SRI SIDDARTH CHAKARAVARTHY

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EDUCATION

Vellore Institute of Technology, Vellore *Jul 2018 - Jul 2022*
B.Tech in Computer Science & Engineering
GPA: 9.44/10
Received ***Special Achiever's Award*** for outstanding research work during undergraduate

Nanyang Technological University, Singapore *Jan 2022 - Jul 2022*
Research Exchange Student (*Areas of Research:* ***Deep Learning*** *and* ***Computer Vision***)

PUBLICATIONS

In Submission

1. **CLAM: Continual Learning with Multimodal Concepts**
   Susmit Agrawal, Deepika Vemuri,**Sri Siddarth Chakaravarthy P**, Dr. Vineeth N. Balasubramanian
   *Conference on Computer Vision and Pattern (**CVPR**), 2024*
2. **Safety and Reliability Integrated Physics-informed Neural Networks (PINN) for Obstacle Avoidance**
   Rudrashis Majumder, **Sri Siddarth Chakaravarthy**, Samahith S A, Hemanth Patel, Dr. Suresh Sundaram
   *International Conference on Robotics and Automation (**ICRA**), 2024*
3. **RCE-Neural Network for Semantic Segmentation in Autonomous Vehicles**
   Sri Siddarth Chakaravarthy, Dr. Xie Ming, Dr. Vijayarajan V
   *Artificial Intelligence for Autonomous Robots (**MDPI**), 2024 (Abstract Accepted)*

Conference Presentations & Symposiums

1. **Design of Farmer friendly interface using kiosk** [paper]
   Sri Siddarth Chakaravarthy, Dr. Saleem Durai M A, Dr. Srimathi C, Dr. Robin Ram Mohan Doss
   *8th International Conference on Research into Design (**ICORD**), Jan 2021*
2. **Optical Character Recognition using CNN with Air-writing for Indian Language** [paper]
   Sri Siddarth Chakaravarthy
   Computational Intelligence Issues in Blockchain, AI, and ML, May 2021

EXPERIENCES

Indian Institute of Technology (IIT), Hyderabad *Jan 2023 - Present*
Research Assistant
Mentor: Dr. Vineeth N Balasubramanian

- Working on **hierarchical vision-language** models for **open-world object detection** and **concept discovery**.
- Worked on developing **incremental interpretable models** using **multi-modal** data with Concept Bottleneck Models (**CBM**) framework. Leveraged **GPT-3** for generating human-interpretable concepts to overcome sparsity of annotations.
- Worked on **Open World Object Detector** for **incremental learning** in collaboration with Monterey Bay Aquarium Research Institute (**MBARI**) to facilitate monitoring of underwater species using **FathomNet** dataset.

Indian Institute of Science (IISc), Bangalore *Oct 2022 - Mar 2023*
Project Assistant
Mentor: Dr. Suresh Sundaram

- Worked on **3D reconstruction** for **sparse-view** input. Experimented **guassian splatting** with structural priors for **reducing artifacts** in meshes.
- Worked on **sensor-fusion** for object detection in **optical** and **infrared data** by using **fused connections** in **densenet**.
- Worked on deployable **light-weight models** for ob-board object detection on **UAV** drones. Developed **fog removal** and **image restoration** models using **swin transformer**.

Google Summer of Code (*OpenCV*) *Jun 2022 - Sep 2022*
GSOC Contributor & Community Member | *Open Source Contributions*
Mentor: Yuantao Feng

- Trained **resource-efficient light-weight object detection** models (**YOLOX**, EfficientDet, and **Nanodet**) for on-device computation in resource-restricted devices.
- **Quantized trained models** to using Quantization modules from **cv.dnn** module to **FP16** and **INT8** versions. **Optimised post-processing** methods for quantized models for inference of **high-resolution** COCO dataset images on **CPU-based** devices.
- **Contributions**: opencvzoo.models.object_detecion_nanodet ( ) & opencvzoo.models.object_detecion_yolox ( )
- Actively participated in **community discussions** and **resolved queries** and **issues** realted to the **OpenCV modelzoo** repository. Addressed to **commit changes** and **assisted** other developers with issues related to the **opencv.dnn** framework.

