Dlubal

Structural Analysis & Design Software

www.dlubal.com

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Webinar

Using AI with RFEM 6

Questions During the Presentation

GoToWebinar Control Panel
Desktop

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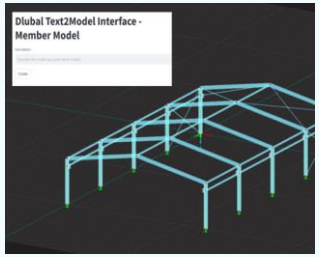
CONTENT



What is Artificial Intelligence?

“Popular Presentation” vs. Reality

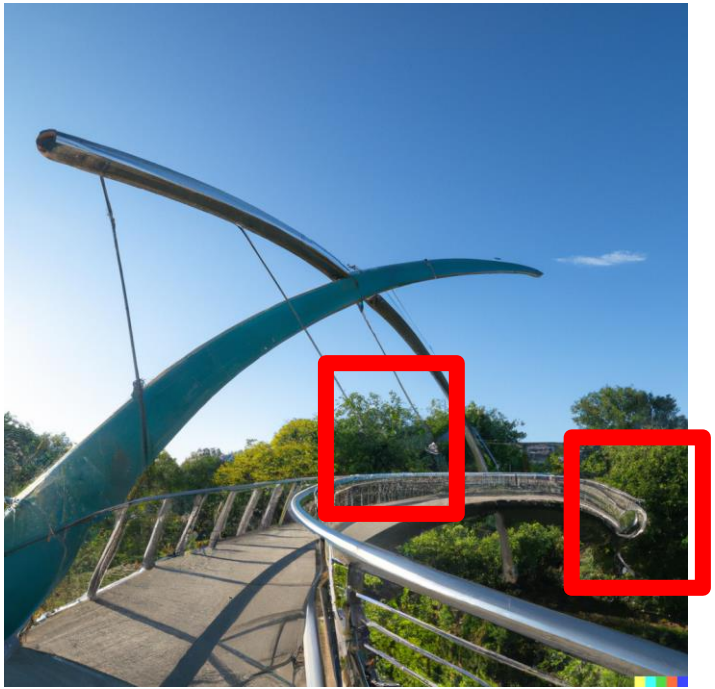
https://www.chitkara.edu.in/blogs/what-is-artificial-intelligence-and-future-scope/

https://incubator.ucf.edu/what-is-artificial-intelligence-ai-and-why-people-should-learn-about-it/

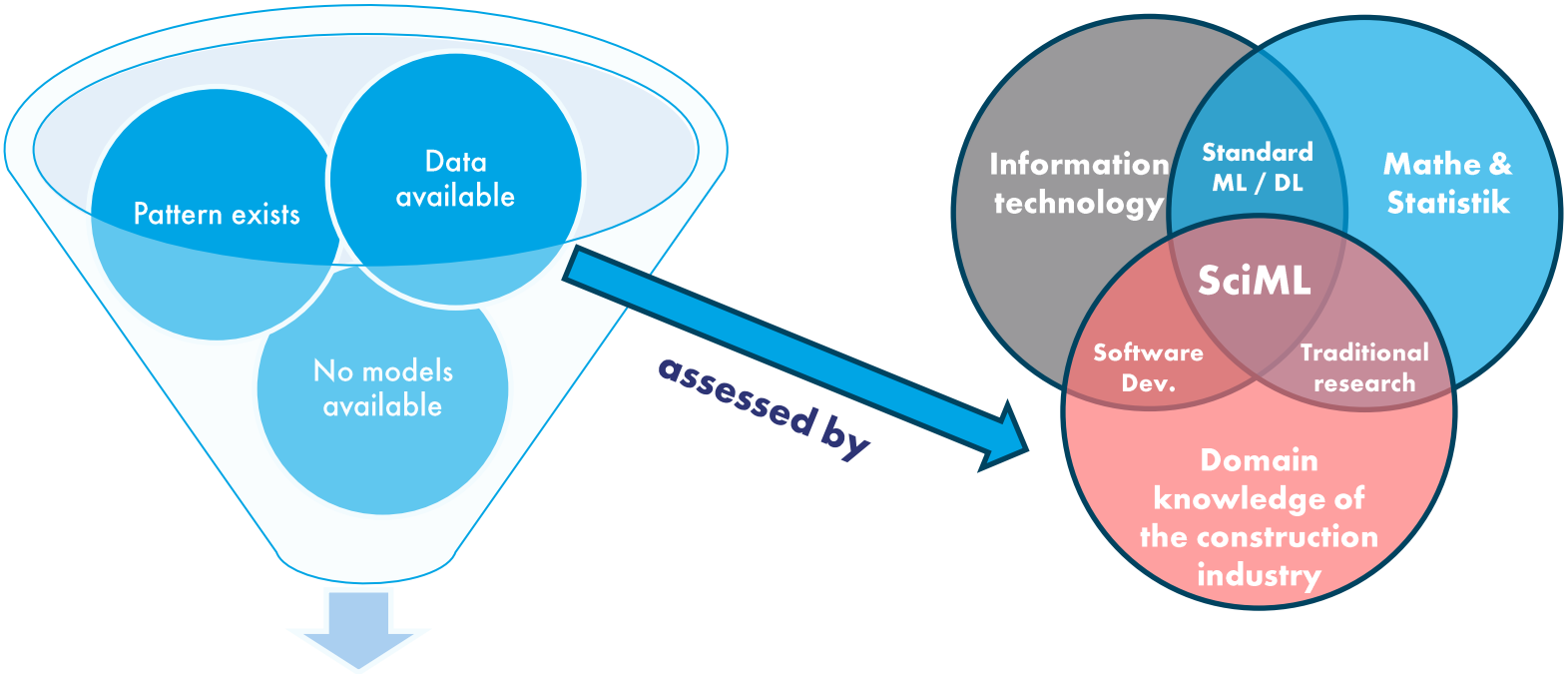
https://www.uni-potsdam.de/de/pogs/weiterbilden/data-science-und-ki

Why we deal with AI at Dlubal...

