

AI for Real Added Value

Séminaire IA en ingénierie mécanique
04 Juin 2025



Agenda

Introduction

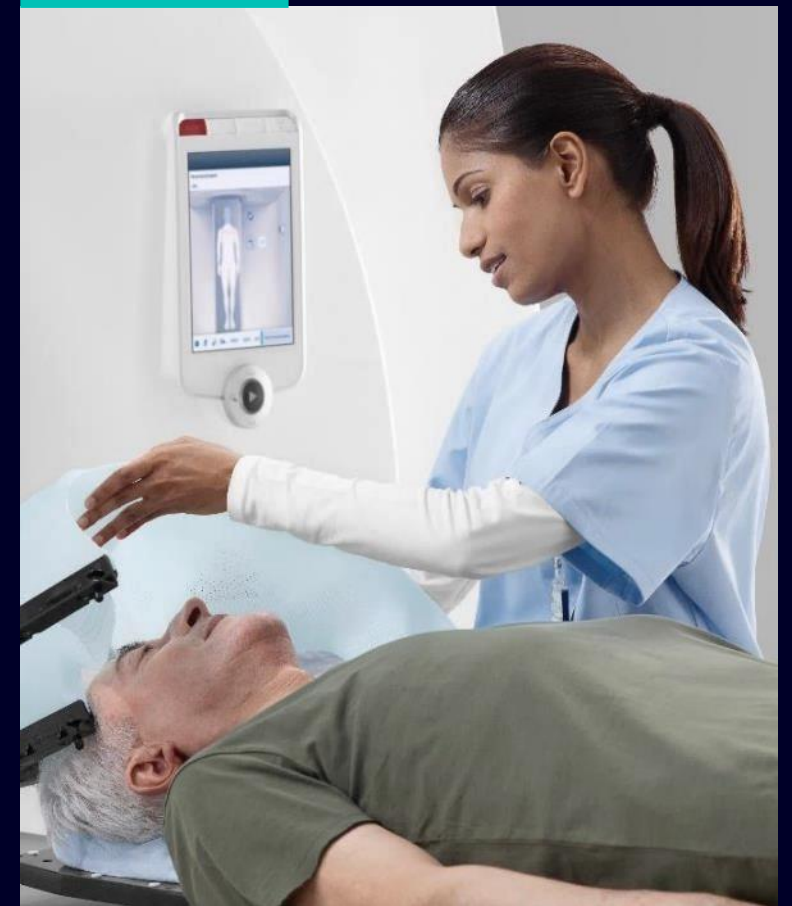
AI-enabled CAD

Generative AI

Conclusion

Introduction

Siemens, a leading technology company



Siemens makes AI ready for industry



Robust

Driving collaboration to achieve reliable, secure, and trustworthy AI for industry



Democratized

Making Industrial AI accessible to everybody, anywhere, and anytime

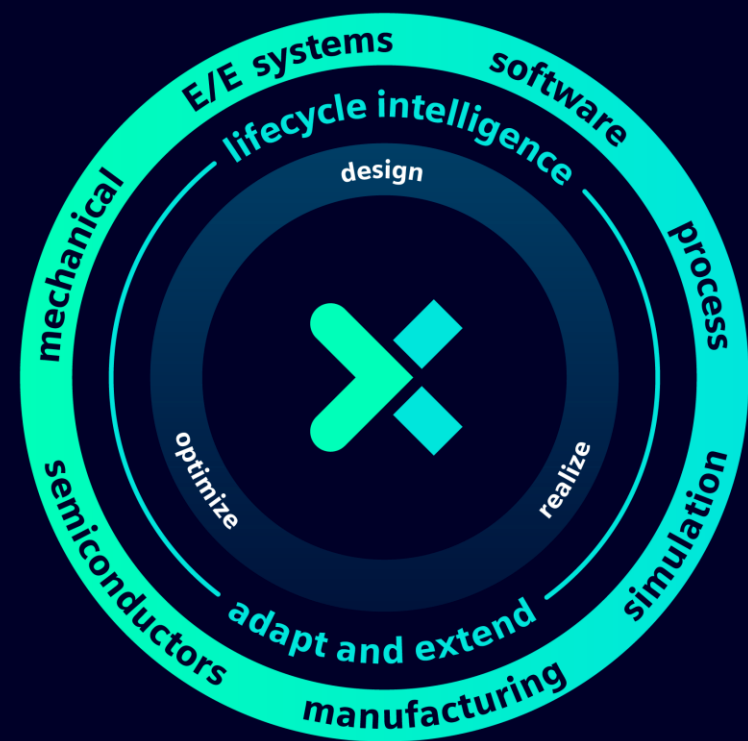


With purpose

Supporting companies to achieve their scalability, quality, and sustainability targets

