. Tanoy Mukherjee, Prof. Joydev Chattopadhyay, AER Unit, Indian Statistical Institute, Kolkata, and Mr. Debal Ray, PCCF, Directorate of Forests, The Government of West Bengal, India
Aug. 2023 - Aug. 2024

Research Topics: Feature Detection, Keypoint Detection, Deep Feature Understanding

- Implemented a working system using Superpoint feature extraction and Superglue feature matching for identifying the fur patterns on the leopard species for re-identification at the individual scale.

Sketch-Based Few-Shot Keypoint Detection ***(ICCV 2025)*** *Guildford, UK*

Collaborators: Dr. Ayan K. Bhunia, Sony Playstation, and Prof. Yi-Zhe Song, University of Surrey
Jun. 2023 - Aug. 2024

Research Topics: Meta-Learning, Few-Shot setting, Prototypical Networks, Keypoint Detection

- Implemented a few-shot keypoint detection system working in a source-free setup with annotated sketch examples.

Knowledge Distillation for Document Applications ***(ICDAR 2024)*** *Leuven, Belgium*

Collaborators: Dr. Jordy Van Landeghem, Prof. Matthew Blaschko, KU Leuven
May. 2023 - Feb. 2024

Research Topics: Knowledge Distillation, Document Image Classification, Document Layout Analysis

- Analyzed how knowledge distillation works for documents and how their interesting properties can be leveraged in downstream tasks.

Self-Supervised Document Layout Analysis ***(ICDAR 2023)*** *Barcelona, Spain*

Collaborators: Prof. Josep Lladós, Computer Vision Center, Universitat Autònoma de Barcelona
Jan. 2023 - Feb. 2023

Research Topics: Self-supervised Learning, Object Localization, Document Layout Analysis

- Contributed towards a novel self-supervised document layout segmentation strategy that does not require textual or layout guidance.

Self-Supervised Object Detection *Kolkata, India*

Mentors: Prof. Umapada Pal, CVPR Unit, Indian Statistical Institute, Kolkata, and Prof. Saumik Bhattacharya, Indian Institute of Technology, Kharagpur
Aug. 2022 - Mar. 2023

Research Topics: Self-supervised Learning, Object Localization, Object Detection, Contrastive Learning

- Implemented a novel framework that uses BYOL-styled self-distillation for distilling knowledge from distinctive image patches.

Towards Faster Fine-Grained Sketch-based Image Retrieval ***(CVPR 2025)*** *Guildford, UK*

Collaborators: Dr. Aneeshan Sain, Sony Playstation, and Prof. Yi-Zhe Song, University of Surrey
Sep. 2021 - Dec. 2022

Research Topics: Knowledge Distillation, Gradient Consensus, Reinforcement Learning, Policy Gradient

- Contributed towards a novel, efficient framework for sketch-based applications

Honorary & Volunteer Services

Directorate of Forests, The Government of West Bengal, India *Kolkata, India*

Honorary Technology Consultation for the Leopard Census Project
Sep. 2023

- Acted as a consultant and a developer for the automated Clouded Leopard census using computer vision systems.

G20 Expo, The Second Education Working Group Meeting, The G20 Summit 2023 *Amritsar, India*

Representative for India in the Advancement of Cutting-edge Technologies
Mar. 2023

- Invited to represent India in the prestigious G20 Summit 2023 from IDEAS, Indian Statistical Institute, Kolkata.