MicroNova
Software and Systems

Optimal use of artificial intelligence

More efficient operating processes through data science and machine learning

- **Mastering challenges around the use of AI**
- **Identify potential for improvement in the company**
- **Significantly accelerate processes with AI-supported automated tests**

Through the correct use of artificial intelligence (AI) and data science, many operating processes can be made significantly more efficient - especially with regard to the validation of autonomous driving functions. Data science is an important prerequisite for the development of AI systems. With the help of data pre-analyses and workshops, MicroNova's consultants identify the specific potential for improvement in your company.

In the field of artificial intelligence, in particular Narrow AI, MicroNova offers services around Machine Learning (ML) and focuses here primarily on so-called Deep Learning.

Deep learning uses algorithms that allow a system to train itself to perform specific tasks. Especially in software development, AI-supported automated testing can significantly accelerate processes.

Whether building the necessary IT infrastructure for scalable AI solutions or optimizing existing AI initiatives: We are looking forward to supporting you in your challenges around the use of AI.

AI services at a glance

Data Science: Beratung

Business Understanding

- Identification of problems and KPIs
- Expansion and optimization of existing AI initiatives
- Synchronization of the AI strategy with business objectives
- Transformation planning taking into account existing processes and infrastructure

Data Cleaning, Data Mining, Data Exploration

- Data collection and preparation
- Labeling via classification

Feature Engineering

- Definition of the relevant parameters for a particular problem
- Definition of the data required for a solution
- Development and implementation of the algorithms

Predictive Modeling

- Postprocessing of results from existing models
- Performance analysis of existing models
- Development and implementation of the algorithms

Data Visualization

- Graphics
- Simulations
- Visualization e.g. with the Cluu-Framework*

*) For information on „Data Management with Cluu" please refer to https://www.micronova.de/en/testing/individual-software-development/data-management-cluu.html

Consulting on the use, evaluation and comparison of algorithms

- Which algorithm fits which question?
- Which key figures are available for certain algorithms?

Trainings

- Basic introduction to Reinforcement and Supervised Learning
- Lectures on Reinforcement and Supervised Learning

Machine Learning: Reinforcement Learning, Supervised Learning, Unsupervised Learning in Kombination with Regression

Selection of suitable technologies and methods

- Analysis of the operational processes
- Innovation workshops and data pre-analyses

Use cases for AI

Simulation models

The creation of a so-called digital twin accelerates vehicle development, since ECU software can be tested in a virtual environment - without the need for a real prototype. This approach therefore requires an increasing number of simulation models. Especially with regard to autonomous vehicles, such models can virtually cover a wide range of different scenarios and factors.

Neural networks are particularly suitable for vehicle components that are difficult to reproduce with physical modeling, such as individual parts of an engine. MicroNova Consulting supports companies in data analysis, in the selection of suitable AI technologies for modeling, and in the integration and validation of the individual model components.

Test of AI

The validation of AI systems in vehicles - especially driver assistance systems and autonomous vehicle functions - requires new test methods, such as scenario-based testing. The test environments required for this purpose must be able to integrate the ECU software and must also be massively scalable in order to carry out the high test efforts for autonomous driving functions in an acceptable time. MicroNova Consulting supports you with the conception, introduction and further development of processes, methods and tools for AI-based systems for autonomous driving. Other areas of application include functional safety according to ISO 26262 or the ASAM standard OpenSCENARIO.

Error Mining

One of the challenges in testing autonomous vehicles is how to evaluate the large amounts of test results in a meaningful and practical way. MicroNova Consulting supports the design and implementation of appropriate solutions.

Sensor data analysis

For a vehicle to be able to move autonomously on the road, it must be able to recognise its surroundings and to decide correctly which path it must take or which reaction is required. MicroNova Consulting supports companies in the design of solutions for object recognition, e.g. traffic light recognition, and in the calculation of routes based on trajectories.

Our experience – your advantage

Die MicroNova consultants have many years of practical experience in their respective fields and have direct access to our experts in hardware and software development as well as testing. With MicroNova Consulting you get not only consulting, but also the knowledge and experience from more than 30 years of automotive engineering.

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