

# Swadesh Jana

## Machine Learning Researcher

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## PERSONAL STATEMENT

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

## TECHNICAL SKILLS

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

## WORK EXPERIENCE

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- Mercedes-Benz AG**, Pattern Recognition Team Sindelfingen, Germany  
Working Student Apr 2024–Jan 2026
- Supporting 2D and 3D vision plus lidar-based data processing and model training
  - Researching improvements to VLM inference techniques using vision token withdrawal
  - Researched 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 Remote  
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

## RESEARCH EXPERIENCE

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- Eberhard Karls Universität Tübingen**, Autonomous Learning Group &  
**Max Planck Institute, IMPRS-IS & Ellis Institute** Tübingen, Germany  
Thesis Student Aug 2025–present
- Title: Improving Coding Abilities of LLMs using Guided Asymmetric Self-Play
  - Investigating CoT, self-play reasoning and coding capabilities in RL-trained LLMs
  - Supervisors: Prof. Dr. Georg Martius, Dr. Pavel Kolev, Dr. Antonio Orvieto
- 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

## EDUCATION

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- 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

## ADDITIONAL PROJECTS

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

- **Multimodal Transformer and Graph-based Mechanism of Action Prediction** Jun 2023–Jan 2024
  - Conducted research on multimodal 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 Artificial Intelligence (10.1109/TAI.2025.3565671)
  - Codebase: [github.com/JUCompBio/DTI-MOA](https://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](https://github.com/Swadesh13/Pollution-STGCN)
  - Supervisor: Dr. Sarbani Roy
- **Image Classification & Object Detection on road anomalies dataset** Mar 2021–Sep 2021
  - Researched 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

## ACHIEVEMENTS

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- 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

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- 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.*