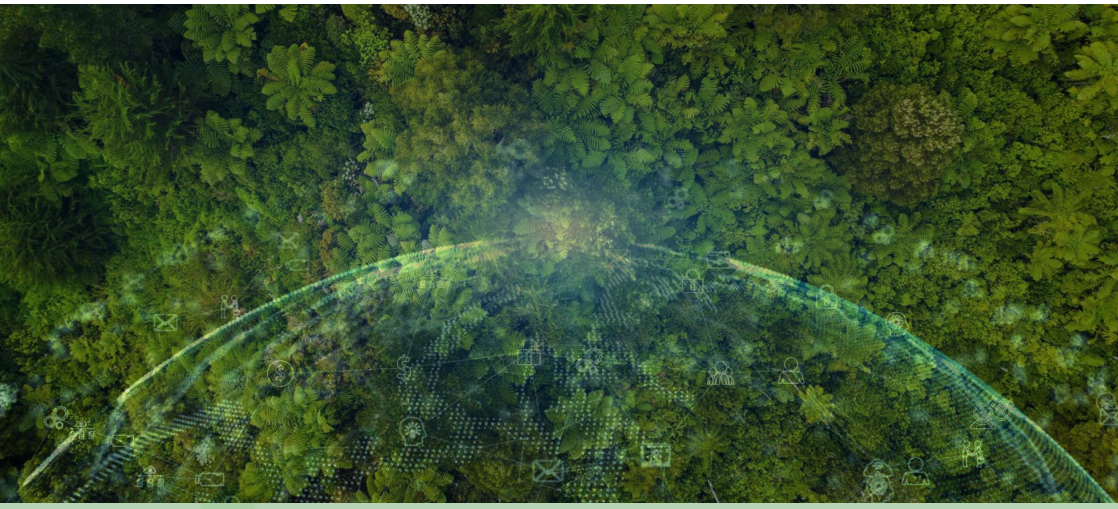
REDUCE



REDUCE -

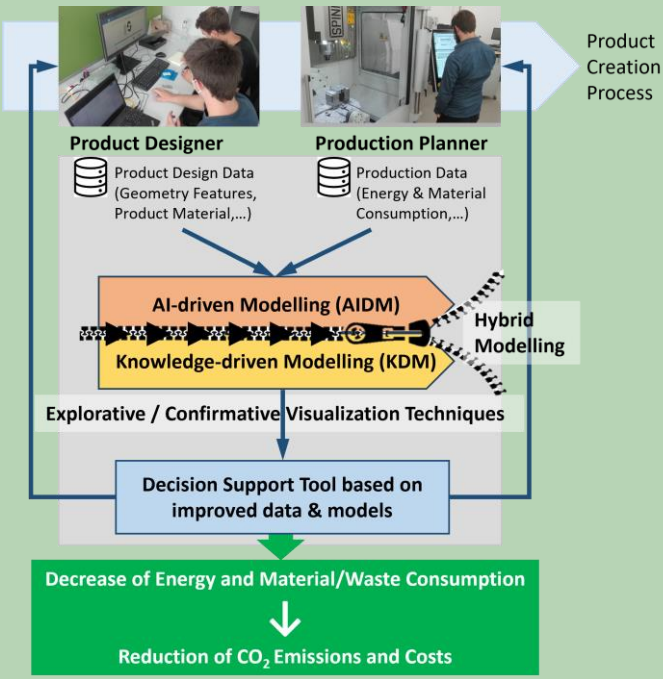
Reduced Carbon Footprint using Explainable AI for Human Empowerment in Design/Engineering and Production

reduce.pro2future.at

PROJECT OVERVIEW

Austria's and Europe's manufacturing industry is currently facing enormous pressure to reduce its CO_2 emissions. Digital transformation may help, thereby enhancing competitiveness in terms of both ecological and economic considerations, through the utilization of digital tools for sustainable product design and production. However, ecological aspects are still rarely considered, largely due to the absence of a tool capable of accurately and precisely predicting the energy consumption of a product throughout the entire product creation process. As a result, the manufacturing industry currently estimates the ecological sustainability of products late in the design process, or even afterwards.

REDUCE is pioneering a change by creating a Decision Support Tool (DST) that helps product designers and production planners predict the energy and material/waste consumption, CO_2 emissions and costs associated with their decisions.



PROJECT GOALS & INNOVATIONS

Overall Project Goal of REDUCE

The **REDUCE** project aims to reduce CO_2 emissions and costs in product design and production and to increase the economic competitiveness of **Austrian manufacturers** by providing a **Decision Support Tool (DST)** based on **hybrid prediction models** for **energy and material consumption** (and related costs and CO_2 footprint) to empower product designers and production planners.

Specific Goals of REDUCE

- Develop a **new user-centered Decision Support Tool (DST)** to empower product designers and production planners to make informed decisions based on **energy and material consumption** predictions.
- Create **hybrid models for energy and material consumption** prediction through the synergistic **interweaving explainable AI-driven modelling (AIDM) with knowledge-driven modelling (KDM)**, based on accurate and precise data
- Provide explainability of data and models through **explorative and confirmative visualization techniques** incorporated into the DST.
- Generate **more accurate and precise data** by **AI-based disaggregation into product and production machine contributions** regarding energy and material consumption to make **machine-independent statements** about product-specific design attributes.
- Assess the **ecological and economic sustainability of product design solutions** using improved data and models and taking cost efficiency into consideration.

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