This is what DallE2 understands by a “sustainable concrete bridge over a river”

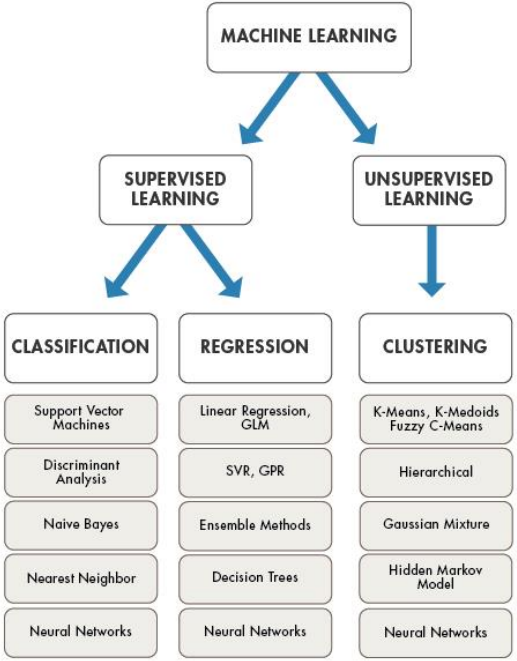


Ingredients of artificial intelligence (AI)

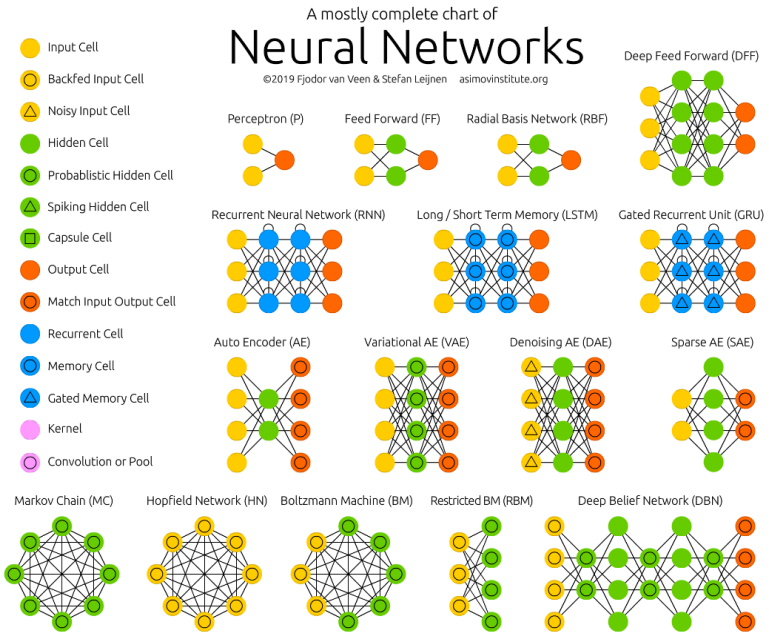


Necessary prerequisites for the (sensible) use of AI

Machine and deep learning algorithms (ML/DL)