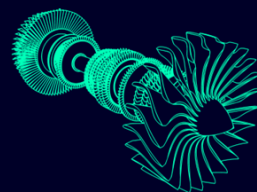
Siemens + Altair

Creating the world's most complete AI-powered design and simulation portfolio



Simulation and Analysis

Multi-domain simulation, generative design and optimization



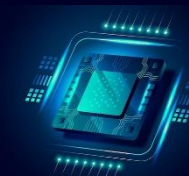
AI

AI-powered workflows to accelerate CAE and product development



High-Performance Computing

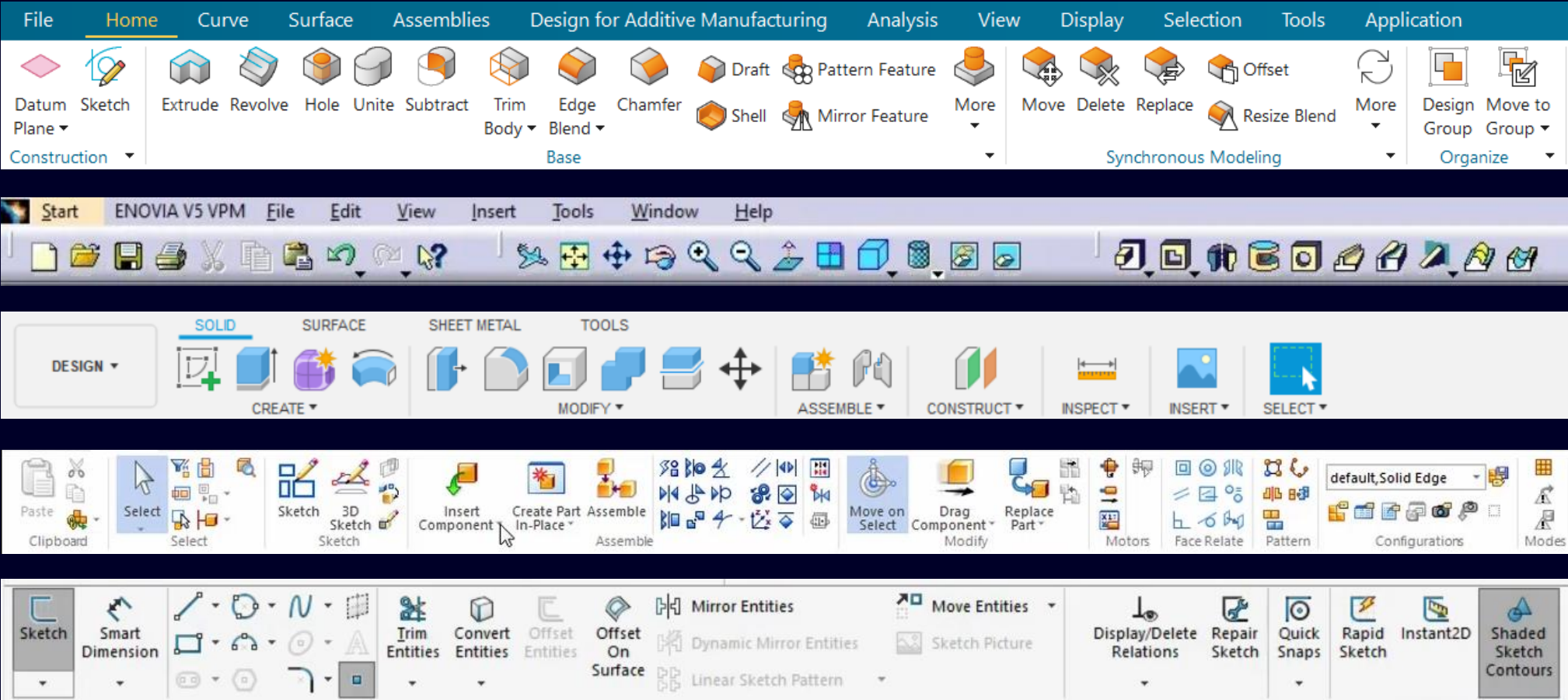
Scalable and optimized HPC platforms to accelerate simulation



