Soumyajit Karmakar

Email • Github • LinkedIn

Education

Indian Institute of Information Technology, Guwahati 2019 - 2023
Bachelor of Technology in Computer Science and Engineering. CGPA: 9.35/10.00
Rank 2 / 222 in the institute.

Birla School Pilani, India 2019
12^{th} standard, CBSE. PCM Score: 95%.

Objective

Recent graduate passionate about Deep Learning and its application in the domain of Computer Vision, with 3 research papers at top conferences. Looking to pursue higher studies.

Research Experience

Indian Institute of Science, Bengaluru
Vision and AI Lab (VAL)
Project Assistant - Advisor : Prof. R. Venkatesh Babu September 2023 - Present (3 months)

- Working on developing an improved hard negative mining strategy for Contrastive-Loss based vision and language models, such as, CLIP.

International Institute of Information Technology, Hyderabad
Center for Visual Information Technology (CVIT)
Bachelor's thesis - Advisor : Dr. C. V. Jawahar January 2023 - April 2023 (4 months)
Research Fellow - Advisor : Dr. C. V. Jawahar May 2023 - August 2023 (4 months)

- Member of the Mobility team, with the goal to use AI for improving road safety and autonomous driving.
- Worked on a project developing Diffusion Models for various downstream tasks such as semantic segmentation especially for the urban road settings.

University of North Carolina at Charlotte, North Carolina (Online)
Research Intern - Advisor : Dr. Srijan Das and Dr. Michael S. Ryoo August 2022 - March 2023 (8 months)

- Developed a joint training framework using a Self-Supervised Auxiliary Task (SSAT) to enhance the performance of ViTs on small datasets.

CSIR-CEERI Pilani, Rajasthan
Research Intern, Intelligent Systems Lab - Advisor : Dr. Sanjay Singh May 2022 - July 2022 (3 months)

- Developed a novel few-shot learning framework, using a Convolution based ensembling technique, for anomaly detection.

Achievements

- Secured **Global Rank 1**, student category, in the Heuristic Track in the Parameterized Algorithms and Computational Experiments (PACE) 2022, a worldwide algorithmic competition. We secured overall **Global Rank 5**. Link for this paper. Link for this solver. Link for its GitHub repo.
  In the Exact Track we secured **Global Rank 10**. Link for this paper. Link for this solver. Link for its GitHub repo.

Publications

- Srijan Das, Tanmay Jain, Dominick Reilly, Pranav Balaji, **Soumyajit Karmakar**, Shyam Marjit, Xiang Li, Abhijit Das, Michael Ryoo. "Limited Data, Unlimited Potential: A Study on ViTs Augmented by Masked Autoencoders". In Proceedings of the 2024 IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**) 2024, Waikoloa, Hawaii, USA.
- **Soumyajit Karmakar**, Abeer Banerjee, Prashant Sadashiv Gidde, Sumeet Saurav, Sanjay Singh. "Convolutional Ensembling based Few-Shot Defect Detection Technique". In Proceedings of the 2022 Indian Conference on Computer Vision, Graphics and Image Processing (**ICVGIP**), IIT Gandhinagar, India.
- Aman Jain, Sachin Agarwal, Nimish Agrawal, **Soumyajit Karmakar** and Srinibas Swain. "Feedback vertex set using Edge Density and REmove Redundant (FEDRER): A heuristic solver for finding a feedback vertex set in a directed graph" . In Poster Session of the 2022 International Symposium on Parameterized and Exact Computation (**IPEC**), Potsdam, Germany.

Projects and other works

- Contributed to open source project CompilerGym. CompilerGym is a open source library of reinforcement learning environments for compiler tasks maintained by Facebook Research.
- A study on Directed Feedback Vertex Set Problem, a project under supervision of Dr. Srinibas Swain, CSE Assistant Professor at IIIT Guwahati.
  Objective: To analyse and implement the current state of the art algorithm on the problem of Directed Feedback Vertex Set.
- Developed a working model for Human Action Recognition with State of the Art performance under the supervision of Dr. Sanjay Singh during the winter break of 2021.
- Served as reviewer for the ICVGIP 2022, IIT Gandhinagar, conference.

Relevant Courses and Exams

- **Computer Science:** Artificial Intelligence, Machine Learning, Deep Learning, Analysis and Design of Algorithms, Data Structures, Programming Languages, Data Communication, Digital Hardware Design, Computer Architecture.
  Online Course- Deep Learning Specialization by Prof. Andrew Ng (On Coursera).
- **Mathematics:** Graph Theory, Discrete Mathematics, Statistical Methods and Algorithms, Probability Theory, Real Analysis, Differential Equations, Linear Algebra, Multi-variable Calculus.
- **Standardized Exam:** 331/340 in GRE (162 Verbal Reasoning, 169 in Quantitative Reasoning). 112/120 in TOEFL.

Technical Skills

- **Programming Languages:** Python, C++.
- **Frameworks:** PyTorch, TensorFlow.