FRANKFURT
UNIVERSITY
OF APPLIED SCIENCES

Press release

Making ophthalmic lens production in Germany attractive and profitable
Application-oriented implementation of digitalisation, Industry 4.0 and artificial intelligence in plant engineering and industrial production

Frankfurt am Main, 11 December 2023. How can the processes involved in the production of ophthalmic lenses be optimised in such a way that high quality is maintained while costs are reduced? The Industrial Data Science (INDAS) research group at the Frankfurt University of Applied Sciences (Frankfurt UAS) is addressing this question in the "smart_coating@INDAS" project. Together with two partners from the field - the plant manufacturer Bühler Leybold Optics in Alzenau and the lens manufacturer Optovision in Langen - the group has applied data mining to the data provided by the partners. By automatically analysing the data, it was possible to discover regularities, irregularities and hidden correlations. Specifically, an anti-reflective lens coating machine was scrutinised. Deficiencies and gaps in the standard process were described and research approaches developed to rectify and close them.

"Our main aim is to keep Germany an attractive location, as many companies in the lens manufacturing sector are relocating production to Eastern Europe. With our project, we want to contribute to process stability and thus enable the manufacturer to offer high quality and remain competitive. The company involved in Langen continues to manufacture in Germany and has no plans to outsource," explains Prof Dr Jörg Schäfer, who is supervising the project at Frankfurt UAS together with his colleague Prof Dr Dirk Stegelmeyer and several doctoral students. "The project is a successful example of a successful three-way constellation in the Rhine-Main region: university - plant manufacturer - production company, and it also ideally combines the two teaching and research areas of computer science and mechanical engineering at our university," adds Stegelmeyer. It was always important for the research group to compare the ideas for process optimisation with the real conditions and to check their feasibility. For example, a regular cleaning process for the machine had to be taken into account when analysing the entire production process. The aim was to find out how much the number of lenses to be produced could be increased using digitalised processes in front of a cleaning window without compromising the quality of the end product. One of the biggest challenges of the project was to establish the optimum quality parameters. The research group divided the optimisation process into a total of five levels: Levels 1 and 2 are now already being successfully implemented by the company, but it will probably be some time before all five levels can be fully realised, according to Schäfer.

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Further information on the INDAS research group can be found at: www.frankfurt-university.de/indas

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Industrial Data Science Research Group (INDAS)

INDAS (Industrial Data Science) was founded in 2018 and is an interdisciplinary research group that emerged from a collaboration between the Computer Science and Mechanical Engineering clusters at Frankfurt University of Applied Sciences. The group aims to bridge the gap between applied data science and Industry 4.0 by focusing on machine learning in industrial use cases - including (but not limited to) predictive maintenance, quality and productivity. Specifically, INDAS seeks to address Industry 4.0 problems related to predictive maintenance from the perspective of data and computer science and develops machine learning solutions for industrial processes.

Caption: Digital process optimisation for the perfect ophthalmic lens
Image source: Bühler Leybold Optics

The Frankfurt University of Applied Sciences (Frankfurt UAS):

With around 15,200 students and over 1,000 employees in teaching, research and central service units, Frankfurt University of Applied Sciences is one of the largest universities of applied sciences in Germany. "Opportunities through education" are lived here. Diversity and social responsibility are the university's values. Practical relevance, interdisciplinary education, international orientation and regional integration characterise its profile. Excellent quality of teaching and research is the aspiration. Through partnerships with around 200 universities worldwide, Frankfurt UAS is well networked in a global education world. Four faculties offer 72 degree programmes with a technical, economic-legal and social focus. A diverse continuing education programme also enables external students to pursue lifelong learning while working. In addition, demanding, inter- and transdisciplinary research is carried out in unusual subject combinations. In dialogue with partners from industry, associations and institutions, Frankfurt UAS is an innovative development partner for the joint generation of forward-looking solutions. The close link between research and teaching and practice qualifies students for a successful entry into attractive professional fields and ensures their ability to make connections in everyday working life. Founded in 1971 as Frankfurt University of Applied Sciences, the university campus is located close to the city centre in the heart of Frankfurt.

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