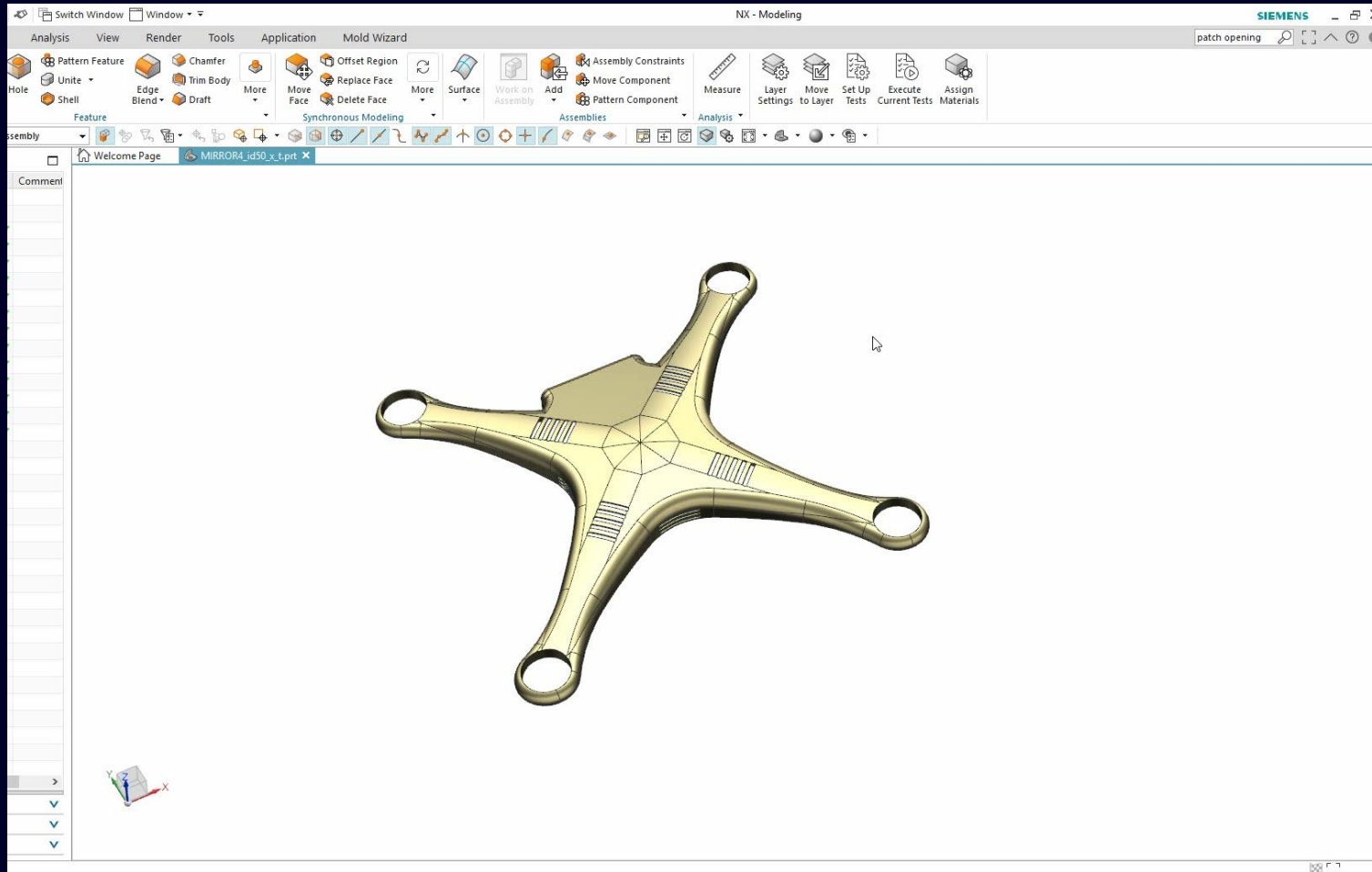
AI-Enabled CAD

Enhancing Design Efficiency with Siemens' NX

A Plethora of Toolbars



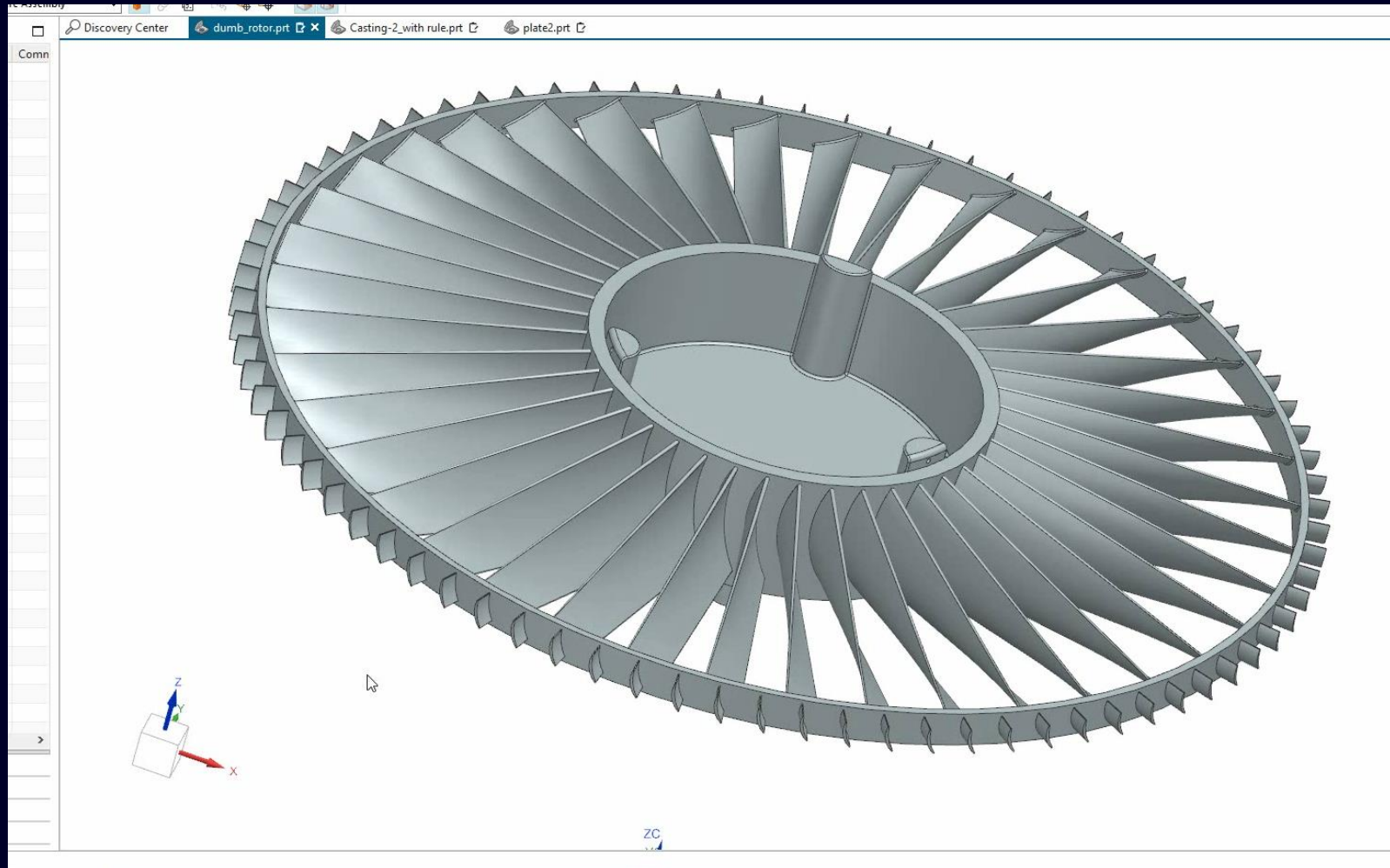
2019 - NX Command Prediction



Considers the user interactions and can detect the command repetition.

Provide best choices based upon what the user has done in the past.