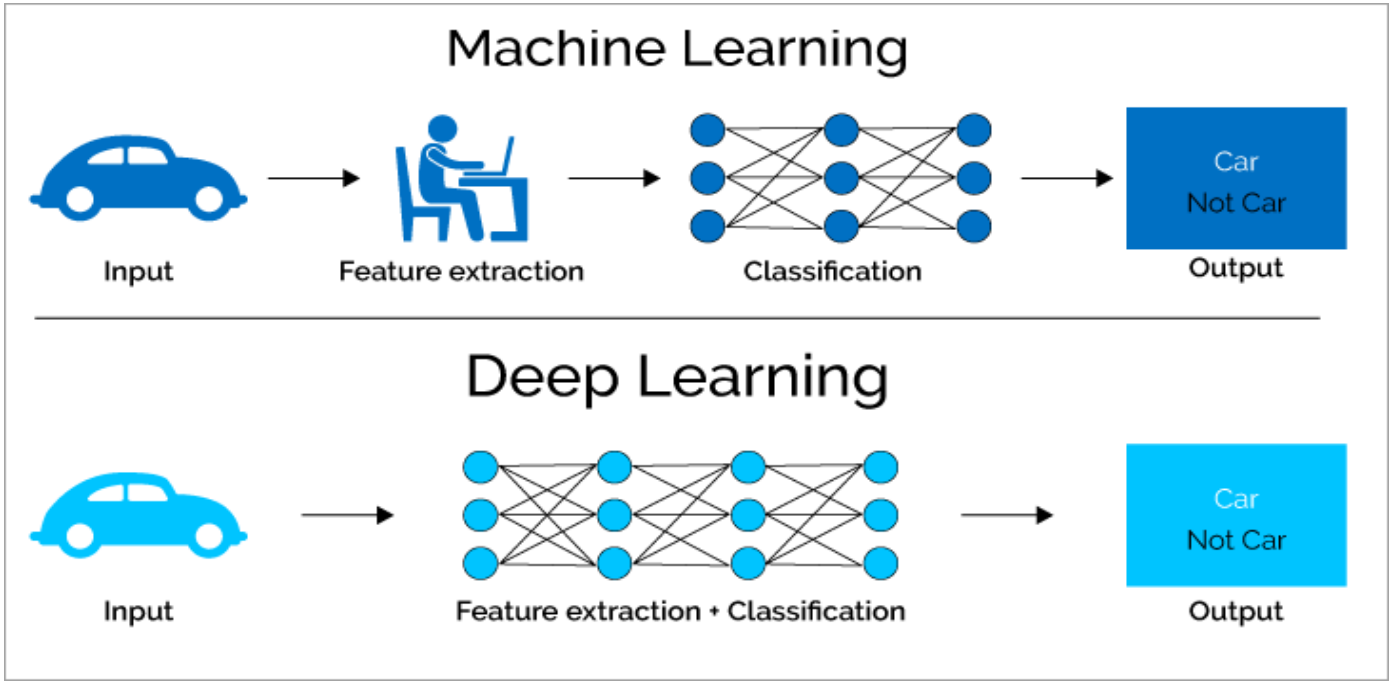


https://de.mathworks.com/help/stats/machine-learning-in-matlab.html



https://www.asimovinstitute.org/neural-network-zoo/

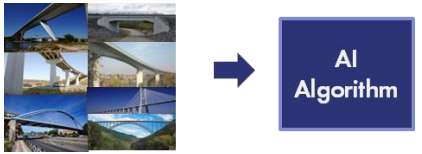
Difference between Machine and Deep Learning

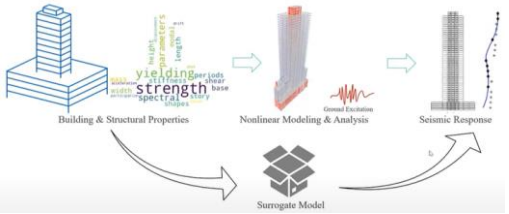


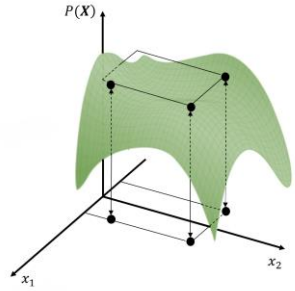
https://cdn.softwaretestinghelp.com/wp-content/qa/uploads/2019/04/DeepLearning.png

What should AI be used for in the construction industry?

- if empirical models are used anyway
- if the “physics-based” model is “incomplete”
- for mining databases
- to save time (e.g. meta- and surrogate models & optimization)

