Souvik Datta

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EDUCATION

Vellore Institute of Technology **Chennai, India**
Bachelor of Technology in **Electrical and Electronics Engineering** July 2019 – May 2023
CGPA: 8.55/10

RELEVANT EXPERIENCE

Software Developer | Supervisor: Mr. Gaurav Vij Feb 2023 – Present
Q Blocks **Toronto, Canada**
• Orchestrated the development and scalability of cutting-edge Generative AI APIs, utilizing PyTorch and Docker to establish a robust and high-performance infrastructure.

UAV Project Intern | Supervisor: Mr. Irnanda Setiawan | [Certificate] | [Report] Dec 2022 – Apr 2023
PT Kaltim Prima Coal (KPC) **Sangatta, Indonesia**
• Spearheaded an UAV operation for inspecting 70kV Transmission Lines, increasing revenue by $1.26 million.
• Optimized total efficiency by 43% by planning the flight route and identifying critical bottlenecks for inspection.
• Lead a team of 7 engineers, effectively managing and coordinating their efforts to meet project deliverables.

Deep Learning Research Assistant | Supervisor: Dr. Subbulekshmi D May 2022 – Nov 2022
Vellore Institute of Technology **Chennai, India**
• Worked on Deep Learning models for Brain Tumour & Skin Cancer Segmentation using Vision Transformers.
• Presented an abstract on GNN-based "Semi-Supervised Learning for Autonomous Navigation" at ICDAC, 2022.

Computer Vision Intern | Supervisor: Mr. Shivankit Arun | [Certificate] | [Report] Jan 2022 – Jul 2022
Omnipresent Robot Technologies **New Delhi, India**
• Programmed custom YOLOv5 object detection model over 6 classes for drone analytics with a 93% accuracy.
• Developed Python scripts with Geocoding APIs and Folium, increasing effective data visualization by 14%.
• Optimized Deep Learning Models by 37% for scene-change detection in remote sensing applications.
• Implemented k-means Learning Algorithm and improved change detection on multi-spectral images by 54%.

Project Assistant | Supervisor: Dr. Sriramalakshmi P Apr 2022 – Jun 2022
Vellore Institute of Technology **Chennai, India**
• Extensively used MATLAB/Simulink on Tidal Energy Conversion Modules for Power Generation applications.
• Achieved an Output Voltage of 118V against an Input of 120V, yielding an Overall Efficiency of 98.33%.
• Tested Fast Fourier Transform Analysis and attained a very low Total Harmonic Distortion of 0.26%.

Research Intern | Supervisor: Dr. Chinmaya K.A. | [Certificate] May 2021 – Jul 2021
Indian Institute of Technology, BHU **Varanasi, India**
• Designed a Closed-Loop Converter with PI Controller having 16% more transient stability against disturbances.

PUBLICATIONS

1. S. Datta, M. Kundu, R. D. Choudhury, S. P. and S. VT, "**IoT Book Bot**", 2022 IEEE India Council International Subsections Conference (INDISCON), 2022, pp. 1-6. | [Certificate] | [arXiv] | [IEEE Xplore]
2. M. Kundu, S. Datta and K.G, "**IoT-Based Anaesthesia Control and Monitoring System**", in Reinvention of Health Applications with IoT: Challenges and Solutions, 1st ed., A. Pathy and S. S, Ed. Taylor and Francis Group, 2022, Chapter - 8, pp. 127-141, DOI: 10.1201/9781003166511-8. [Link]
3. Datta, S., Sriramalakshmi, P. (2023). "**Two-Stage Boost Inverter for Wave Energy Conversion**". In: Doolla, S., Rather, Z.H., Ramadesigan, V. (eds) Advances in Renewable Energy and Its Grid Integration. ICAER 2022. Lecture Notes in Electrical Engineering, vol 1041. Springer, Singapore | [Certificate] | [Springer] | [DOI] | [PPT]
4. S. Datta, R. Bharatwaj, Subbulekshmi D., D T. and A S., "**Semi-Supervised Learning for Autonomous Navigation**", International Conference on Data Analytics and Computing (ICDAC). Wenzhou, China, May, 2022. | [Certificate] | [Abstract] | [PPT]
5. S. Datta and Subbulekshmi D., "**Review of Deep Learning Algorithms for Urban Object Detection using Unmanned Aerial Vehicles (UAVs) based Remote Sensing**". [Under Review] | [Draft]