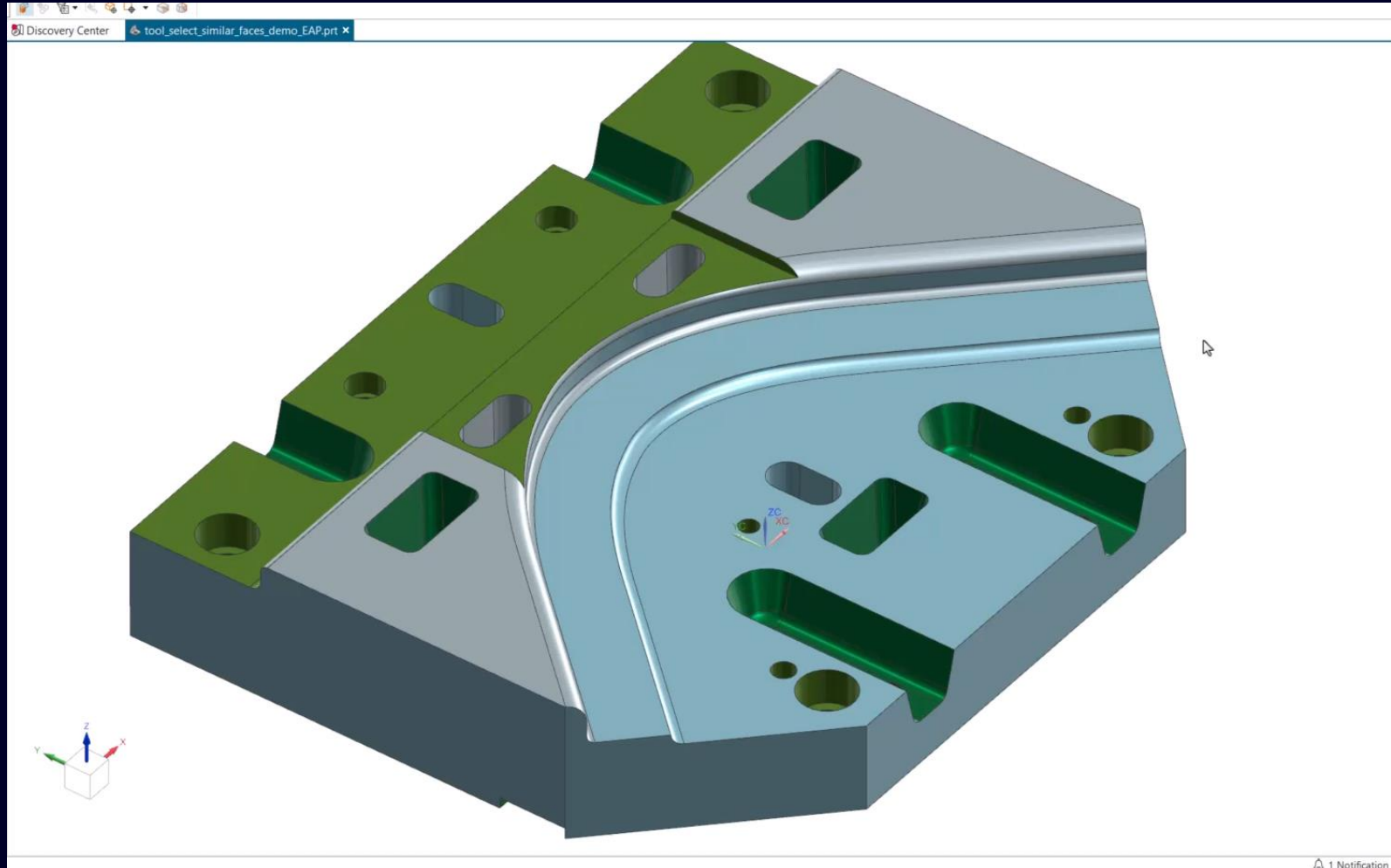
NX Selection Prediction



Selection prediction framework predicts input selection entities.

