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**
• Built scalable REST APIs for SDXL, Falcon-7B, MPT-7B, and other Gen AI Models, serving 10,000+ users.
• Contributed to the development of the first pip package, achieving 4,000+ downloads in the first two months.
• Scaled our Decentralized GPU Network by integrating new data centers, increasing capacity to over 30,000+.

Deep Learning Research Assistant | Supervisor: Dr. Subbulekshmi D Mar 2023 – Present
Vellore Institute of Technology **Chennai, India**
• Presented an abstract on GNN-based 'Semi-Supervised Learning for Autonomous Navigation' at ICDAC, 2022.
• Leading a research project on 'Swarm Drones in Industrial Applications' & mentoring 2 undergraduate students.

UAV Project Intern | Supervisor: Mr. Irnanda Setiawan | [Certificate] | [Report] Dec 2022 – Apr 2023
PT Kaltim Prima Coal (KPC) **Sangatta, Indonesia**
• Managed a UAV operation for inspecting 70kV lines, reducing blackouts & increasing revenue by $1.26 million.
• Boosted task efficiency by 23% via strategic route optimization and resolving roadblocks like EM Interference.

Power Elec. Project Assistant | Supervisor: Dr. Sriramalakshmi P Apr 2022 – Jul 2022
Vellore Institute of Technology **Chennai, India**
• Presented a research paper on 'Two-Stage Boost Inverter for Wave Energy Conversion' at IIT Bombay ICAER.
• Extensively used MATLAB/Simulink on Tidal Energy Conversion Modules for Power Generation applications.
• Evaluated the performance and operation of PMSG, Inverter, Zeta Converters, H-Bridge Circuits and LC Filters.
• Achieved an Output Voltage of 118V against an Input of 120V, delivering a high Overall Efficiency of 98.33%.
• Conducted Fast Fourier Transform Analysis, yielding a remarkably low Total Harmonic Distortion of 0.26%.

Computer Vision Intern | Supervisor: Mr. Shivankit Arun | [Certificate] | [Report] Jan 2022 – Jul 2022
Omnipresent Robot Technologies **New Delhi, India**
• Developed YOLOv5 object detection pipelines over 6 classes for drone analytics with a high F1 Score of 93.5%.
• Improved object tracking data visualization by 14% via Python scripts integrating Geocoding APIs & Folium.
• Implemented k-means learning algorithm, boosting change detection accuracy on multi-spectral images by 54%.

EV Research Intern | Supervisor: Dr. Chinmaya K.A. | [Certificate] May 2021 – Jul 2021
Indian Institute of Technology, BHU **Varanasi, India**
• Conducted an in-depth case study on Three-Port DC-DC converters for EVs, identifying technical challenges.
• 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 Remote Sensing using Unmanned Aerial Vehicles (UAVs)**". [Journal Paper – Accepted] | [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 the 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 10th All India Rank (out of 76 teams) in the Electric BAJA SAE, 2022. [Certificate]
2. Secured 1st position out of 30 teams in the prestigious Aerospace Quiz League conducted by VIT. [Certificate]
3. Discovered 3 asteroids as part of NASA International Astronomical Search Collaboration, 2021. [Certificate]
4. Consistently contributed to high-quality Open-Source Projects through Hacktoberfest editions 2021 & 2022.

EXTRACURRICULARS

Finance Secretary, Youth Red Cross –
- Pioneered a fund-raising campaign that provided a full meal to over 150+ disadvantaged kids across Chennai.
- Administered a major book donation drive for 200+ economically underprivileged children in North Bengal.
- Managed a massive fund-raising initiative, providing nourishment to 650+ community animals across India.
- Orchestrated 10+ webinars to address critical social issues like - Mental Health, Sanitation & Child Labour.

Power Electronics Head, The Road Runners, eBAJA ATV –
- Developed the design of the Data Acquisition System (DAQ) and its integration with RX/TX communication.
- Simulated EV performance using Proteus and MATLAB/Simulink, improving system efficiency by 18%.
- Conducted a literature review on BLDC motors and controllers for eBAJA applications, covering 50+ sources.
- Enhanced precise wheel RPM calculations by 20% using Proteus, HC-SR04 Sensor & Magnetic Reed Switch.

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 Functions 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.