AI Health Services

FUSE-AI

Editorial

FUSE-AI was founded with the vision of using AI-supported software to optimise image evaluation in radiology in order to increase diagnostic quality and improve the quality of patient care.

We are listed with the German Federal Institute for Drugs and Medical Devices (BfArM) and have been certified according to **DIN 13485** for the production of medical software since 2023.

Our **team of developers** consists of software developers, system administrators and machine learning engineers from the fields of medical technology / informatics and physics. In addition, scientists from areas such as Medical Advisory, Medical Affairs and Medical Device Standards & Regulatory Affairs are integrated in our team.

"The intelligent algorithms of Prostate.Carcinoma.ai are a real added value for our radiological reporting workflow. Thanks to the software with integrated AI, our findings have a higher quality and the process is sped up."

Dr Felice Burn, KSA Aarau, Switzerland

Research at our universities is the first step in the economic value chain. However, innovative results from the research groups too rarely enter the economic cycle. This is all the more painful because German scientists are able to demonstrate their great capabilities internationally time and time again.

But innovations are not an end in themselves. New approaches in science must diffuse into society. Patents should become more public.

The reason for that is that the German economy is urgently dependent on innovations in order to survive in global competition.

Therefore, it is necessary to increase political efforts to promote the transfer from the university to the economy.

But the business community with its trade associations should also promote interactive exchange with universities and research institutes. To this end, it is necessary to institutionalise this exchange and to ensure a continuous dialogue.

*Photo: **Dr. Sabrina Reimers Kipping**, Co-Founder, Head of Medical Affairs, **Juri Rohde**, COO, Head of Regulatory Affairs*
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AI in Bioinformatics

Random Forest, Feature Selection, PCA or Clustering - Which method suits your analysis?

The use of artificial intelligence in bioinformatics is driving progress in applied biotechnological research as well as in drug development and personalised medicine.

Machine learning methods from the sub-field of AI in computer science are used where statistical methods reach their limits:

Knowledge generation and pattern recognition with Unsupervised Learning

Patterns can be recognised from large data sets and new knowledge can be generated. **Unsupervised Learning** methods enable, for example, clustering of features, dimensionality reduction of large data sets, extraction of relevant information and more. We use methods such as PCA, k-means clustering, hierarchical clustering, anomaly detection, manifold learning and neural networks (self-organising maps, GAN).

Making predictions with Supervised Learning

Supervised Learning is used, for example, to make predictions. Typical questions are those to predict classification or regression. These include the predictions of an abnormal finding, of healing prospects or of the distribution of drug side effects. We use, for example. linear models, ensemble methods, decision trees, random forest and feature selection.

This is what we can provide for you

- We develop **concepts** and establish standards for storing data sets in databases as a basis for data analysis. In doing so, we support the transfer of knowledge between biotechnology, computer science and artificial intelligence.

- We carry out **data analyses** on questions from oncology and multifactorial diseases using machine learning methods, in particular PCA, clustering, Deep Learning.

- We develop **computer vision systems** for intelligent image analysis of medical images (e.g. microscopy, radiology, sonography) with deep learning models.

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Data Science

Would you like to evaluate data from your company to create added value?

Based on our extensive experience with data analyses in the biotechnological, pharmaceutical and medical sectors, we offer you our support in the evaluation of your data. With increasing digitalisation, more and more information from different areas is available to companies.

In order for you to be able to draw added value, for instance, to improve research, marketing or business development, the data has to be analysed. Due to the amount of data and the complexity of possible procedures, this cannot always be guaranteed with internal company resources.

Evaluation and visualisation of company data

For our clients such as Olympus Europa SE & Co. KG or saniva diagnostics GmbH, among others, we have structured and processed historical medical procedures, market and sales figures in various **market intelligence projects**, as well as created forecasts and presented the results in a dashboard.

We also support **research and development activities** by analysing extensive sensor data from laboratory experiments using methods of explorative data analysis, signal processing and feature extraction.

This is what we can provide for you

- **Consulting** in the area of Business Intelligence / Data Analysis / Data Science

- **Preparation of data** for further analyses

- **Carrying out data analyses for R&D**, marketing and business intelligence

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Medical Image Recognition

Do you have an idea for a product or process improvement through AI?

Do you need a partner for the implementation of your idea? If you want to find out whether your idea is feasible and which prerequisites are necessary for implementation, you're welcome to ask us. Or do you lack the internal capacities, experience and processes to develop machine learning and deep learning methods yourself? In this case we are your service provider. Artificial intelligence in the healthcare industry can make a difference in many places: Intelligent software can improve medical care, support doctors and nursing staff, ensure quality, automate processes and save costs.

FUSE-AI aims to improve diagnostic decisions.

To achieve this goal, we are pursuing two paths: on the one hand, we are developing our own **Deep Learning-based software products** for medical image analysis. On the other hand, we support companies in creating their own added value in medical care.

With our experience in analysing cross-sectional images (MRI and CT), X-rays and microscopic images and our knowledge in segmentation, classification and prognosis, we are an ideal partner for your AI idea.

This is what we can provide for you

- Feasibility checks for your AI idea

- Defining the requirements for your AI software development project

- Development of AI software as an external partner, especially in the areas of unsupervised learning for data analysis (principal components analysis (PCA), clustering, regression analyses) and medical image analysis (object detection, semantic segmentation and classification).

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Partners in Research

Are you looking for a partner for your research project in the field of medical image analysis?

Both companies and universities benefit from strategic research collaborations with regional, national and international partners from science and industry. We therefore see great added value in active cooperation in research networks and alliances. We also participate in applying for funding for collaborative projects, especially in the field of medical image analysis.

Product development UltraWear: Medical app for AI-supported bio-feedback in physiotherapy

FUSE-AI is involved in the product development of a novel medical app called UltraWear. This app provides patients with chronic back pain with AI-supported feedback through the use of ultrasound to support the correct execution of physiotherapeutic exercises. The product development is operated by an interdisciplinary team with the **Fraunhofer Institute for Biomedical Engineering (IBMT)**, among others. The project is funded by the Federal Ministry of Education and Research.

AI-based Diagnostics: prostrate cancer

FUSE-AI and the **University Hospital Jena UKJ** have been developing a cost-saving assistance system for MRI diagnosis of prostate cancer using deep learning methods since April 2020. The aim of the cooperation is to develop and validate a deep-learning-based assistance system for the diagnosis of prostate cancer. The cooperation is funded for two years by the **Central Innovation Programme for SMEs ZIM** of the Federal Ministry for Economic Affairs and Energy.

This is what we can provide for you

- Developing AI algorithms to analyse medical images

- Developing algorithms for prediction

- Developing unsupervised learning methods for the analysis of unlabelled data, e.g. clustering.

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FUSE-AI

ISO
13485
Quality Management System
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