SKILLS

Languages: Python, MATLAB/Simulink, Docker, LaTeX
Libraries: NumPy, Matplotlib, Pandas, OpenCV, scikit-learn, TensorFlow, Keras, PyTorch, Kubernetes
Technical: CARLA, Proteus, LT-Spice, Fritzing
Environment: Git/GitHub, Linux, Raspbian OS
Hardware Boards: Arduino, Raspberry Pi, esp8266

PROJECTS

Jet Engine Health Prediction | Pandas, scikit-learn | [CODE] | Machine Learning
• Predicted Remaining Useful Life (RUL) for turbofan jet engines using a Random Forest Classifier Model.
• Performed Exploratory Data Analysis on NASA's Dataset and analyzed feature correlation using Seaborn.
• Applied hyperparameter optimization using Randomized Search CV & increased F1-Score to an overall 91.2%.

State Estimation using Kalman Filter | NumPy, Matplotlib | [CODE] | Kalman Filter
• Developed Kalman Filter-based state estm. model for precise approximation & visualization of a robot's state.
• Attained an extremely low Mean Square Error of 2.8% & 1.1% for the robot's position & velocity on evaluation.

RF-Learning Robot | PyTorch, Pybullet, Gym-OpenAI | [CODE] | Reinforcement Learning
• Programmed a quadruped robot to exhibit walking gait using PyTorch-based Reinforcement Learning model.
• Optimized learning rate & other hyperparameters to marginally improve the Mean Reward of the model by 14%.

3D Point Cloud from Depth Map | Open3D, Keras, OpenCV | [CODE] | Computer Vision
• Produced 3D point cloud data maps from 2D monocular RGB image-based depth maps using Open3D functions.
• Exploited a PointNet-based Object Detection model to classify 3D point cloud data with 81% training accuracy.

IoT Book Bot | Arduino, OpenCV, Raspberry Pi | [CODE] | Robotics
• Engineered a mobile robot using Raspberry Pi, Arduino and esp8266 for IoT Navigation and Object Detection.
• Implemented a 2D object detection model on MS COCO classes and a QR-Code and Barcode decryption script.

AWARDS AND HONOURS

1. Achieved an outstanding All India Rank – 10 (out of 76 teams) in the Electric BAJA SAE, 2022. [Certificate]
2. Secured 1st Position out of 30 teams in Aerospace Quiz League conducted by Team Aviators. [Certificate]
3. Found 3 asteroids under NASA International Astronomical Search Collaboration, 2021. [Certificate]
4. Consistently contributed to high-quality Open-Source Projects through Hacktoberfest editions 2021 & 2022.

EXTRA-CURRICULARS

Student Member, Youth Red Cross –
- Organized a fund-raising campaign that provided a full meal to over 150 underprivileged children.
- Contributed to the collection of books for 200 poor school children in North Bengal reliant on donations.
- Administered a massive fund-raising initiative to feed more than 300 community animals across pan-India.
- Arranged 3 webinars to address critical issues like - Mental Health, Drug Abuse and Child Labour.

Power Electronics Head, The Road Runners, eBAJA ATV –
- Co-Developed the design of the data acquisition system and its integration with RX/TX communication.
- Simulated models to determine EV performance using Proteus and MATLAB/Simulink software.
- Reviewed and researched relevant literature on BLDC motors and controllers for eBAJA applications.
- Used Proteus software with HC-SR04 Sensor & Magnetic Reed Switch for wheel RPM calculations.

CERTIFICATES AND MOOCs

1. **Neural Networks and Deep Learning** — DeepLearning.AI - Coursera | [Certificate] | [GitHub]
   Learned key NN concepts such as Optimizers, Loss functions, Activation functions, Backpropagation etc.
2. **Robotics: Aerial Robotics** — University of Pennsylvania - Coursera | [Certificate] | [GitHub]
   Studied essential concepts such as quadcopter kinematics, trajectory tracking, and motion planning strategies.
3. **Machine Learning** — Stanford University - Coursera | [Certificate] | [GitHub]
   Mastered key ML topics like Linear Algebra, Statistics, Probability, Cost Function using MATLAB scripts.
4. **Self-Driving Cars** — University of Toronto - Coursera | [Certificate] | [GitHub]
   Grasped prime autonomy concepts like visual perception, localization, state estimation etc. using CARLA.
5. **3D Computer Vision** by Dr. Gim Hee Lee — National University of Singapore
   Studied crucial concepts like 3D Geometry, Pose Estimation, Multi-View Stereo, Camera Calibration etc.