Shuvam Das

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Education

Indian Institute of Technology Dhanbad Expected May 2025
Bachelor of Technology in Electrical Engineering *Dhanbad, Jharkhand*

- **Relevant Coursework:** Data Structures and Algorithms (C++), Prob & Stat.

Experience

PricewaterhouseCoopers India May 2024 – July 2024
Technology Consultant Intern *Kolkata, West Bengal*

- **AWS Glue Job Development and Management** - Designed and implemented AWS Glue jobs to perform scalable ETL (Extract, Transform, Load) operations, extracting data from client-side systems and loading it into Amazon S3. Ensured data integrity, accuracy, and consistency while optimizing data pipelines.
- **Data Integration from SAP, Salesforce, and Darwinbox** - Integrated and ingested large datasets from SAP, Salesforce, and Darwinbox into Amazon S3, streamlining data workflows to enhance business analytics. Applied best practices in cloud data migration to increase accessibility and reduce latency.
- **SQL Table Optimization** - Modified existing SQL tables to improve database performance and accommodate evolving data structures, resulting in more efficient data storage, faster query execution, and enhanced system reliability.
- **Tableau Data Visualization and Reporting** - Leveraged Tableau to develop actionable data insights and visualizations for an electrical domain company, including dynamic dashboards and Management Information System (MIS) reports. Enabled data-driven decision-making and strategic business planning.
- **Technical Consultancy in Cloud Solutions** - Provided expert consultancy on AWS cloud solutions, data integration, and infrastructure optimization. Guided clients in adopting cloud-based architectures and AWS best practices, driving operational efficiency and technology adoption.
- **Tech Stack: Amazon Redshift, AWS Glue, Amazon S3, SQL, Tableau, Microsoft PowerPoint.**

UiT- The Arctic University of Norway Feb 2024 – May 2024
Artificial Intelligence Research Intern *Norway (remote)*

- **Optimized Image Comparison Metric Development** - Engineered a robust similarity index for comparing image scores from YOLO and DELF models, focusing on the heat signatures of Regions of Interest (ROIs) to enhance image analysis precision.
- **Model Output Analysis and Visualization** - Leveraged Google Places and Oxford Datasets to extract and visualize ROIs. Applied advanced techniques such as heatmaps, Grad-CAM, LIME, and Score-CAM to analyze model attention and improve interpretability of deep learning models.
- **Similarity Score Computation using Siamese Network** - Implemented a Siamese neural network architecture to compute similarity scores between images, improving the detection of subtle variations and optimizing model performance in image recognition tasks.
- **Metric Refinement through Validation and Iteration** - Continuously refined the similarity metric by validating predicted ROIs against ground truth data, ensuring a highly reliable and effective measure for evaluating model accuracy and performance.
- **Tech Stack: Machine Learning, Deep Learning, Python, Open-CV, Yolo, DELF.**

Deepkapha AI labs Dec 2022 – Aug 2023
Data Scientist Intern *Assen, Netherlands (remote)*

- **Anomaly Detection Model Development for Solar Panels** - Developed an advanced anomaly detection model using DenseNet and ResNet-50 architectures, identifying issues like vegetation overgrowth and panel cracking to prevent long-term damage and optimize solar panel performance.
- **Maintenance Strategy Optimization and Revenue Impact Analysis** - Predicted degradation rates based on maintenance delays, quantifying potential revenue loss from unaddressed anomalies. Enabled more effective maintenance strategies by integrating predictive insights into operational workflows.

- **Solar Panel Efficiency and Longevity Optimization** - Optimized solar panel efficiency and extended lifespan through early detection of anomalies, resulting in cost savings and more efficient maintenance schedules, improving overall system performance.
- **Storm Wind Analysis and Predictive Modeling** - Led the development of predictive models for storm wind analysis using high-resolution satellite imagery and advanced architectures such as EfficientNet-B7, EfficientNet-B6, and ResNeXt101 to accurately forecast wind speeds.
- **Tech Stack: Computer vision, Machine Learning, Data Science, Python, Tensorflow, Pytorch, Python.**

Projects

Optimized Fast Charging of Lithium-Ion Batteries Using Machine Learning | *Python, MATLAB, (BMS), Li batteries, sensors*

- Developed Predictive Models: Engineered a machine learning model to accurately predict key battery metrics, including State of Health (SOH), State of Charge (SOC), and Remaining Useful Life (RUL) of lithium-ion batteries, enabling real-time health monitoring.
- Dynamic Charging Efficiency Optimization: Enhanced charging efficiency by dynamically adjusting between Constant Current (CC) and Constant Voltage (CV) modes based on battery health predictions, ensuring optimal charging cycles.
- Battery Lifespan and Performance Improvement: Prolonged battery lifespan and improved performance by preventing overcharging and minimizing heat generation through precise control of the charging process.
- Microcontroller Integration for Real-time Management: Integrated machine learning algorithms with microcontroller systems via UART and I2C protocols, providing seamless management of the charging process and real-time adjustments based on battery health.

Solar anomaly detection Model - Web App | *DSA, Rest APIs, Flask, Deep Learning, Computer Vision, Docker.*

- Developed Streamlit Web Application: Created a user-friendly web app using Streamlit, allowing customers to upload solar PV panel images from drone surveys for automated anomaly detection.
- Anomaly Detection and Categorization: Implemented a deep learning model that detects and categorizes anomalies such as panel cracking, vegetation overgrowth, and other defects, providing actionable insights on potential damage over time.
- Revenue and Energy Loss Prediction: Integrated predictive analytics to estimate revenue loss and energy degradation if maintenance is delayed, offering detailed financial and operational forecasts for solar panel owners.
- Scalable Web Infrastructure: Deployed the web app using Docker, ensuring scalability and seamless integration with REST APIs for efficient data handling and processing.

Technical Skills

Languages: C++, C, Python, R, HTML, CSS, TypeScript
Technologies: Tensorflow, Pytorch, Data Analysis, Flask, SQL, MongoDB, Rest APIs, API hosting, Docker, AWS service, Fine-tuning LLMs, Open-CV.
Tools: Tableau, Postman, Jupyter Notebook, Google Collaboratory, VS Code, Pycharm, MS Excel, MS Office.
Concepts: DSA, OOPs, OS, DBMS, Prob and Stats, Compiler, Artificial Intelligence, Machine Learning, Neural Networks, Deep Learning, Generative-AI, LLMs.

Achievements

- **HPAIR 2023 Delegate:** Selected by **Harvard's committee** to represent India at the **Harvard Project for Asian and International Relations (HPAIR) 2023 conference**.
- Ranked among the **top 30 teams out of 4000** participants in **NIT Trichy's** prestigious ML hackathon.
- Solved over **400+ DSA and competitive programming problems** on various coding platforms.
- **Hackfest 2023 – Top 15 Finalist:** Achieved 14th position out of 1200 teams in Hackfest 2023 (IIT Dhanbad)
- Secured **2nd rank in ML hackathon** by IIT Dhanbad.
- Attained an **All India Rank of 6295** in the highly competitive **JEE Advanced 2021**.

Social Engagements

Volunteer: KARTAVYA - NGO run by students of IIT Dhanbad to educate underprivileged childrens.
PR Team: Concetto'24 (Annual Tech-fest at IIT Dhanbad).
Sports-Engagements: Chess, Table-Tennis.