FORTISSIMO
PLUS

FFPLUS SUCCESS STORY:
INNOVATION STUDY

LARGE LANGUAGE MODELS FOR COMPUTER AIDED DESIGN

ORGANIZATIONS

SSC is a German IT service provider specialising in secure data exchange and data management solutions for industrial collaboration, particularly in the automotive sector. **Karlsruhe Institute of Technology** (KIT) support applied research and technology knowledge transfer at the interface between science and industry. The partners collaborated to combine industrial software expertise with advanced AI research.

THE CHALLENGE

2D CAD drawings are widely used across industry and are often archived as images, making it difficult to retrieve structured information. Although these drawings contain valuable graphical elements, tables and annotations, this information is not directly accessible for automated processing or search. Conventional OCR struggles with dense layouts, multiple formats and strict data protection requirements, preventing scalable automation.

Technology used: Data Engineering, RLHF, MLOps
Industry Sector: Automotive

THE SOLUTION

SSC developed a local generative AI solution to automatically extract metadata and structured information from 2D CAD drawings. A configurable synthetic data generation pipeline produces realistic training data reflecting industrial CAD formats. Vision–language models were fine-tuned and benchmarked using large-scale HPC resources, requiring around 6,500 GPU node hours. The model will be integrated into SSC's SWAN platform, enabling engineers to query drawings via an interactive chatbot.

THE IMPACT

The innovation extends SSC's core data exchange offering into AI-driven automation, strengthening its competitive position in the automotive sector and opening access to new markets. Testing across 2,600 CAD drawings demonstrated a 92% reduction in time for table header classification compared with manual processes, delivering significant productivity gains and reducing error rates.

By automating repetitive review tasks, engineers can focus on higher-value design and collaboration activities, improving job quality and knowledge retention. The project also enhanced internal capabilities, with several employees gaining advanced skills in AI, data engineering and HPC workflows.

More efficient handling of engineering data reduces rework and duplication, contributing to lower resource consumption and more sustainable industrial processes overall. The local deployment approach ensures compliance with data sovereignty requirements, supporting wider adoption of AI in sensitive engineering environments.

BENEFITS

- Expansion of SSC's portfolio into AI-driven automation for engineering workflows.
- 92% reduction in time required to extract key metadata from CAD drawings.
- Up to 96% reduction in manual review effort compared to traditional processes
- Improved data quality through automated validation against PDM systems
- Development of advanced AI and HPC expertise among 3–4 SSC employees.