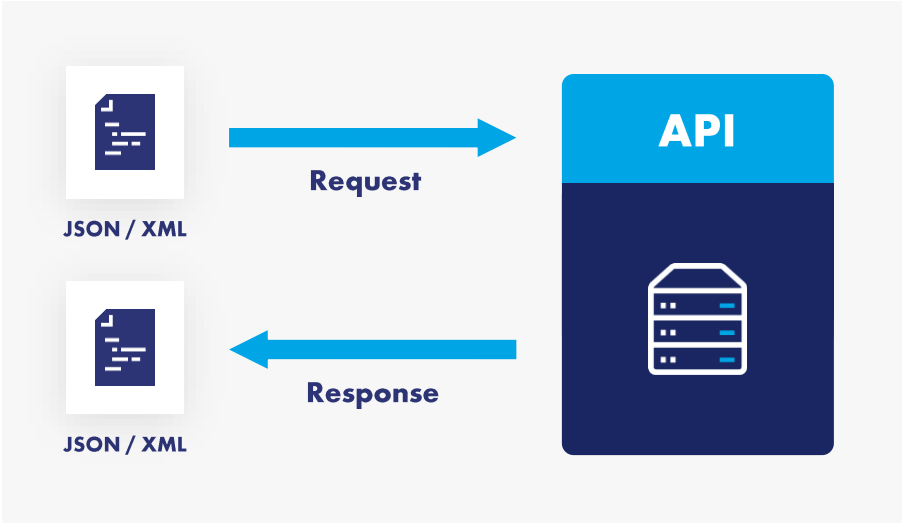




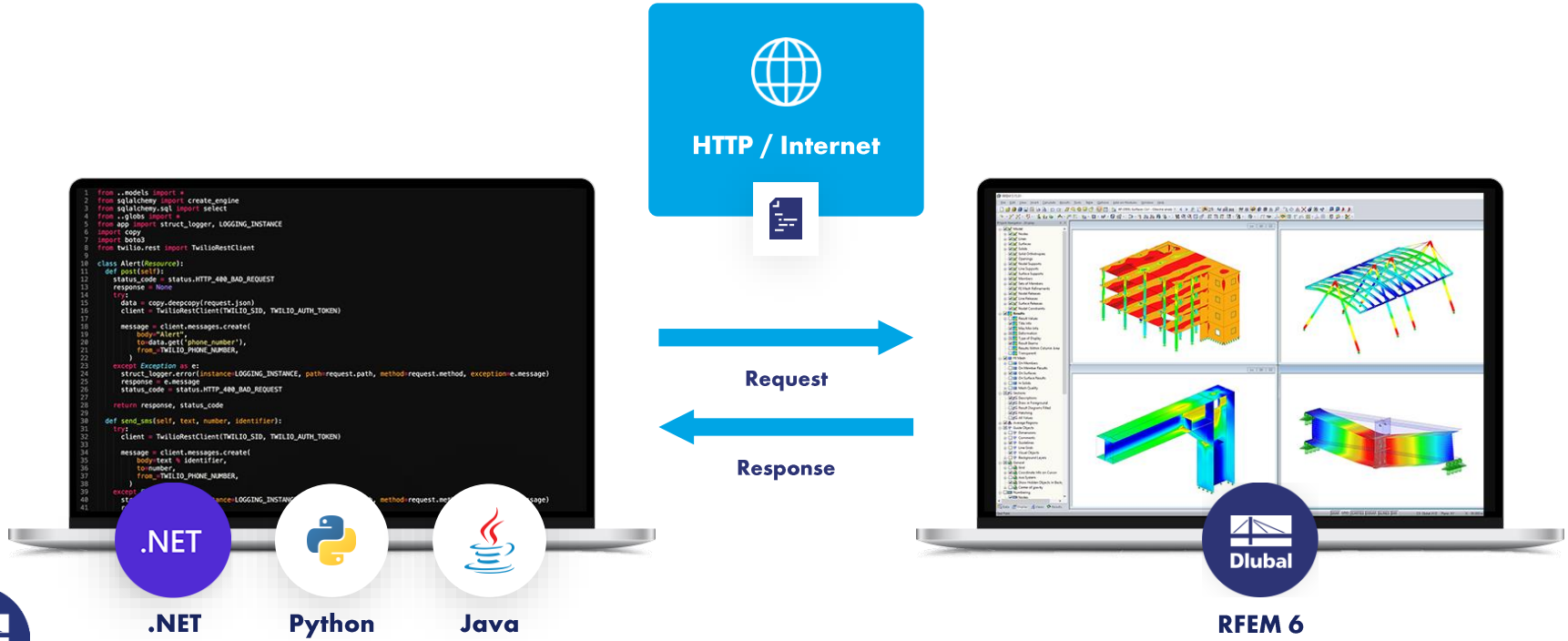


Balmer, Vera M., et al. "Design Space Exploration and Explanation via Conditional Variational Autoencoders in Metamodel-based Conceptual Design of Pedestrian Bridges." arXiv preprint arXiv:2211.16406 (2022).

What is an API?



What are Webservices?



