SATYAJEET DAS

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EDUCATION

University of Pennsylvania, School of Engineering and Applied Science | Philadelphia, PA May 2024
Master of Science in Electrical Engineering {Robotics & Machine Learning} GPA: 3.97/4.00
Courses: Modern Convex Optimization, Principles of Deep Learning*, Machine Perception, Introduction to Neural Scene Representation and Neural Rendering, Vision-Based Robot Learning*, Graph Neural Networks, Big Data Analytics, Linear Systems, Advanced Robotics*, Deep Learning for Robotic Manipulation, Advanced Analysis of Algorithms, Advanced Computer Vision
Top GPA Student Award, Class of 2024 (EE & SE)

Veer Surendra Sai University of Technology (VSSUT) | Burla, India May 2021
Bachelor of Technology in Electrical Engineering GPA 9.57/10.0
Ranked 1st in the University for the Graduating Class of 2021. Awarded 5 Gold Medals, including Best Overall Graduate, Best All-Rounder, and Best Electrical Engineering Graduate.

RESEARCH PAPERS

Robotics & Machine Learning:

- "On the Feasibility of EEG-based Motor Intention Detection for Real-Time Robot Assistive Control." {Published, ICRA 2024}
- "Learning Robust Perception based Control Barrier Functions from Safe Expert Demonstrations." {Published, IEEE Open Journal of Control Systems}
- "Real-Time Perception Based Control Barrier Functions for Efficient Robot Navigation Using Depth Camera." {To be Submitted, IEEE RA-L / RSS / IROS 2025}
- "Safe and Explainable End-to-End Deep Reinforcement Learning via Latent Space Analysis for Collision Avoidance and Navigation in Quadrotor Swarms." {In Progress, RSS 2025}
- "Natural Language to Bridge the Cross-Morphology Gap in Robot Manipulation." {In Progress, IROS / CoRL 2025}

Master's Thesis

- **Towards vision-based safety: a real-time approach for generating barrier function using depth sensors.** {Prof. **Nadia Figueroa** & **George Pappas**}

Soft Computing & Artificial Intelligence (Energy)

- "An Optimized Fractional Order Cascade Controller for Frequency Regulation of Power System with Renewable Energies and Electric Vehicles" {Published, Energy Systems, Springer}
- "Design of fractional order multistage controller for frequency control improvement of a multi microgrid system using equilibrium optimizer" {Published, Multiscale and Multidisciplinary Modeling, Experiments and Design, Springer}
- "Slime mould algorithm based fractional order cascaded controller for frequency control of 2-area AC microgrid" {Published, APSIT 2021, IEEE}
- "Shrewd Sine–Cosine Algorithm Based Double Integral Tilt Derivative Controller for Frequency Regulation of Multi Microgrid System" {Submitted, Journal of Energy Storage, Springer Open}

SELECTED PROJECTS

MLOps Pipeline for Bone Fracture Classification & Deployment on Cloud Platforms

Developed an end-to-end machine learning pipeline for classifying bone fractures from X-ray images, leveraging MLOps practices with DVC, and deploying solutions on both Azure and AWS.

Predictive Analytics and Myth-Busting: COVID-19 Forecasting and Weather Impact Analysis

Developed a forecasting model for predicting COVID-19 cases for 81 countries using DNN and LGBM with an accuracy of 97.6% - 99.8%. Dispelled rumours regarding the weather's role in COVID-19 transmission; examined and demonstrated that weather had little to no role in the spread of COVID-19.

RSNA STR Pulmonary Embolism Detection

Developed the Pulmonary Embolism Detection model based on CNN (Efficientnet-b0) with a weighted log loss of 0.08 for reducing human delays and errors in detection and treatment of PE from chest CT pulmonary angiography images.

Multi-Robot Multi-Target Localization and Planning using Graph-Reinforcement Learning

(Prof. George Pappas Group)

Developed a multi-robot and multi-target path planning and localization algorithm using deep Q-learning combined with Graph Neural Network, outperforming the Dec-SB and Random Walker algorithms for efficiently solving the active information acquisition problem.

Motion Planning for Self-Driving Car

Developed a functional motion planning stack that avoids both static and dynamic obstacles, tracks the centerline of a lane, and handles stop signs. The stack includes behavioral planning logic, static collision checking, path selection, and velocity profile generation in the CARLA simulation environment.

Distributed Learning with Graph Neural Networks

Developed a Graph Neural Network to learn a distributed policy that mimics the optimal centralized controller in a multi-agent system with N agents tasked with controlling a dynamical process, ensuring collision and spread avoidance.

NeRF: Neural Radiance Fields

Provided one of the most simplified implementations of the famous Neural Radiance Fields paper, "NeRF: Representing Scenes as Neural Radiance Fields for View Synthesis".

Real-Time E-Commerce Streaming & Analytics

Implemented an end-to-end real-time streaming and analytics solution for e-commerce data using Apache Flink. The system ingests sales data through Kafka, processes it in Flink, and stores results in PostgreSQL for analytics and Kibana for visualization.