Samsung R&D Institute (SRI), Bangalore *Jan 2022 - Jul 2022*

Research and Development Intern (Machine Learning) | ***Industry Collaboration (R & D)***

Mentor: Dr. Satya Kumar Vankayala

- Developed a **feed forward model** for **optimizing transmit power** in base stations for **downlink communications** in next-generation networks (**5G and 6G**).
- **Generated power profiles** based on geographical positions of UE and BS pair in mMIMO using **MATLAB 5G toolkit**. **Created simulation environments** for **sampling training data**.
- Performed hyperparameter tuning to **generalize** on various environmental conditions. The proposed model **performed better** than traditional power allocation policies with increase in accuracy of around **5%**.

Vidrona-LTD, United Kingdom *Jul 2021 - December 2021*

Research Intern (Computer Vision) | ***Internship***

Mentor: Dr. Ashutosh Natraj

- Worked on developing **detection** and **segmentation** models for **predictive and prescriptive maintenance of power transmission assets**. Designed deployable models for detecting faults in power lines, SAG in jumper cables, degree of rusting in components and predicting armour rod faults by leveraging computer vision.
- **Improved accuracy** of existing system by **10%** by **tuning hyperparameters** of a **Faster-RCNN** model with **Resnet backbone**. Received notable recognition from the **Ministry of Power** with the **ISGF Innovation Award**.

Hewlett-Packard and Enterprises (HPE), Bangalore *Mar 2021 - June 2021*

Research and Development Intern | ***Industry Collaboration (R & D)***

Mentor: Manikanda Das R

- **Developed microservices** for an e-commerce application by **containerization of services** onto docker and modelled the **Netflix conductor** engine to enable **microservice orchestration**.
- **Integrated microservice** modules using **flask**. **Scripted APIs** for microservices using Postman to enable orchestration of microservices running on Docker. Improved the **workflow executions** by **10%** and demonstrated versatility of Netflix Conductor Engine in orchestration.

SELECT PROJECTS

Predictive and Prescriptive Analysis in Power Transmission Lines using Deep Learning

Guide: Dr. Vasantha W B & Dr. Ashutosh Natraj | ***Bachelor's Thesis*** | *VIT-Vellore & Vidrona.Ltd* | *[Thesis]*

- Devised an approach for **SAG estimation** in jumper cable lines, classification of components based on **rust influence** and **micro-level fault detection** in domestic power lines(insulation wire and bolts). Worked on **SCADA data for predictive analysis** of circuit faults in power lines. Generated mesh for components to engage **Augmented Reality** support for **visualizing components** in real-time as **3D visualization**.

Adaptive Colour Scene Semantic Segmentation using RCE-Neural Network

Guide: Dr. Xie Ming | ***Research Exchange*** | *Nanyang Technological University* | *[Doc]*

- Experimented the use of **RCE-Neural network** for **semantic segmentation** application on autonomous vehicle data using **Carla simulator**. Leveraged the **self-adaptive learning- modified prototype functions** for **spherical influence maximisation**.

Behavioral Cloning Model for curved lane detection in Autonomous Vehicles

Guide: Dr. Vijayarajan V | ***Research Project*** | *VIT-Vellore* | *[Demo]*

- Leveraged hough transform and trained an end-to-end neural network model which estimates steering angle and velocity. Utlizied **behavioural cloning** for **imitation learning** to generalize over different environments. **Demonstrated** the **results** on a **simulator**.

HONORS AND AWARDS

- Awarded with ***Excellence Award*** for outstanding work project development & presentation at VIT-Open house (2018).
- Selected for the ***HPE-CTY*** to conduct research with **Hewlett Packard Enterprises's** research & development team (2021).
- Selected as a ***Samsung-PRISM*** Research collaborator (2022).
- Recipient of ***NTU-India Connect Exchange Scholar***, selected as one of the research exchange students from a competitive pool of candidates. (2022)
- ***Top 1% in branch*** in the passing academic year. (2022)

TECHNICAL SKILLS

- **Programming Languages**: Python, C/C++, Java, JAX, Bash, Javascript, PHP, HTML, SQL, MATLAB.
- **Tools and Frameworks**: Git, LATEX, Docker, Postman, PyTorch, PyTorch lightning, Tensorflow, OpenVINO, Caffe, Onnxruntime, NerfStudio, Open3D, ROS.
- **Embedded Systems**: Arduino, NVIDIA Jetson systems (nano, Xavier NX), Raspberri Pi, Coral.