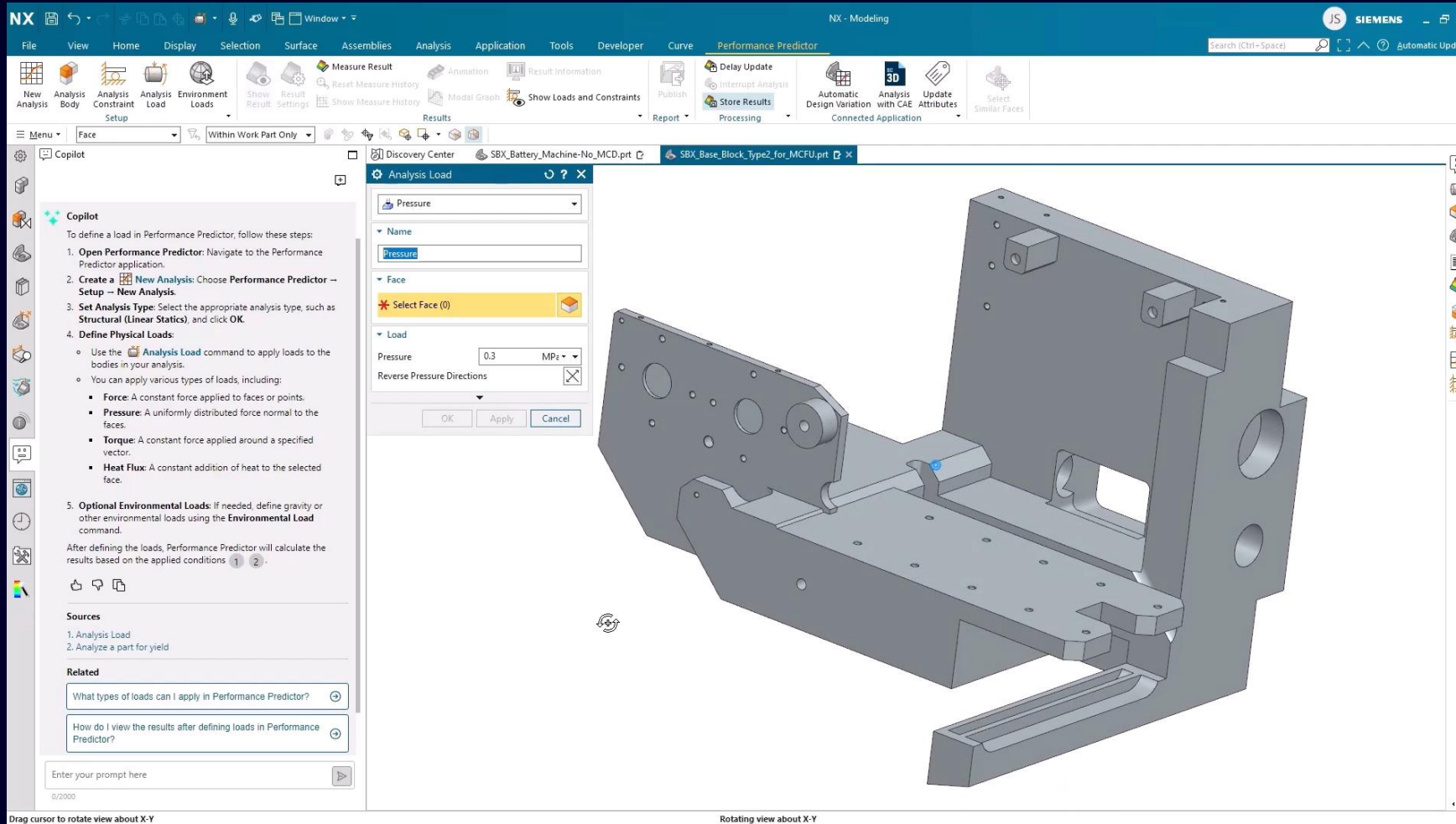
Allows designers to concentrate on engineering and not routine MCAD tasks.

NX Select Similar Faces



Perform operations on geometrically similar functional regions with reduced number of clicks

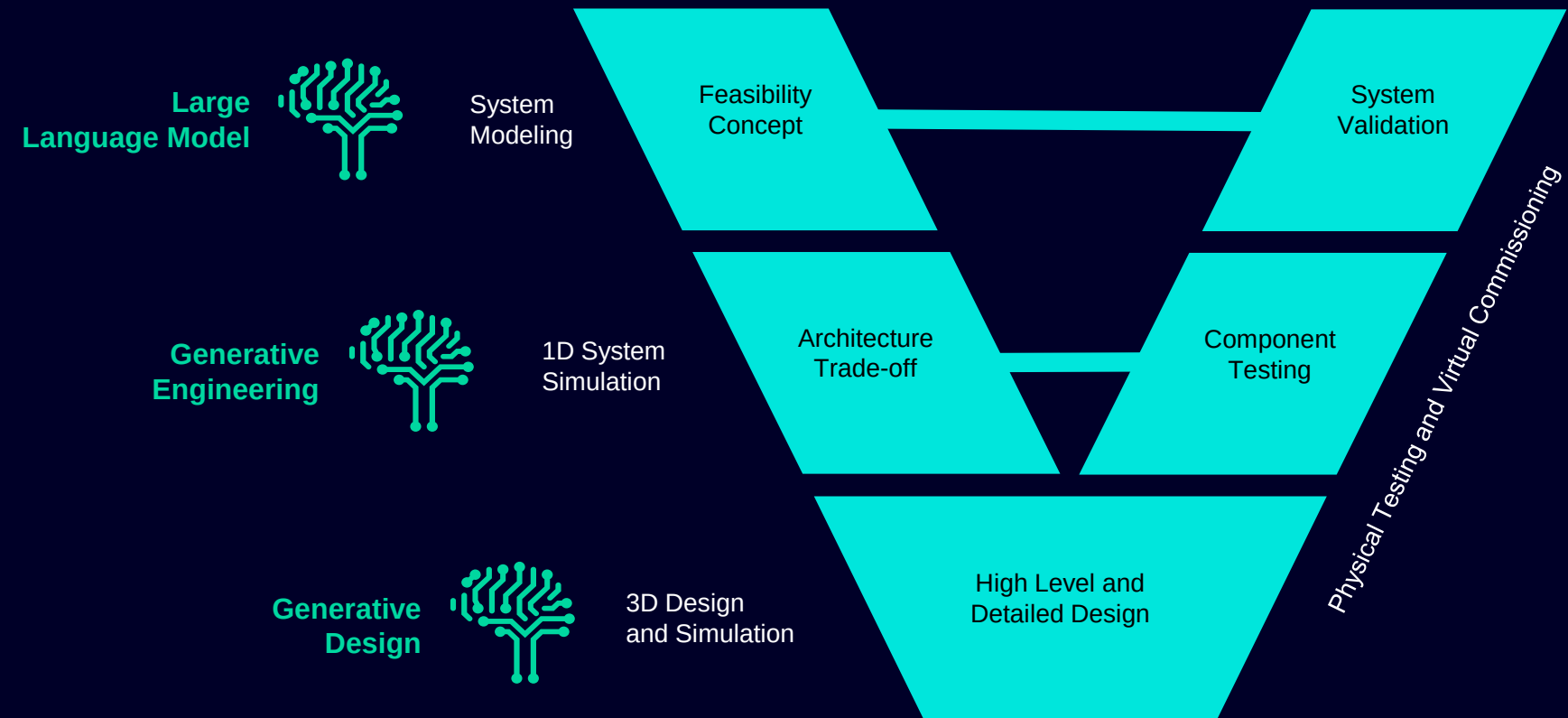
NX X Copilot



NX X Copilot enables users to ask natural language questions, access detailed technical insights and streamline complex design tasks

