Rajdeep Banerjee

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Objective

M.S. in Robotics and Automation Engineering student at Worcester Polytechnic Institute with 3+ years of professional experience in machine learning, computer vision, and generative AI applications for autonomous systems. Proven track record of developing high-accuracy models for traffic light recognition, driver distraction detection, and real-time object detection. Experienced in ETL pipelines, large-scale data integration, and engineering optimization using LLM-based tools. Seeking to leverage expertise in robotics, AI, and system design to advance intelligent, safety-critical, and data-efficient autonomous technologies in research and industry.

Education

M.S. in Robotics and Automation Engineering 2025 – Present
Worcester Polytechnic Institute (WPI), Worcester, MA, USA

B.Tech in Mechanical Engineering 2016 – 2020
Kalinga Institute of Industrial Technology (KIIT), Bhubaneswar, India
CGPA: 8.85

Professional Experience

Senior Machine Learning Engineer, ZF Group October 2022 – July 2025
Machine Learning Research Engineer (Intern), ZF Group June 2022 – October 2022

- **Traffic Light Recognition**: Developed a traffic light recognition system for Indian road conditions using Faster R-CNN for object detection and a custom classification pipeline. The system achieved a test accuracy of **98.6%**, enhancing navigation accuracy and robustness for autonomous vehicles.
- **Driver Distraction Detection**: Designed an LSTM-based model with minimal acceleration data, achieving a **92.65%** test accuracy for safety-critical applications.
- **Operational Design Domain (ODD)**: Enhanced AV reliability by developing adaptable frameworks for varying operational conditions.
- **Generative AI for Engineering Optimization**: Developed LLM-based tools to automate code optimization, significantly reducing MISRA violations, streamlining certificate classification, and enhancing overall workflow efficiency.

Associate Software Engineer and Analyst, Accenture September 2020 – December 2021

- Developed ETL pipelines with **SAP BODS** for large-scale data integration; used tools like **QlikView, Informatica, Tableau, PowerBI, Talend** to optimize data workflows.
- Coordinated with multi-functional teams, improving data handling for large-scale projects.

Projects

ClassifyTraffic
Developed a deep learning model for recognizing traffic signs like merge, speed limit, and stop signs, allowing AVs to navigate optimally. Achieved a training accuracy of **99.61%** and **99.88%** on test data.
Tools Used: Python, TensorFlow, OpenCV

DetectMe
Created a real-time object detection model using Scaled YOLOv4, achieving high-confidence detection for robotic vision tasks.
Tools Used: Python, YOLOv4, OpenCV

LaneDetect
Built a lane detection algorithm that identifies lane boundaries under varied conditions, supporting AV alignment and lane changes.
Tools Used: Python, OpenCV, NumPy

ParkMyCar
Designed an urban parking solution to detect vacant spaces, optimizing space usage in high-traffic environments.
Tools Used: Python, OpenCV, TensorFlow

ATV Design
Part of the Juggernaut Racing team, participated in Enduro Student India 2018, achieving an overall rank of 17 out of 72. Led the design of an ATV, focusing on optimizing roll cage, suspension, and braking systems.
Tools Used: SolidWorks, Ansys, CATIA

Certifications

- **Neural Networks and Deep Learning** and **Improving Deep Neural Networks** - DeepLearning.ai (online)
- **Introduction to Self-Driving Cars** and **State Estimation and Localization for Self-Driving Cars** - University of Toronto (online)
- **Linear Algebra** - Imperial College London (online)

Technical Skills

- **Programming Languages**: C++, Python, MATLAB, ROS, CUDA
- **Deep Learning Frameworks**: TensorFlow, Keras, PyTorch
- **Libraries**: NumPy, Pandas, Matplotlib, OpenCV, PIL
- **Engineering Tools**: SolidWorks, Ansys, CATIA

Leadership & Positions

Head of Robotics and Automation - KIIT AI Society, Bhubaneswar
Led robotics projects emphasizing practical learning and innovation in AI applications. Coordinated workshops and guided a team of 20+ students, resulting in the successful development of automation prototypes.

Campus Ambassador - All India Council for Robotics & Automation (AICRA)
Represented KIIT at AICRA events, fostering industry connections and promoting participation in national-level robotics competitions.

Honors & Publications

- **Certificate of Merit**: Awarded for contributions in the Boeing University Innovation Leadership Development (BUILD) program, an annual flagship aerospace innovation, leadership, and talent development initiative by Boeing India. As team lead, Rajdeep spearheaded the development of a smart cleaning robot to segregate biodegradable and non-biodegradable waste, addressing India's escalating waste management crisis.
- **Paper Presentation**: Presented "A Study on Single and Multi-Layer Perceptron" at ICCMC 2019, contributing to discussions on neural networks and ML architectures. (DOI: 10.1109/ICCMC.2019.8819775)

Languages

English — Bengali — Hindi

References

Available upon request.