Dlubal Github Repository

https://github.com/Dlubal-Software

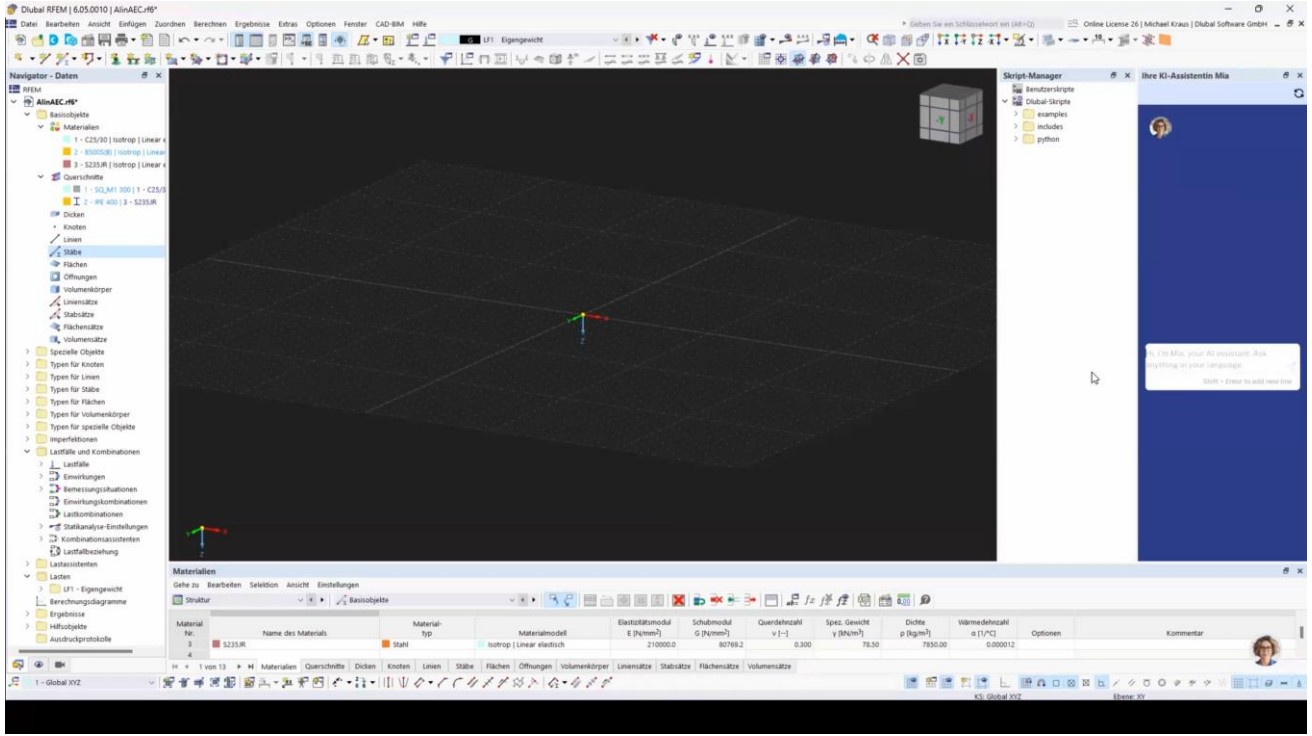
Support Assistant „Mia“

- “Generative AI” based chat bot

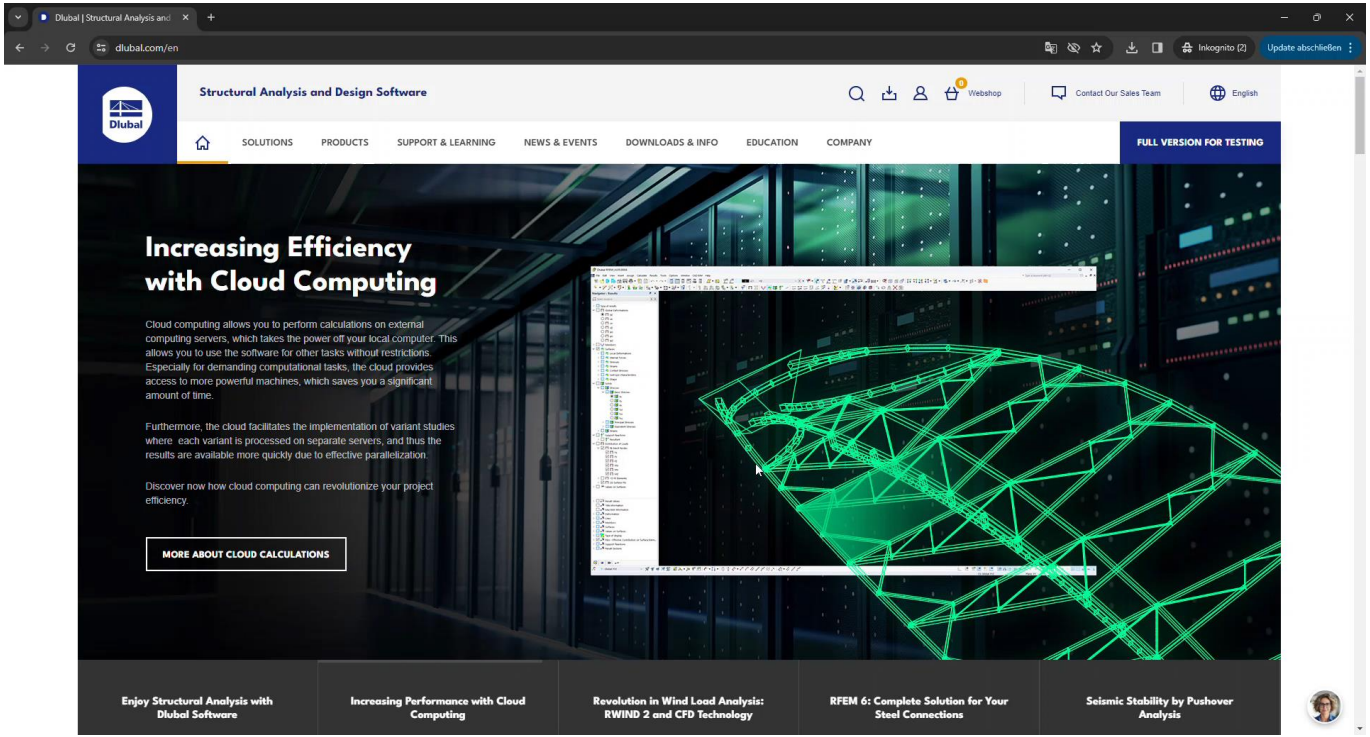
- trained on our data from FAQ, knowledge base and manuals

- can be used both on the website and within the Dlubal programs

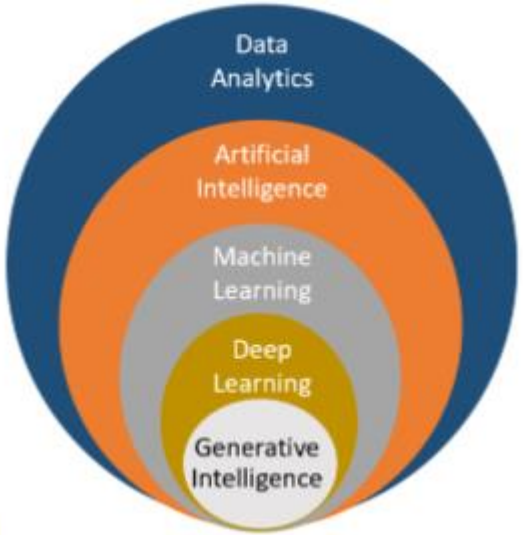
Support Assistant “Mia” - in the Dlubal software