AI Generative Design

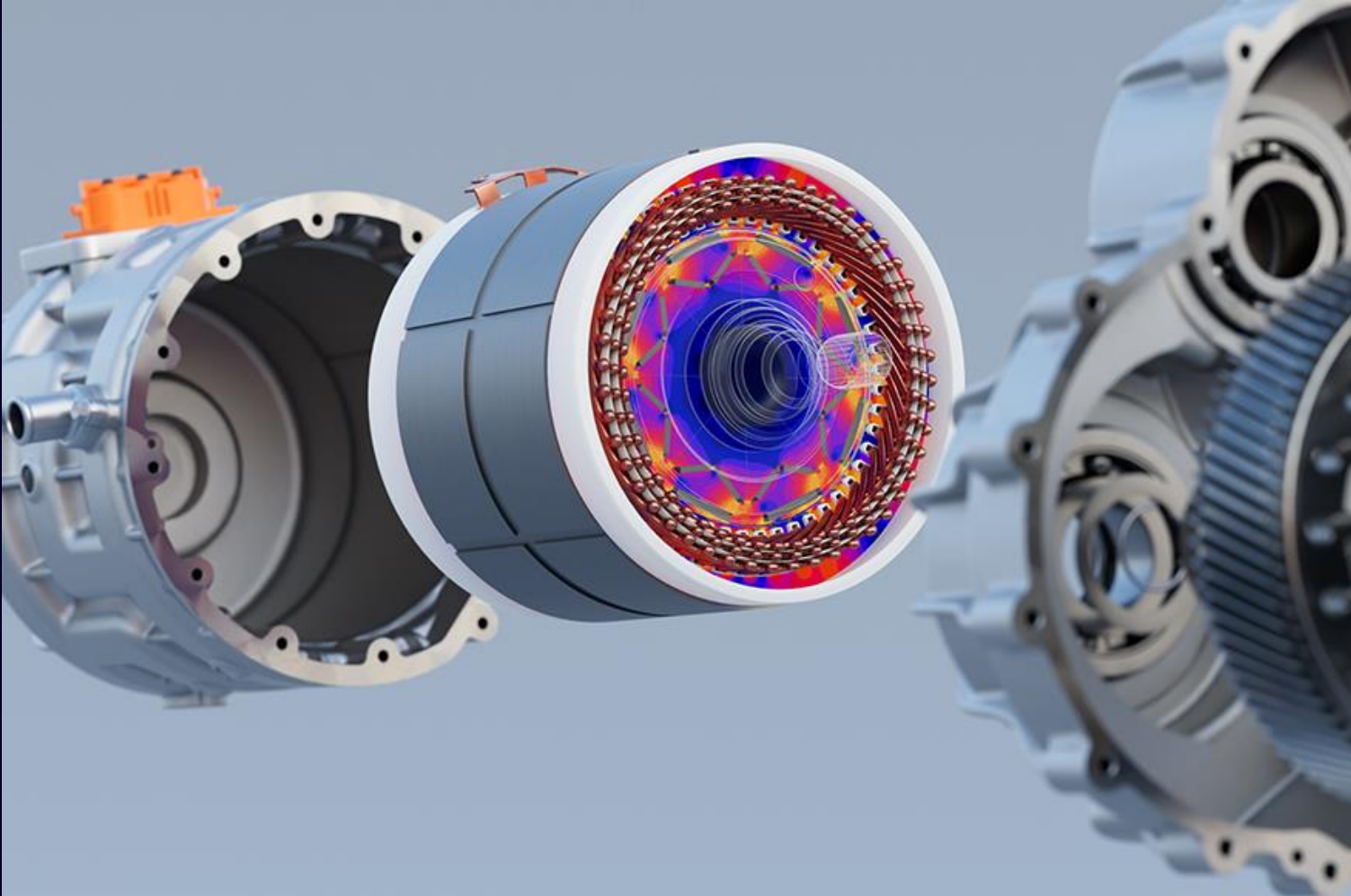
AI Generative Design



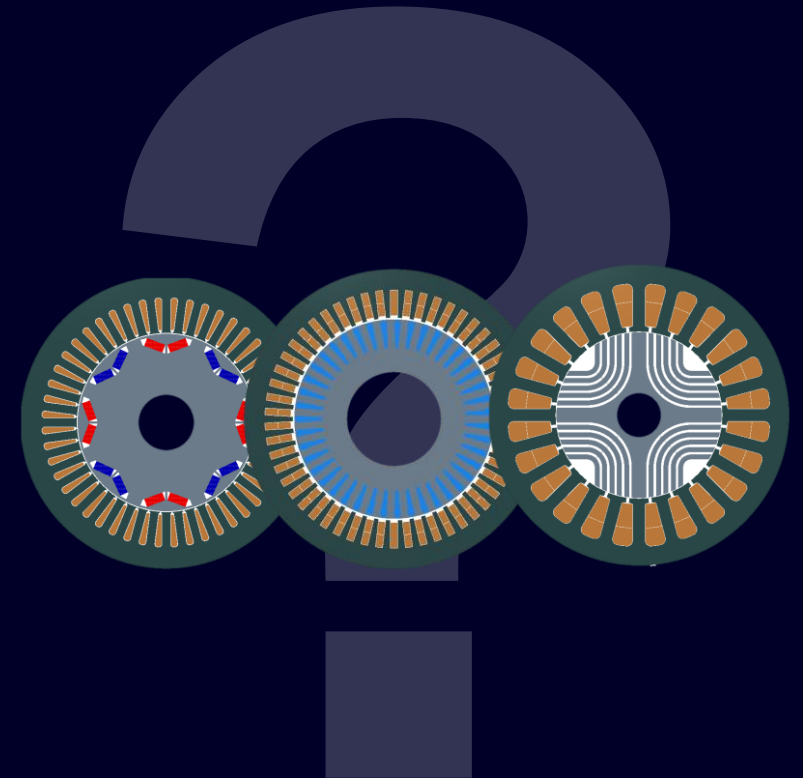
Is Generative Design AI ?