Custom Compliance Q&A Chatbot: Tailored Information Retrieval Aligned with Organizational Protocols

Developed a chatbot capable of parsing and answering complex queries aligned with company protocol, leveraging Llama3, LangChain, Streamlit, and Groq API for precise information retrieval and real-time response generation.

SKILLS

Programming Languages: Python, C++, C, C#, MATLAB, HTML, CSS, JavaScript, SQL
Software & Frameworks: PyTorch, TensorFlow, JAX, ROS, GAZEBO, CARLA, Scikit-learn, OpenCV, Apache Spark, PyBullet, AWS, Isaac Sim
Other Skills & Tools: Robotics, Machine Learning, Deep Learning, Computer Vision, Foundational Models, Control Systems, LLM, Graph Neural Networks, Reinforcement Learning, Data Science, Embedded Systems, Docker, Linux.

PROFESSIONAL EXPERIENCE

University of Pennsylvania - GRASP Lab
Graduate Research Assistant | USA Nov 2022 – Aug 2024

• Conducted research at the GRASP Lab (General Robotics, Automation, Sensing, and Perception) at the intersection of machine learning, computer vision, control systems, and robotics, under the mentorship of Prof. Nadia Figueroa, George Pappas, Ruzena Bajcsy, and Nikolai Matni.

Figueroa Robotics Lab @ Penn
Summer Research Intern - Machine Learning & Robotics | USA May 2023 – August 2023

• Developed a novel online EEG-based human intention classifier for robotic assistive control.

• Developed RGB-D camera-based real-time SDF predictor for reactive obstacle avoidance and safe control.

University of Southern California, Viterbi School of Engineering
Graduate Research Assistant | USA Aug 2024 – Aug 2025

• Conducting research at the intersection of machine learning and robotics to enhance the efficiency, explainability, and generalizability of robot learning.

FirstWork| USA
Advisor – Artificial Intelligence | USA Aug 2023 – Mar 2024

• Advised on an AI-powered learning platform designed to personalize educational experiences and enhance learning outcomes for individuals on the autism spectrum.

Tata Group (Tata Steel Limited)
Manager | India Jul 2021 – Jul 2022

• Managed (planning & development) the level-2 automation team, a team of 17 software developers engaged in the Research & Development of in-house software projects for enhancing the performance & efficiency of the steel plant.

• Independently worked on the "CONARC-LDC application" and designed a deep learning model for forecasting the hourly electricity requirement, resulting in an approximate saving of $30,000 per day during the energy bidding process.

Indian Institute of Technology, Kharagpur (IIT-KGP)
Research Intern – Data Science & Machine Learning | India May 2020 – July 2020

• Developed a forecasting model for predicting COVID-19 cases for 81 countries using DNN and LGBM with an accuracy of 97.6% - 99.8%.

• Dispelled rumors regarding the weather's role in COVID-19 transmission; examined and demonstrated that weather had little to no role in the spread of COVID-19.

Veer Surendra Sai University of Technology (VSSUT)
Undergraduate Research Assistant | India Jan 2019 – June 2021

• Conducted research in soft computing, machine learning, control systems, and power system stability under Prof. Sidhartha Panda of VSSUT, resulting in four research papers.

ADDITIONAL EDUCATION / ONLINE CERTIFICATIONS

SPECIALIZATION

- Deep Learning Specialization by *deeplearning.ai* (Coursera) [5 Courses]
- Self-Driving Cars Specialization by *University of Toronto* (Coursera) [4 Courses]
- Machine Learning Engineering for Production (MLOps) Specialization by *deeplearning.ai*
- IBM Data Science Professional Certificate (Coursera) [9 Courses]
- Applied Data Science with Python Specialization by *University of Michigan* (Coursera) [5 Courses]
- Business Analytics Specialization by *Wharton School of the University of Pennsylvania* (Coursera) [5 Courses]
- Algorithms Specialization by *Stanford University* (Coursera) [4 Courses]

COURSES

- Generative AI With Diffusion Models by *NVIDIA*
- Building RAG Agents for LLMs by *NVIDIA*
- Machine Learning by *Stanford University* (Coursera)
- Industrial IoT on Google Cloud Platform by *Google Cloud* (Coursera)
- Google Cloud Business Professional Accreditation by *Google Cloud*
- Introduction to Programming with MATLAB by *Vanderbilt University* (Coursera)

AWARDS & HONORS

- Top GPA Student Award, Class of 2024 (EE & SE) – University of Pennsylvania
- Dr. Nityananda Patnaik Gold Medal for Best All Rounder Graduate in Engineering - VSSUT
- Prof. Nilakantha Pattnaik Memorial Gold Medal for Best Graduate in Engineering - VSSUT
- Guru Prasad Memorial Gold Medal for Best Engineering Graduate - VSSUT
- Late Prof. J.N. Panda & Late Mrs. R. Panda Gold Medal for Best Electrical Engineering Graduate - VSSUT

- University Gold Medal for Best Graduate in Electrical Engineering - VSSUT
- Summited Siyari Top in the Himalayas at 11,800 feet - Tata Steel Adventure Foundation
- Selected by the Vice Chancellor of VSSUT to represent the university in the RUSA initiative by the Government of India