

BHANU PRATYUSH MANTHA

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EDUCATION

National Institute of Technology, Tiruchirappalli

July 2021 – Present

Bachelor of Technology in Electronics and Communication Engineering

CGPA : 8.61/10.0

PUBLICATIONS

- (To be Submitted) First Author: **PLOS Computational Biology**: Affiliated with CMU - SaSi: A Self-augmented and Self-interpreted Deep Learning Approach for Few-shot Cryo-ET Particle Detection
- Co-Author: **CVPR2024**: Muhammad Nawfal Meeran, Gokul Adethya T[†], Bhanu Pratyush Mantha[†]. [SAM-PM: Enhancing Video Camouflaged Object Detection using Spatio-Temporal Attention](#). In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 1857–66, 2024.
- Co-Author: **IC2E3**: P.V Yeshwanth, Jithin Rajan, Bhanu Pratyush Mantha, Pottabathina Siva, S.Deivalakshmi. [Self-Governing Assessment Network \(SGAN\) Based Super Resolution for CT Chest Images](#). In 2023 International Conference on Computer, Electronics & Electrical Engineering & their Applications.

RESEARCH EXPERIENCE

Carnegie Mellon University

June 2023 - Oct 2024

Xu Labs Research Intern

- First author (to be submitted to **PLOS Computational Biology** a Q1 journal) for SaSi, which introduces a self-augmented few-shot learning based weak label approach for Cryo-electron tomography particle detection using self-supervised learning.
- Utilized Consistency Loss, SimCLR, and AugMix to enhance data efficiency, outperforming existing methods using self-supervised learning and sampling strategies. Worked on pretraining a Masked Autoencoder using denoising & reconstruction tasks.
- Conducted a study comparing different machine learning algorithms for Reservoir Computing.

SLB

May 2023 – July 2023

Data Science Intern

Pune, Maharashtra

- Developed and trained Segmentation models for Instance Segmentation tasks utilizing pre-trained models and adapting Semantic Segmentation models.
- Designed a permutation invariant algorithm to reconnect curve portions obtained during Raster Curve Segmentation.
- Developed a new optimization objective function for Raster Curve segmentation.

National Institute of Technology, Tiruchirappalli

April 2023 – August 2023

Research Intern

- Worked on Generative models like SRGAN and ESRGAN for enhancing the quality of Low-Resolution Images.
- Presented a paper titled "Self-Governing Assessment Network (SGAN) Based Super Resolution for Enhancing CT Chest Images" in IEEE IC2E3 Conference under the guidance of Dr S.Deivalakshmi.

PROJECTS

Nocaine | Python, PyTorch, Go, JavaScript

Rajasthan Police Hackathon 1.0

- Developed an intelligent system that monitors, identifies, and investigates illegal activities hosted on the dark web.
- Integrated the ML service into the Apache Kafka pipeline classifying the content into several crimes using Text and Images.

SAM-PM | Python, PyTorch

Spider R&D

- Developed the Segment Anything Model (SAM) Propagation Module to adapt SAM to videos enforcing temporal consistency and domain-specific knowledge.
- Achieved state-of-the-art performance for video camouflaged object detection task, with the addition of minimal parameters ($< 1M$) keeping the SAM weights frozen. Published as a paper in CVPR 2024 workshops.

CASCA | Python, PyTorch

Smart India Hackathon

- Developed a novel architecture for real-time interception of packets at the data link layer that can be directly deployed on routers offering a seamless experience to users.
- Utilized Zstandard for efficient data compression and minimizing bandwidth usage.

Quark Gluon Reconstruction | Python, PyTorch

Spider R&D

- Conducted a study comparing the results of the Denoising Diffusion Probabilistic Model (DDPM) and Denoising Diffusion Implicit Model (DDIM) research papers for the reconstruction of quark and gluon events.
- Implemented Graph Autoencoder using Graph Convolution Networks to learn better representations for reconstructing quark and gluon events.

Energy Insights | Python, PyTorch, HuggingFace

Schlumberger's New Year Hackathon

- Built web application to extract real-time data from various energy-related websites.
- Integrated the BRIO abstractive summarizer to provide concise and insightful article summaries.
- Utilized multithreading to reduce the response time by 5 times, making the web app a highly scalable, fast, and efficient solution for gathering and summarizing information.

CrackTrack | Python, TensorFlow, Java

L&T EduTech Hackathon

- Developed and Deployed an Android application for precise crack detection of images by integrating EfficientNetB0 for classification.
- Optimized the model through quantization, resulting in a smaller size and improved CPU and hardware utilization latency.

CO-CURRICULAR ACTIVITIES

Spider R&D

July 2022 – Present

Machine Learning Researcher

- Mentored over 15 juniors and led multiple R&D machine learning projects including one accepted to CVPR workshops and one ongoing for IJCAI.
- Conducted a workshop on Introduction to Machine Learning, teaching over 80 underprivileged students.
- Taught about diffusion-based models and Text to Image using Stable Diffusion in college incorporating hands-on coding in PyTorch.

Festember Workshops and Informals

April 2022 – Oct 2023

Manager

- Festember is a non-profit annual cultural fest of NIT, Tiruchirappalli. Worked with the team to contact and bring down artists from various domains to conduct workshops for Festember.
- Worked to convert the best celebrities and artists for RRIFF (Rolling Reels International Film Festival) and was in charge of the venue for the artists.

ACHIEVEMENTS **CERTIFICATES**

- Achieved **12th position** in Amazon ML Challenge among **75000 people** from across the country
- **Runner Up** of Rajasthan Police Hackathon 1.0
- **Winner** of Smart India Hackathon 2023, conducted by the Government of India
- Achieved **first place** among 1100+ teams from all across the nation at the Schlumberger's New Year Hackathon conducted by Shaastra, IIT Madras
- Achieved **first place** among 500+ teams from all across the nation at the L&T EduTech Hackathon conducted by Shaastra, IIT Madras