Multi-Physic Generative Design



Investigate **generative methods** to create E-motor designs with respect to initial requirements

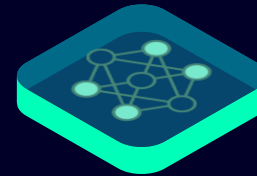


E-motor GenAi : Diffusion Models

The idea behind diffusion models is to teach them to undo a noise-making process.

Once trained, you give them noise and they ‘denoise’ it, generating a new image!

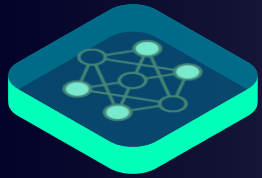
They are the state of the art in image generation, thanks to their high-quality generation and the ease with which they can be trained.



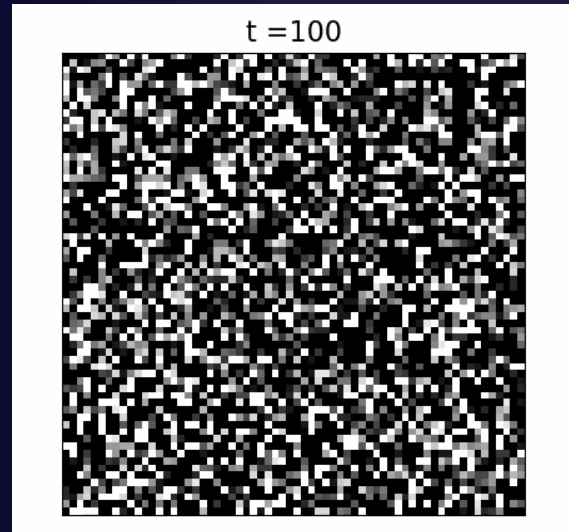
“Flower”



E-motor GenAi : Diffusion Models



“Rotor Topology”
“Torque Value”

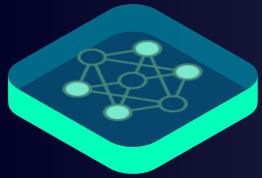


2D Rotor Generation
~160 ms

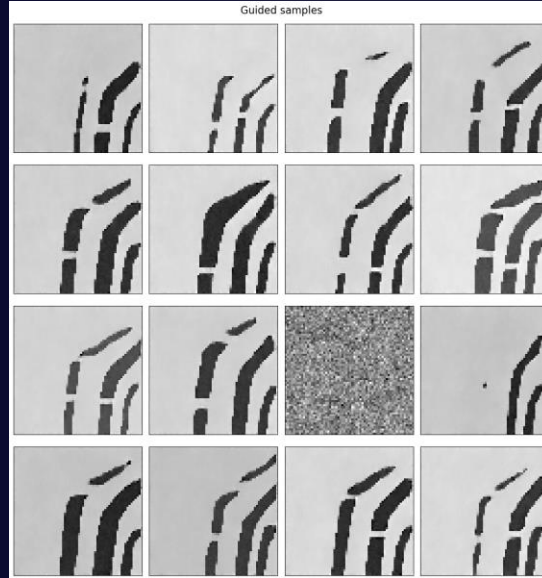


Interpreted Design

E-motor GenAi : Diffusion Models



“Rotor Topology”
“Torque Value”



Quickly generate
several designs

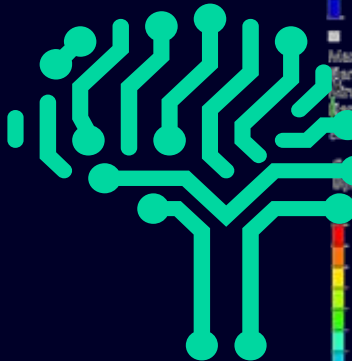


Interpreted Design

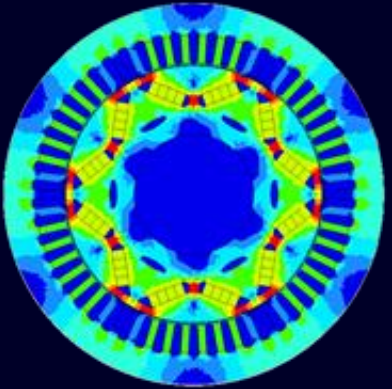
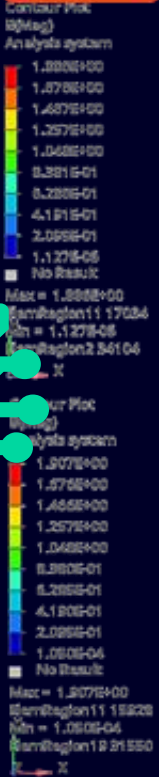
What's Next ?



