Manjunathan Radhakrishnan

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Education

Sri Sivasubramaniya Nadar College of Engineering, Bachelor of Engineering - Electronics and Communication Engineering **July 2019 – July 2023**

- **CGPA:** 9.02/10
- **Coursework:** Circuit Analysis, Electronic Devices, Programming and Data Structures, Linear Integrated Circuits, Computer Architecture and Organization, Microprocessor, Microcontroller and Interfacing, Transmission Lines and Waveguides, Communication Networks, Sensors Actuators and Interface Electronics, Machine Learning.

Research Experience

Research Assistant, SSNCE (Part-time 20 hours/week) **January 2021 – July 2022**

- Worked closely with Prof. N Venkateswaran to develop a modified YOLOV3 architecture on the Darknet Framework, to perform Ship Detection in Synthetic Radar Images. Performed benchmarking of this model with other relevant RCNNs and Object detection to achieve the best mean Average Precision (mAP).
- Achieved 81.02% mAP and a near 100% Accuracy in element detection through inferencing the model. This was achieved at a dynamic relay speed of 8 Frames per Second (FPS) and 69 ms for static images, and 2 FPS without Darknet Architecture.

Research Intern - Computer Vision, IIT Madras **June 2022 – August 2022**

- Conducted research at the Robert Bosch Centre for Data Science and AI, supervised by Dr. Bhargava Rama Chilukuri, Civil Engineering Department, focusing on vehicle trajectory extraction for traffic flow optimization.
- Integrated YOLOv5 with Simple Online Real-Time Tracking (SORT) to accurately track vehicles from CCTV footage.
- Achieved 70% multi-object tracking accuracy with SORT and improved detection accuracy by 10% using DeepSORT, reaching 80.5% with minimal loss in extraction efficiency.

Work Experience

Junior ML Engineer, Mad Street Den (Vue.ai) – Chennai, India (Full-time 50 hours/week) **April 2024 – Present**

- Leading restructuring for Product Tagging and Document Extraction, using fine-tuned multimodal LLMs (Llama, Mistral, Phi) on historical client data.
- Building an agentic architecture for Vue-platform, our GTM product, enabling custom workflows via chatbot with RAG.
- Engineering the Agentic design to be cloud provider agnostic (GCP,AWS,Azure)

Machine Learning Trainee, Mad Street Den (Vue.ai) – Chennai, India (Full-time 50 hours/week) **June 2023 – April 2024**

- Developed TrainConv, a distributed training framework on PyTorch and TensorFlow with configuration-based pipelines, automated orchestration, and Slack notifications for training job updates.
- Managed the entire life cycle of Product Tagging deliveries, including algorithmic building, deployment, and monitoring, for 17+ Top Retail e-commerce clients including Philips Van Heusen Corporation, FairPrice Group, and Nike.

Machine Learning Intern, Mad Street Den (Vue.ai®) – Chennai, India (Full-time 40 hours/week) **March 2023 – June 2023**

- Built a generalized text inferencing pipeline that was also enhanced with the ability to explain the decisions made. Utilised TF-IDF vectorization for text processing and Chi-square feature selection to provide an explanation for the most correlated feature.
- Worked along with the CTO, Anand Chandrasekaran, to revamp the existing Color detection algorithm with exponentially decreased vector operations and minimal background interference.This has now been patented.

Machine Learning Intern, Drishti – Bangalore, India (Full-time 40 hours/week) **March 2023 – June 2023**

- Built large molecular action models that are data-driven, reducing the need for rule-based engines.
- Leveraged Boundary Matching techniques to accurately integrate temporal and spatial features, delivering reliable action recognition models. Constructed and benchmarked AutoML workflows using GCP Vertex AI Studio.
- Aided in the end-to-end Kubernetization of the existing workflows, thereby powering the Drishti Data Platform

Academic Projects

Deep learning-based Intelligent Gait Analysis using an IoT-based monitoring device **Smart India Hackathon | August 2022**

- Built DeepGait, using a 6-axis IMU and force sensors with an ESP8266 to transmit data via MQTT to AWS DynamoDB.

