SOURODIP KAR

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Education

Narula Institute Of Technology **September 2021 – June 2025**
B.Tech in Computer Science and Engineering (AI & ML) — CGPA: 8.14 *Agarpara, West Bengal*

St. Augustine Day School Barrackpore **May 2019 – July 2021**
Higher Secondary Education (Class XII), CISCE — Percentage: 83.2% *Barrackpore, West Bengal*

St. Claret School **February 2009 – May 2019**
Secondary Education (Class X), CISCE — Percentage: 85% *Debpukur, West Bengal*

Experience

Space Applications Center (SAC), ISRO **March 2025 – Present**
Machine Learning Intern *Ahmedabad, Gujarat*

- Developed a two-stage computer vision pipeline to detect and segment rooftop solar panels from high-resolution satellite imagery using YOLOv11 for object detection and SAM for segmentation.
- Fine-tuned the YOLOv11 model using Python, PyTorch, and the Ultralytics framework on custom-labeled regional data (Ahmedabad) to address geographic domain shift, while employing SAM in a zero-shot setting to eliminate the need for pixel-level annotations.
- Integrated data processing and geospatial analysis tools including OpenCV, NumPy, GeoPandas, and Rasterio to manage datasets and generate precise mask overlays on georeferenced imagery.
- Improved detection mAP from 0.711 to 0.901 and segmentation IoU from 0.697 to 0.891, enabling scalable and annotation-efficient solar panel mapping for renewable energy assessment.

Projects

MindfulLibrary | *Python (Pandas, NumPy), Machine Learning (TF-IDF, NLP), Langchain, Gradio* **March 2025**

- Built an LLM-driven book recommender using semantic search to suggest books by mood, tone, and interest.
- IApplied NLP (TF-IDF, cosine similarity) to match queries to book metadata for personalized filtering.
- Developed an interactive Gradio UI to display book covers and summaries via a lightweight local app.

Coccidiosis-Disease-Classification | *Python, Deep Learning* **October 2024**

- Built a web app to classify chicken fecal images as coccidiosis or healthy using a deep learning model.
- Modularized the training pipeline in Jupyter with logging, utility functions, and exception handling.
- Used DVC for pipeline tracking; deployed the final app using Docker and CI/CD on AWS.

Image Inpainting | *Python, OpenCV, Stable Diffusion* **June 2024**

- Built a PyQt5 GUI for users to upload images and apply inpainting using segmentation masks.
- Applied OpenCV's GrabCut to extract foregrounds; used Stable Diffusion to replace masked content.
- Example: After segmentation, replace a rose in the image with a sunflower using a user prompt.

Technical Skills

Languages: C, Java, Python, SQL/ANSI SQL, JavaScript, HTML5/ CSS3
Machine Learning & AI:: TensorFlow, Keras, Scikit-learn, OpenCV, NumPy, Pandas, Matplotlib
Cloud Platforms:: Google Cloud Platform (GCP), Amazon Web Service (AWS)
Development Tools:: Git, GitHub, Linux, Jupyter Notebooks, REST APIs, MongoDB

Leadership / Extracurricular

- Finalist – ISRO Bharatiya Antariksh Hackathon 2024 & Smart Bengal Hackathon 2023, recognized for AI-driven solutions in space-tech, smart governance, and urban innovation
- 2× IEEE Xplore Author (2024 & 2025) – Published research on "Enhancing Diagnostic Accuracy for Kidney Abnormalities through Resolution-Optimized Deep Learning Models" and "Exploring Geospatial Mapping through Speech Commands"
- Student Ambassador of Idea-o-meter (College)
- Student Member of IETE (Institution of Electronics and Telecommunication Engineers)