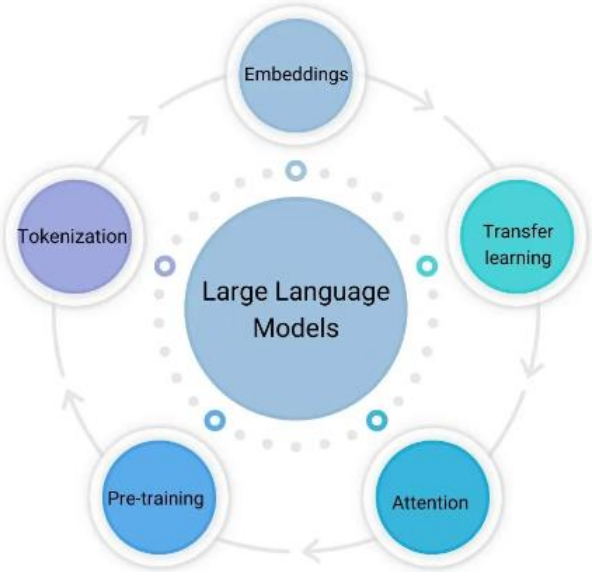


Support Assistant “Mia” - on the website



Basic concepts of Large Language Models (LLMs)





Basic concepts of Large Language Models (LLMs)

Tokens 106 Characters 364

```
Write a product launch email for new headphones.

This product is AI-powered and priced at $79.99.

The tone is friendly and exciting.

Output as a JSON object with "subject" and "body" fields.

Example:
{
  "subject": "Introducing Our New AI-Powered Headphones!",
  "body": "We are thrilled to announce the launch of our new AI-powered
 headphones"
}

Output:
```

- `Use whitespaces  carefully`
- Tokens can sometimes be counter-intuitive

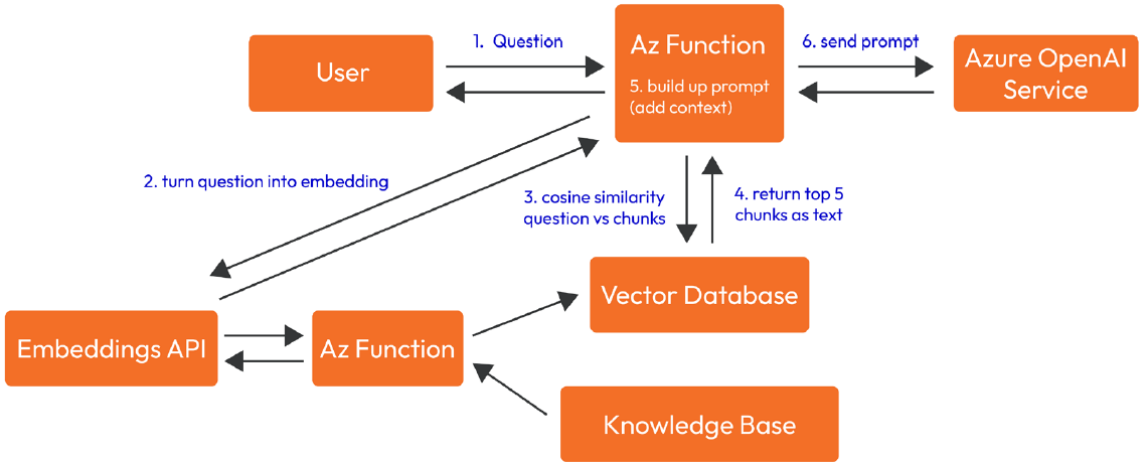
```
October, 18th 2022
October 18 2022
2022/10/18
10-18-2022
10-18-22
```

- Tabular data is space-efficient

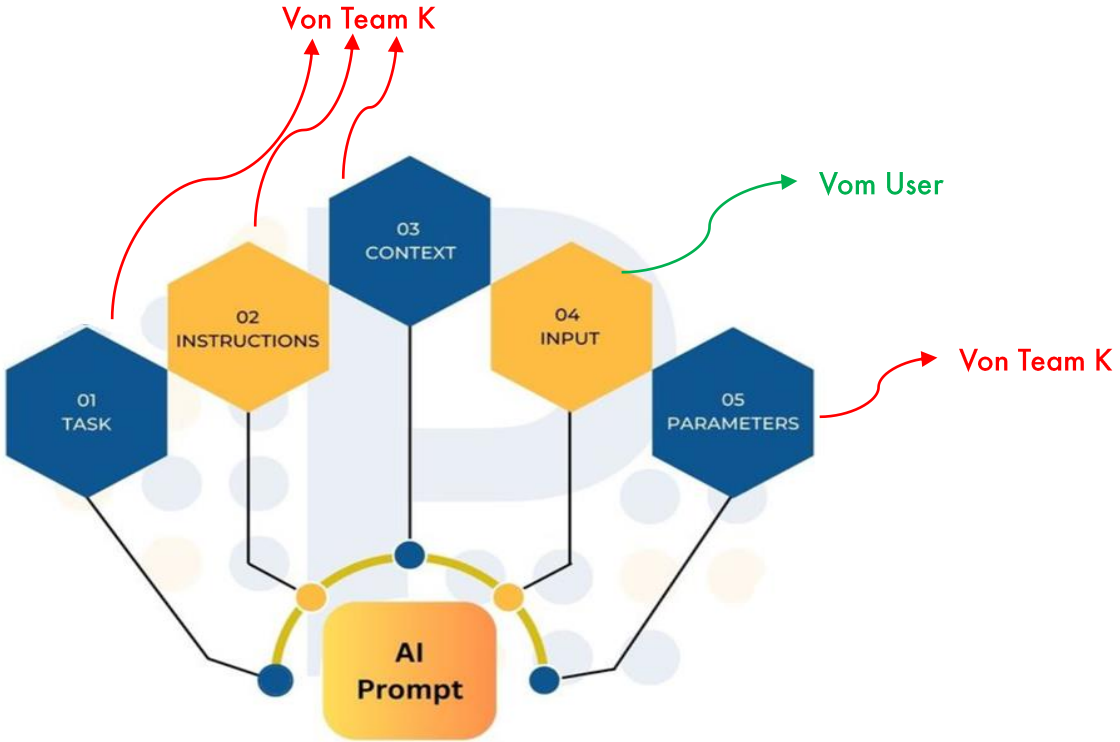
Grounding LLMs

Grounding: Providing your own data for the LLM

Idee: Reusing the same LLM pipeline but with different data sources for different end users