- Collected and processed gait data using customized data collection protocols, from physiotherapy clinics to train an LSTM model for gait assessment and correction.
- Designed a 3D-printed casing for a compact (30g) setup, including USB-C charging and fallback data storage.

Graph Convolutional Networks for Predicting State-wise Pandemic Incidence in India **Research | February 2022**

- Implemented graph convolutional networks (GCNs) for predicting COVID-19 incidence in Indian states and union territories as a semi-supervised learning task using data like foreign visitor count, senior citizen population, and population density.
- The best observed accuracy was 85.3%, when the training nodes were Jammu and Kashmir, Rajasthan, Kerala, Puducherry, Jharkhand and Tripura

Traffic Sign Recognition and Flow Simulation using Cellular Automata **Research, SSNCE | August 2021**

- Worked with Dr. B. Praba, Professor and Head, Mathematics Department, SSN to achieve the objective of Recognizing traffic signs and issuing appropriate vehicle responses in traffic
- Modeled traffic flow as a NxN sparse binary matrix, adjusting based on cellular automata rules triggered by computer vision-based sign detection.

Programmable Insulin Delivery System **Research, SSNCE | February 2022**

- Developed a Raspberry Pi-based system for automated insulin delivery, processing data from Continuous Glucose Monitors (CGM) and administering insulin via micropump.
- Developed end-to-end data processing and feedback loop leveraging CGM sensor and ideated to include SoC processing to enable real-time insulin dosing adjustments based on blood glucose trends, currently processed online through cloud computing.

Publications and Conferences

Graph Convolutional Networks for Predicting State-wise Pandemic Incidence in India **April 2022**

- *IEEE Artificial Intelligence and Signal Processing Conference*, 2022
- Published on IEEE Xplore - DOI: 10.1109/AISP53593.2022.9760527

Real-time Ship Detection and Localization in SAR Images using Artificial Intelligence **August 2021**

- *5th National Industry Innovators Meet, Institution of Electronics and Telecommunication Engineers*

Achievements

Winner of MADHACK 24 and MADHACK 23, Mad Street Den's Annual Hackathon **September 2024, 2023**

- Developed an auction-based Inventory Optimization Solution using real-time events, now live as the Optimization Hub.
- Engineered a Graph-Node Marketplace where Individual task nodes and Graphs can be orchestrated for a specific use case.

Best Capstone Project Award, Electronics and Communication Department, SSN **May 2023**

First Place at National Level Smart India Hackathon, Government of India **August 2022**

First Place at IEEE CatalystIdea Hackathon, IEEE Communications Society **December 2021**

Best Innovation and Research Funding Grant, Internally Funded Research, SSN **April 2021**

Positions of Leadership

Treasurer, Association of Electronics and Communication Engineers, SSN **July 2021 – June 2023**

Secretary and Senior Member - 200+Hrs of Service, National Service Scheme, SSN **August 2020 – June 2023**

Machine Learning Head, Technical Club, SSN **March 2021 - June 2022**

TECHNICAL SKILLS

Programming Languages: Python, C/C++/CUDA, Verilog, Perl, JavaScript, Go, Bash, HTML, CSS

DL Frameworks: PyTorch, TensorFlow, TensorRT, ONNX, NLTK, Pandas, NumPy, Scikit-Learn, Seaborn, Matplotlib, OpenCV

Web and DevOps Frameworks: Node.js, Django, Flask, FastAPI, Docker, Kubernetes, Jenkins, GitHub Actions

Embedded and Hardware Systems: FPGA, Node MCU (ESP8266), Nvidia Jetson, Raspberry Pi, Intel Movidius

Data Management: SQL, Databricks, Elasticsearch, DynamoDB, PostgreSQL, Neo4j, GraphQL, Redis, Apache Kafka, Tableau

Simulation and Testing Tools: MATLAB, Xilinx ISE, NI USRP, NI LabVIEW, PSpice, NI Multisim, Pytest, Selenium

Monitoring and Logging Tools: Grafana, OpenSearch, Loki

Cloud Platforms: Amazon Web Services (S3, EC2, EFS, ElastiCache, DynamoDB, Textract, Bedrock), Azure (Cosmos DB, AKS), Google Cloud Platform (Vertex AI Studio, GCS, BigQuery, Compute Engine, Cloud TPUs)