Swadesh Jana

Machine Learning Researcher

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 github.com/Swadesh13 k kaggle.com/swadeshjana Google Scholar

Personal Statement

Experienced in reinforcement learning, large language models, vision and multimodal perception. Passionate about designing reliable, generalizable AI systems, with a focus on bridging research insights and deployable ML solutions.

Technical Skills

- **ML & Research Concepts:** Deep Learning | Reinforcement Learning | LLM Fine-tuning | Computer Vision
- **ML Frameworks:** PyTorch | TensorFlow | Scikit-Learn
- **Programming:** Python | C/C++ | Java | JavaScript | HTML | CSS
- **Compute Platforms:** HPC Clusters | GPU Training | Cloud (AWS / GCP – basic proficiency)
- **Software & Deployment:** Node JS | Streamlit | MongoDB | SQL | Docker | Singularity | Git | Linux Bash
- **Other Skills:** Latex | Data Preprocessing & Analysis | Model Training & Optimization

Research Experience

Eberhard Karls Universität Tübingen, Autonomous Learning Group &
Max Plank Institute, IMPRS-IS & **Ellis Institute**   Tübingen, Germany
Thesis Student   Aug 2025–present

- Investigating CoT, self-play reasoning and coding capabilities in RL-trained LLMs.
- Supervisors: Prof. Dr. Georg Martius, Dr. Pavel Kolev, Dr. Antonio Orvieto

Mercedes-Benz AG, Pattern Recognition Team   Sindelfingen, Germany
Working Student   Apr 2024–present

- Supporting 2D and 3D vision plus lidar-based data processing and model training.
- Researching on improving VLM inference techniques using vision token withdrawal and entropy estimation.
- Researched on model-based uncertainty-estimation in 3D object detection.

TCS Research and Innovation Labs, PERC Lab   Mumbai, India
Research Intern   May 2022–Oct 2022

- Implemented model compression using lottery ticket hypothesis, channel pruning, and knowledge distillation.
- Developed workflows to produce optimally pruned vision models based on user requirements.

Google Summer of Code, Red Hen Lab
Research Intern | Supervisor: Dr. Peter Uhrig   Jun 2021–Aug 2021

- Implemented hand gesture recognition in videos using OpenPose, CNN, and LSTM: GSoC page.
- Invited to Oxford IMCC online talk: YouTube. Accepted in a symposium at ISGS, 2022: YouTube.

Jadavpur University   Kolkata, India
Undergraduate Student Researcher   Jun 2020–Aug 2023

- Conducted ML-based research in computer vision, geoinformatics, and medical data analysis.
- Collaborated with researchers, deployed object detection models on cloud, researched on model development.

Projects

Check the complete list of projects at https://swadesh13.github.io/projects.html

- **Improving LLM coding performance using RL-based methods**   Aug 2025–current
  - Researching RL methods like self-play and RLVR-based training for improving coding performance in LLMs.
  - Supervisors: Prof. Dr. Georg Martius, Dr. Pavel Kolev, Dr. Antonio Orvieto

- **Multimodal Transformer and Graph-based Mechanism of Action Prediction**   Jun 2023–Jan 2024
  - Researched on multi-modal biological data using GNNs and transformer-based protein and molecule encoders for predicting mechanism of action (MoA) in drug-target interactions (DTI).
  - Publication: IEEE Transactions on Artifical Intelligence (10.1109/TAI.2025.3565671)
  - Codebase: github.com/JUCompBio/DTI-MOA
  - Supervisor: Dr. Ujjwal Maulik

- **Improving Lung CT Analysis through Fuzzy Dilated Convolution Attention** Aug 2022–Feb 2023
  - Developed fuzzy atrous convolutional layers for better image segmentation in medical datasets.
  - Publication: IEEE ASPCON 2023 conference 10.1109/ASPCON59071.2023.10396336.
  - Supervisor: Dr. Ujjwal Maulik
- **Short-term Air pollution prediction using Graph Convolutional Neural Networks** Oct 2021–Feb 2022
  - Application of Spatio-Temporal Graph-based CNN model for air pollution prediction.
  - Publication: Technological Forecasting and Social Change (10.1016/j.techfore.2024.123684)
  - Codebase: github.com/Swadesh13/Pollution-STGCN
  - Supervisor: Dr. Sarbani Roy
- **Image Classification & Object Detection on road anomalies dataset** Mar 2021–Sep 2021
  - Research on classification and object detection models on a self-annotated collection of road anomaly images.
  - Publication: Springer MONE (10.1007/s11036-023-02118-6)
  - Supervisor: Dr. Sarbani Roy

EDUCATION

M.Sc. in Machine Learning, Eberhard Karls Universität Tübingen Tübingen, Germany
Current GPA: 1.46 Oct 2023–present

B.E. in Computer Science and Engineering, Jadavpur University Kolkata, India
CGPA: 9.4/10 - First Class Distinction with Honours (add. 20 credits) Aug 2019–May 2023

ACHIEVEMENTS

- Secured 8th rank (50 teams) in RL course (Tübingen) competition on a two-player hockey game Feb 2025
- Selected for grant support from AICTE & MoE's Innovation Cell for innovation named "RoADAI" Apr 2024
- Secured 2nd rank (55 teams) in a Deep Learning course (Tübingen) challenge on object detection Jan 2024
- Selected for the Google Research Week 2023 at Bangalore, India (Jan 29-31, 2023) Jan 2023
- Secured 49th rank (Top 2%) in SIIM-ISIC Melanoma Classification, 2020 (Kaggle) 2020
- Jagadis Bose National Science Talent Search Senior Scholarship 2019–2023
- Letter of Recognition from West Bengal State for AISSCE 2019 results 2019

TECHNICAL ENGAGEMENT & LEADERSHIP

- Mentor at GSoC, Red Hen Lab Jun–Aug 2023
  Mentored 2 students to extend work on hand gesture recognition, leading to successful completion.
- Secretary at DevHub, Jadavpur University Jan 2021–Feb 2022
  Managing a community-based developers group. Session videos available on YouTube.