Prompt Engineering – Background



Prompt Engineering – Example

Task

Instruction

I am a structural engineer. I will provide you with details related to statics. You should be familiar with the terminology of structural calculations, formulas, design approaches in solid, steel, timber and composite construction as well as mechanics and mathematics.

My first request is: "I need help with the calculation of a reinforced concrete slab. How can I apply a surface load in RFEM?

Input

Prompt Engineering - Instructions in the FAQ

Instructions for prompting Mia:

https://www.dlubal.com/de/support-und-schulungen/support/faq/005515

Prompt Engineering - Instructions in the FAQ

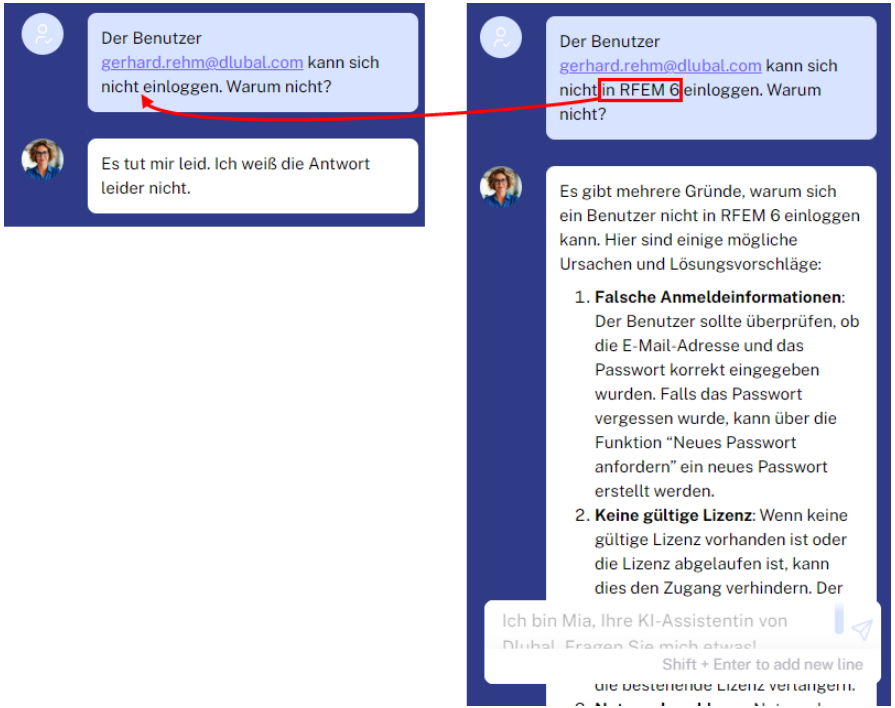
Goal

create a precise, clear, comprehensive and effective input that ensures high-quality answers.

