# Avi Goyal

Würzburg, Germany | 13 October 2000

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## PROFILE

I am currently pursuing a Master's degree in Computer Science at Julius Maximilian University of Würzburg with a strong focus on Machine Learning, Data Analysis, and Algorithm Development. Through academic and practical research projects, I have developed solid expertise in model optimization, computer vision, and distributed systems. I am highly motivated to take on challenging technical roles in innovative environments where I can deepen my expertise and actively contribute to technological advancement.

## EXPERIENCE

**University Hospital Würzburg**                                  Aug 2024 – Sept 2025
*Student Research Assistant – Data Analyst*                       Würzburg, Germany

– Processed and analyzed medical imaging data (e.g., OCT) for detection and segmentation tasks.
– Developed machine learning models for clinical image analysis using Python and PyTorch, achieving over 90% validation accuracy.
– Implemented optimized training pipelines (GPU-accelerated training, data augmentation, batch processing) to significantly improve model performance.
– Created teaching materials and supported AI-related lectures.
– Assisted with exercises and materials for the "AI in Medicine" course and worked closely under the supervision of Prof. Dr. Rüdiger Pryss.
– Collaborated with clinicians and professors on data-driven medical research projects.
– Tech Stack: Python, PyTorch, PySpark, OpenCV, Pandas, Albumentations, Matplotlib, Scikit-learn.

**Julius Maximilian University of Würzburg**                      Mar 2025 – Oct 2025
*Data Science Research Assistant – AutoML in Data Science and Computer Vision*    Würzburg, Germany

– Developed automated neural architecture generation using Large Language Models (DeepSeek Coder 7B).
– Generated and validated approximately 1,900 unique neural network models, expanding the LEMUR dataset by 13×.
– Achieved 2–12% performance improvements over manually designed baselines across benchmark datasets (MNIST, CIFAR-10/100, CelebA, ImageNette).
– Developed the Few-Shot Architecture Prompting approach, achieving +11.6% accuracy on CIFAR-100 and identifying $n=3$ as optimal configuration.
– Built a sub-millisecond MD5 validation system preventing duplicates and saving 200–300 GPU hours.
– Analyzed context overflow issues resulting in 99.8% generation failures for large LLM prompts.
– Applied balanced dataset statistics to correct evaluation bias by up to 15.7%.
– Contributed to the research project "Enhancing LLM-Based Neural Network Generation: Validation, Prompt Engineering, and Systematic Optimization" under Prof. Dr. Radu Timofte.
– Tech Stack: Python, PyTorch, DeepSeek, LLMs, Machine Learning, Deep Learning, Generative AI, AutoML, NAS, NumPy, Pandas.

**PTN Event**                                                     June 2022 – Mar 2023
*Software Developer*

– Collaborated with team leads, business analysts, and product owners to define functional and technical requirements.
– Supported the architecture team in ensuring architectural consistency and high software quality.
– Contributed to technical design documentation according to ISO and project standards.
– Actively participated in Agile (Scrum) processes and demonstrated strong leadership skills to ensure timely delivery.
– Tech Stack: PHP, WordPress, Python, JavaScript, React, Node.js, REST APIs, SQL, Git, Docker, Agile, Jira.

**The Sparks Foundation** — Sept 2020 – Dec 2021
*Data Science & Business Analysis Intern*

– Implemented real-world supervised machine learning and predictive analytics projects.
– Developed and applied regression and classification models to solve business problems.
– Conducted quantitative analyses to support data-driven decision-making.
– Tech Stack: Python, Pandas, Scikit-learn, NumPy, Matplotlib, Seaborn, Jupyter Notebook.

## EDUCATION

**Julius Maximilian University of Würzburg** — Oct 2023 – Present
*Master of Science in Computer Science* — CGPA: 2.4

**SRM Institute of Science and Technology (Main Campus), Chennai** — July 2018 – May 2022
*Bachelor of Technology in Computer Science and Engineering* — CGPA: 9.0/10

## TECHNICAL SKILLS

**Programming Languages:** Go, Python, C, C++, JavaScript
**Data Science & Analytics:** Data Preparation, Predictive Modeling, Quality Management
**Lib/Frameworks:** Django, Django REST, Node JS, React JS, Flask
**Databases:** MySQL, MongoDB, PostgreSQL, Redis
**Cloud Native Technologies:** Kubernetes, Docker, Prometheus
**Platform Skills:** Tableau, Machine Learning, Deep Learning, NLP, Microsoft Azure
**Other Skills:** Analytical Thinking, Leadership, Adaptability, Time & Stress Management & Collaboration

## LANGUAGES

German (A2 Level) | English (C1 Level) | Hindi (Native Speaker) | Japanese (A1 Level)

## CERTIFICATIONS

❋ Google Data Studio A-Z Data Visualization (2024)
❋ Data Science With Python: Data Processing and Visualization (2024)
❋ HackerRank Python Certificate (2023)

## PROJECTS

**Petroleum Trade Network**

– Developed and maintained websites for international Oil and Gas conferences.
– ogad-conference.com | ptnevents.com | digital-twin-conference.com | artificial-lift-summit.com | container-shipping-conference.com | supplychain-conference.com | digital-transformation-conference.com
– Tech Stack: Django, HTML, CSS, JavaScript, WordPress, Redux, React.js

**Major Project – Water Quality Classification using Machine Learning** — 8TH SEMESTER, FINAL YEAR PROJECT | GRADE: A+

– Collected and processed a dataset of over 7,000 water samples based on chemical properties.
– Performed Exploratory Data Analysis (EDA), handled missing values, scaled features, and applied label encoding for model preparation.
– Developed and compared multiple classification models including Logistic Regression, Random Forest, and SVM.
– Validated models using Accuracy, Precision, Recall, F1-score, and Confusion Matrix.

- Built an interactive web application using Flask for user input and result visualization (HTML/CSS/JS frontend).
- Used Jupyter Notebook for iterative development and visualization (Matplotlib, Seaborn).

**Minor Project – Flood Prediction using Machine Learning Techniques**  7TH SEMESTER PROJECT
GRADE: A+

- Applied supervised learning algorithms (Logistic Regression, Decision Tree, Random Forest, SVM) to a dataset of over 3,000 records from Kerala to predict flood risk.
- Performed data preprocessing, feature selection, and model training using Python in Jupyter Notebook.
- Conducted comparative model evaluation using Accuracy, Confusion Matrix, and additional performance metrics.
- Gained practical experience in model tuning, evaluation, and interpretation of real-world environmental data.

## PUBLICATIONS

- **Enhancing LLM-Based Neural Network Generation: Few-Shot Prompting and Efficient Validation for Automated Architecture Design**
  https://arxiv.org/abs/2512.24120
- **NNGPT: Rethinking AutoML with Large Language Models**
  https://arxiv.org/abs/2511.20333