Abhijeet Pendyala

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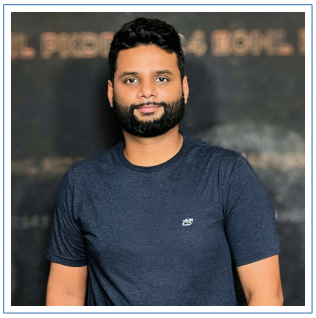
Portfolio LinkedIn



Profile

Machine Learning PhD with 7+ years of experience developing and deploying end-to-end AI solutions for complex industrial problems. Expertise in reinforcement learning, computer vision, and building scalable ML systems. A published researcher at top-tier conferences passionate about translating state-of-the-art research into robust, production-grade software.

Work Experience

Theory of ML Group, Ruhr-Universität Bochum **Germany**
PhD Candidate in Machine Learning *Feb '21 – Present*

- Developed a deep reinforcement learning (RL) solution using PPO and curriculum learning to optimize a complex industrial control system with sparse rewards and conflicting objectives.
- Designed a novel hybrid RL-planning architecture that integrates an offline-trained XGBoost collision model at inference time, significantly reducing safety-limit violations.
- Authored and released `ContainerGym`, an open-source RL benchmark, and published research providing actionable guidelines for industrial system design and scalability.
- **Achievements:** Published twice at the prestigious European Conference on Machine Learning (ECML '24 & '25).
- **Skills:** `Python`, `PyTorch`, `Stable-baselines3`, `Scikit-learn`, `Matplotlib`

Ecoki.de **Germany**
Software Developer (Fullstack) *Feb '21 – Present*

- Spearheaded the design of core architectural frameworks for a low-code ML platform, including a microservices architecture and modular `BuildingBlock` and `Pipeline` systems for energy efficiency applications.
- Engineered and implemented end-to-end ML workflows, from data preprocessing, feature engineering, regression, time-series forecasting, and optimization modules.
- Integrated ML pipeline results into interactive Django-based dashboards for visualization and user input.
- **Achievements:** Led the initiative to standardize engineering practices, creating the platform's first comprehensive automated testing protocols and Sphinx-based technical documentation.
- **Leadership:** Requirements collection, User story mapping, Sprint rituals
- **Skills:** `Python`, `Tensorflow`, `Scikit-learn`, `XGBoost`, `Sphinx`, `Docker`, `Kubernetes`, `Panel`, `Django`

Perception Team, Kopernikus Automotive GmbH **Berlin, Germany**
Machine Learning Engineer *Aug '19 – Apr '20*

- Developed and optimized perception models for autonomous driving, focusing on 2D/3D object detection and localization using models like `RetinaNet`, `YOLO` and `EfficientDet`.
- Designed and maintained data pipelines for perception tasks, including synthetic dataset generation (images and LiDAR) from the `CARLA` simulator.
- Implemented model compression and latency reduction techniques with `TensorRT` for efficient deployment on edge devices (NVIDIA Jetson).
- **Achievements:** Significantly improved the vehicle perception stack by training object localization models on custom-generated synthetic datasets of masked cars and traffic cones.
- **Leadership:** Event Coordinator for the Autonomous Mobility Meetup, Berlin.
- **Skills:** `Python`, `TensorFlow`, `Keras`, `TensorRT`, `CARLA` Simulator

ICAMS, Ruhr-Universität Bochum **Germany**
Assistant Researcher *Aug '18 – May '19*

- Developed surrogate ML models to replace costly material simulations, focusing on damage prediction (regression) and stress hotspot detection (classification).
- Trained and evaluated a suite of regression models (Random Forest, SVR, DNNs) to predict material damage values from micro-mechanical features.
- Engineered a classification pipeline using Random Forest and oversampling techniques (ADASYN) to predict stress hotspots in a highly imbalanced dataset.
- **Skills:** `Python`, `scikit-learn`, `Pytorch`, `fastai`, `pandas`

Theory of Machine Learning Group, INI, Ruhr-Universität Bochum **Germany**
Master Thesis *Apr '18 – Jan '19*

- Designed and implemented a novel algorithm (ACF-BDCA) in C++ to accelerate the training of non-linear Support Vector Machines (SVMs) on large-scale datasets.
- Combined an adaptive coordinate frequency (ACF) optimization method with a budget maintenance strategy to reduce model complexity and improve convergence speed.
- **Achievements:** Developed a new, robust stopping criterion for the non-convex problem based on the logarithmic gap of pseudo-gradients, achieving a >30% training speed-up.
- **Skills:** `C++`, `Convex Optimization`, `Latex`

Fiat Chrysler Automobiles (FCA) **Pune, India**
Research and Development Engineer *Jul '13 – Sep '15*

- Analyzed high-dimensional sensor data from engine dynamometers to diagnose performance anomalies and optimize engine efficiency. Designed and programmed test cycles for durability testing, and performed engine software calibration.
- **Leadership:** Led a team of 15 associates and was responsible for engine and transmission durability testing.
- **Skills:** `Engineering leadership`,`Data Analysis`,`Matlab`,`ETAS-INCA`

Education

Ruhr-Universität Bochum **Germany**
M.Sc. Computational Engineering (Splz. in Machine Learning) *Oct '15 – Dec '18*
Grade: 1.3/4.0 (Distinction)

BITS Pilani, Hyderabad Campus **India**
B.E. (Honors) Mechanical Engineering (Splz. in Computational) *Aug '09 – May '13*
CGPA: 8.1 / 10

Technical Skills

ML & Data Science: PyTorch, TensorFlow, Stable-baselines3, Scikit-learn, Pandas, NumPy, Scipy, XGBoost

MLOps & Deployment: Docker, Kubernetes, Git, MLflow, DVC, Weights & Biases

Web Dev & Visualization: Django, FastAPI, React, Matplotlib, Bokeh, HoloViz Panel

Databases: MySQL, MongoDB

Communication skills

Languages: English (Native Speaker, C2), German (Intermediate, B2), Hindi (Native), Telugu (Mother Tongue)

Public Speaking: Experienced in presenting complex technical concepts to diverse audiences at seminars and international conferences.

Collaboration Tools: Proficient in using project management and collaboration tools like Miro, Jira, and mind mapping software for sprint planning and user story mapping.

Activities

Organization: Organizer of the weekly seminar talks at the computer science department, Ruhr-Universität Bochum (2021-2025)

Co-supervision: Co-supervised a bachelor thesis on the topic of AutoML library evaluation and the pseudo-anonymisation of sensitive data in ML processes.

Peer reviews: LOD 2025, ICANN 2025, ECML 2025

Publications

1. **Curriculum RL meets Monte Carlo Planning: Optimization of a Real World Container Management Problem**, *To appear in European conference for Machine Learning (ECML). Applied Data Science Track* , 2025
   A. Pendyala, T. Glasmachers
2. **Solving a Real-World Optimization Problem Using Proximal Policy Optimization with Curriculum Learning and Reward Engineering**, *European conference for Machine Learning (ECML). Applied Data Science Track*, 2024
   A. Pendyala, A. Atamna, T. Glasmachers
3. **ContainerGym: A Real-World Reinforcement Learning Benchmark for Resource Allocation**, *International Conference on Machine Learning, Optimization, and Data Science (LOD)*, 2023
   A. Pendyala, J. Dettmer, T. Glasmachers, A. Atamna
4. **Online Budgeted Stochastic Coordinate Ascent for Large-Scale Kernelized Dual Support Vector Machine Training**, *International Conference on Pattern Recognition Applications and Methods (ICPRAM)*, 2020
   S. Qaadan, A. Pendyala, M. Schüler, T. Glasmachers