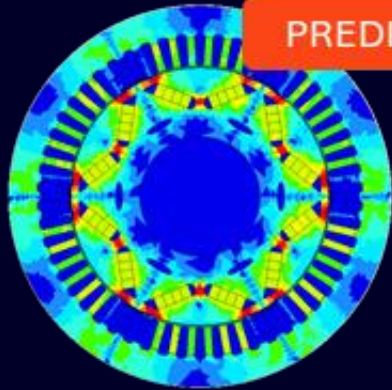
Interpreted Design



FEM



PREDICTION



Accurate torque and performance prediction

Conclusion

Training AI on the “Language of Engineering & Manufacturing”

Existing large language models



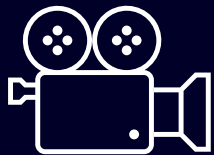
Text



Image



Audio

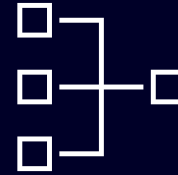


Video

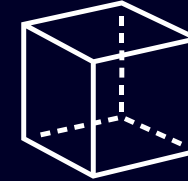


Code

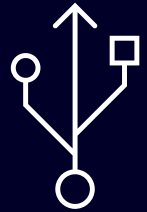
Siemens augmented models



System Design



Mechanical Design



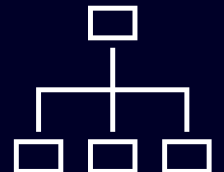
Electrical Design



Simulation



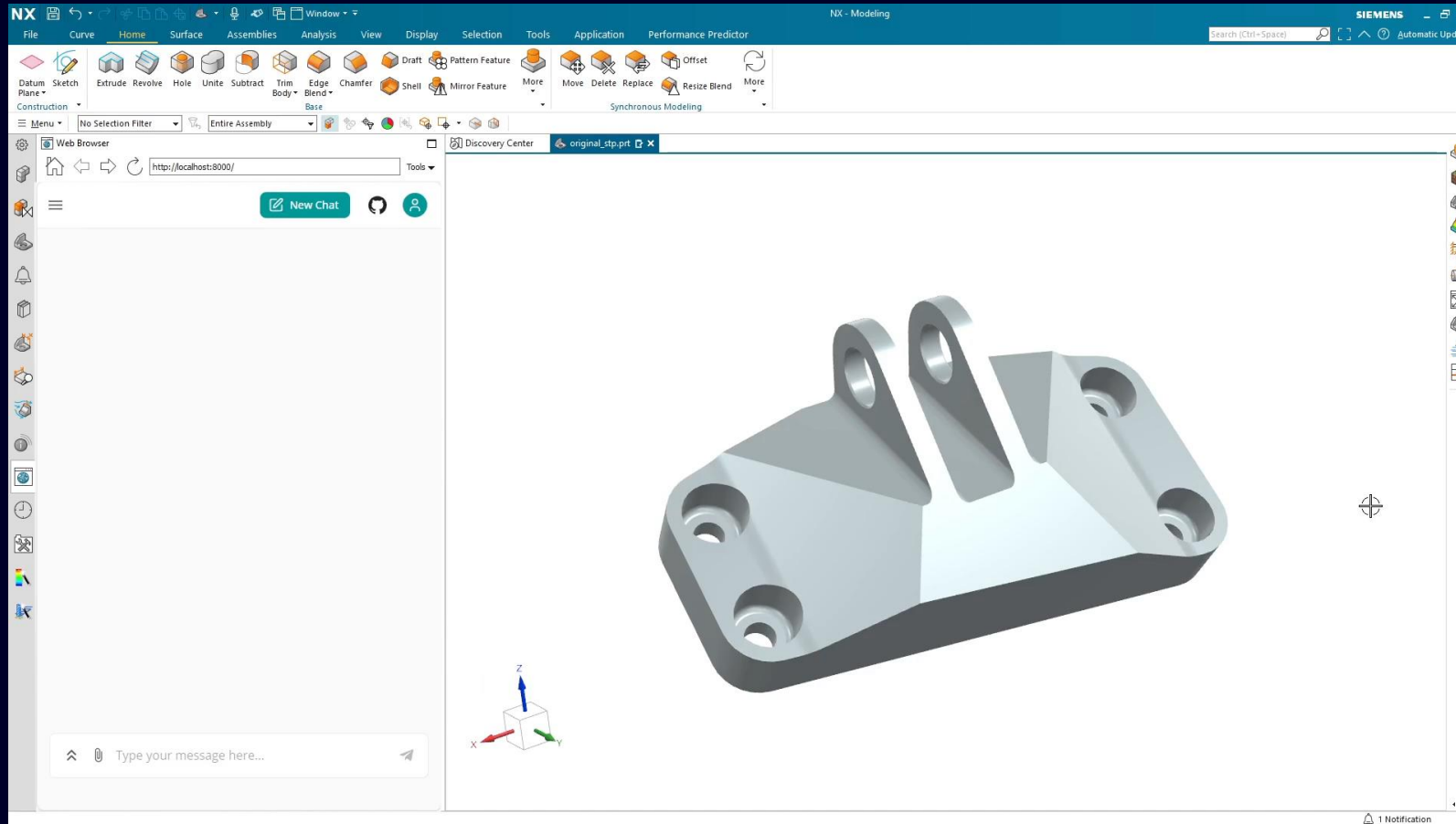
Manufacturing



BOM

Modalities

The Generative AI assistant



Challenge

Designer, Design Engineer
Boundary conditions are manually applied

Solution

Retrieve CAD information with
LBCs
Generative AI Data augmentation

Benefit

Democratization of the simulation
Better a better designer