Subhajit Maity

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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

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, MammoChat, Denoising Attention

- Worked on Visual Large Language Models, **Kolmogorov-Arnold Networks**, Sparse **Self-Attention**.
- Designed the first ever **learnable attentions** for visual understanding tasks that can model complex token relationships and their interactions for better interpretability and explainability.
- Developed the theoretical basis for the **denoising attention** for improved object-level understanding in vision transformers.
- Worked on **federated learning** and **split learning** setup.

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.

Selected Publications & Preprints

Doodle Your Keypoints: Sketch-Based Few-Shot Keypoint Detection **[Paper] [Webpage]** — ***ICCV***
S. Maity, A. K. Bhunia, S. Koley, P. N. Chowdhury, A. Sain, Y. Z. Song — 2025

Sketch Down the FLOPs: Towards Efficient Networks for Human Sketch **[Paper] [Webpage]** — ***CVPR***
A. Sain, **S. Maity**, P. N. Chowdhury, S. Koley, A. K. Bhunia, Y. Z. Song — 2025

Kolmogorov-Arnold Attention: Is Learnable Attention Better For Vision Transformers? **[Paper] [Webpage]** — ***Preprint***
S. Maity, K. Hitsman, X. Li, A. Dutta — 2025

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

DistilDoc: Knowledge Distillation for Visually-Rich Document Applications **[Paper]** — ***ICDAR***
J. Van Landeghem, **S. Maity**, A. Banerjee, M. Blaschko, M. F. Moens, J. Lladós, S. Biswas — 2024

SelfDocSeg: A Self-Supervised vision-based Approach towards Document Segmentation **[Paper] [Webpage]** — ***ICDAR (Oral)***
S. Maity, S. Biswas, S. Manna, A. Banerjee, J. Lladós, S. Bhattacharya, U. Pal — 2023

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, Reinforcement Learning with Human Feedback (RLHF), PPO, DPO, Federated Learning, Split Learning

Research Projects

MammoChat: An Anxiety Management Chatbot for Breast Cancer Patients — *Orlando, FL, USA*
Supervisors: Dr. Aritra Dutta, College of Sciences, Dr. Amrit Singh Bedi, Dr. Yu Tian, College of Engineering & Computer Science, Dr. Jane Gibson, College of Medicine, University of Central Florida — Sep. 2025 - Present
Research Topics: LLMs, Multimodal LLMs, Artificial Emotional Intelligence, Anxiety Management, Emotion Quantification

Denoising Attention for Visual Understanding Tasks *(Submitted)* — *Orlando, FL, USA*
Supervisors: Dr. Aritra Dutta, University of Central Florida, Dr. Srijan Das, University of North Carolina Charlotte — Mar. 2025 - Present
Research Topics: Attention, Vision Transformers, Attention Sink, Dispersed Attention, Attention Entropy

Split Learning on Noisy Signals *(Submitted)* — *Thuwal, Saudi Arabia*
Supervisors: Dr. Aritra Dutta, Dr. Xin Li, University of Central Florida, Dr. Panos Kalnis, King Abdulla University of Science & Technology — May. 2025 - Present
Research Topics: Federated Learning, Split Learning, Signal Denoising in Deep Neural Networks, Differential Privacy

Learnable Self-Attention for Vision Transformers *(Submitted, Preprint Available)* — *Orlando, FL, USA*
Supervisors: Dr. Aritra Dutta, Dr. Xin Li, University of Central Florida — Sep. 2024 - Present
Research Topics: Self-Attention, Vision Transformers, Kolmogorov-Arnold Networks, Kolmogorov-Arnold Representation Theorem

Fibottention *(Preprint Available)* — *Charlotte, NC, USA*
Supervisors: Dr. Aritra Dutta, University of Central Florida, Dr. Christian Kümmerle, Dr. Srijan Das, University of North Carolina Charlotte — Jan. 2024 - Present
Research Topics: Attention, Vision Transformers, Attention Sink, Dispersed Attention, Attention Entropy

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, Point to Point Correspondence

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

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

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

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

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

Honorary & Volunteer Services

Reviewer — *Orlando, FL, USA*
Reviewer for CVPR 2026 — Nov. 2025

Directorate of Forests, The Government of West Bengal, India — *Kolkata, India*
Voluntary Technology Consultation for the Leopard Census Project — Sep. 2023

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