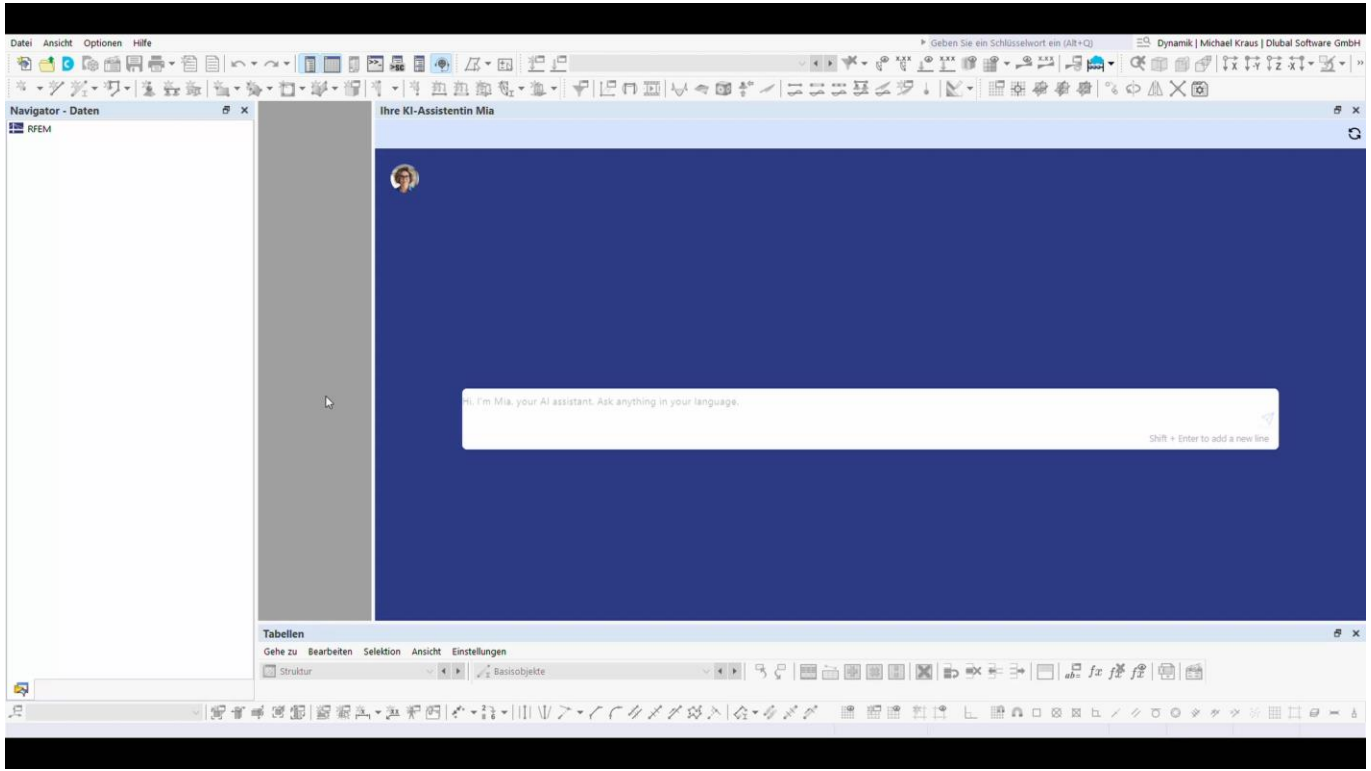
Prompting recommendations for Mia

- Use complete, short and clear sentences and state what is implicit.
- Present all the necessary details as vividly as possible: The more precise, the better.
- Break the task down into small, manageable steps. If necessary, ask several questions in one chat.
- Be specific about what is expected. Ask your question as precisely as possible and with context.
- State the most important thing at the beginning or at the end.

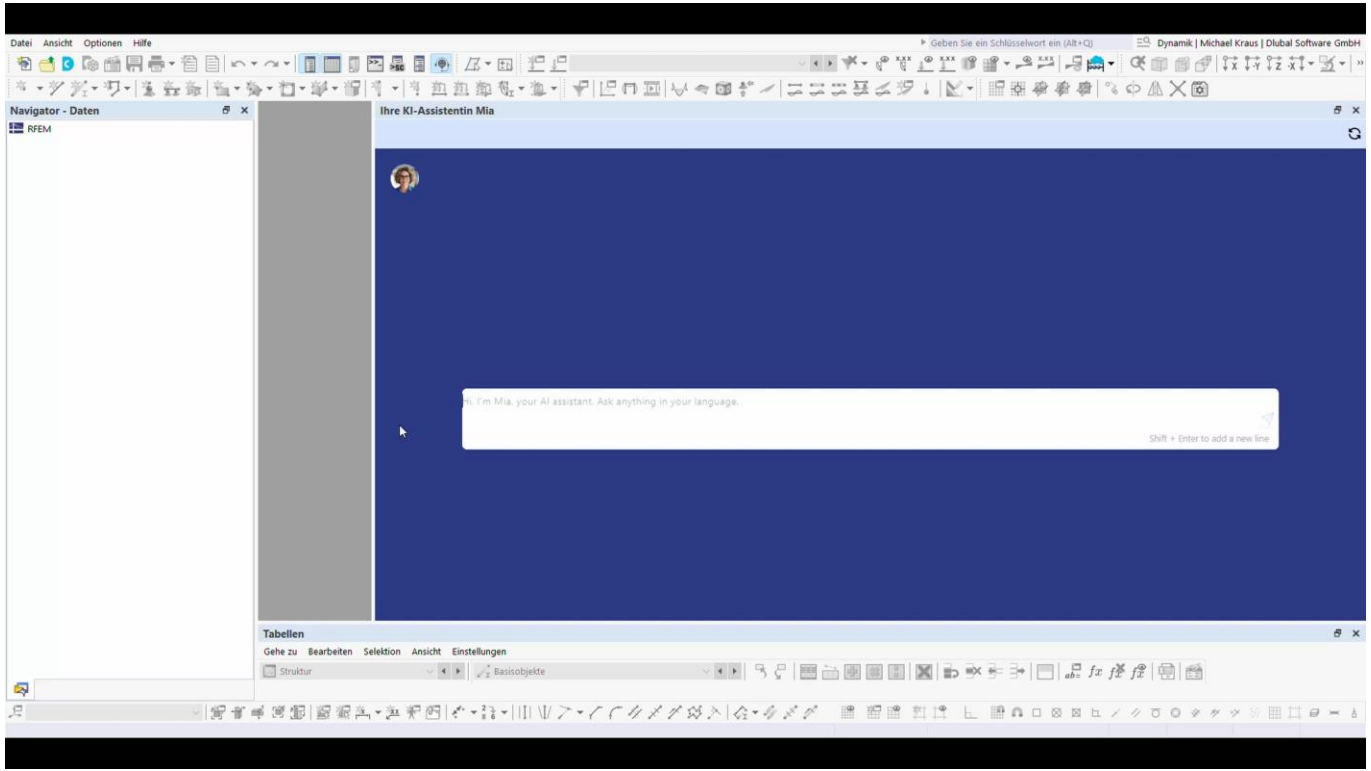
Prompt Engineering – Hands-on



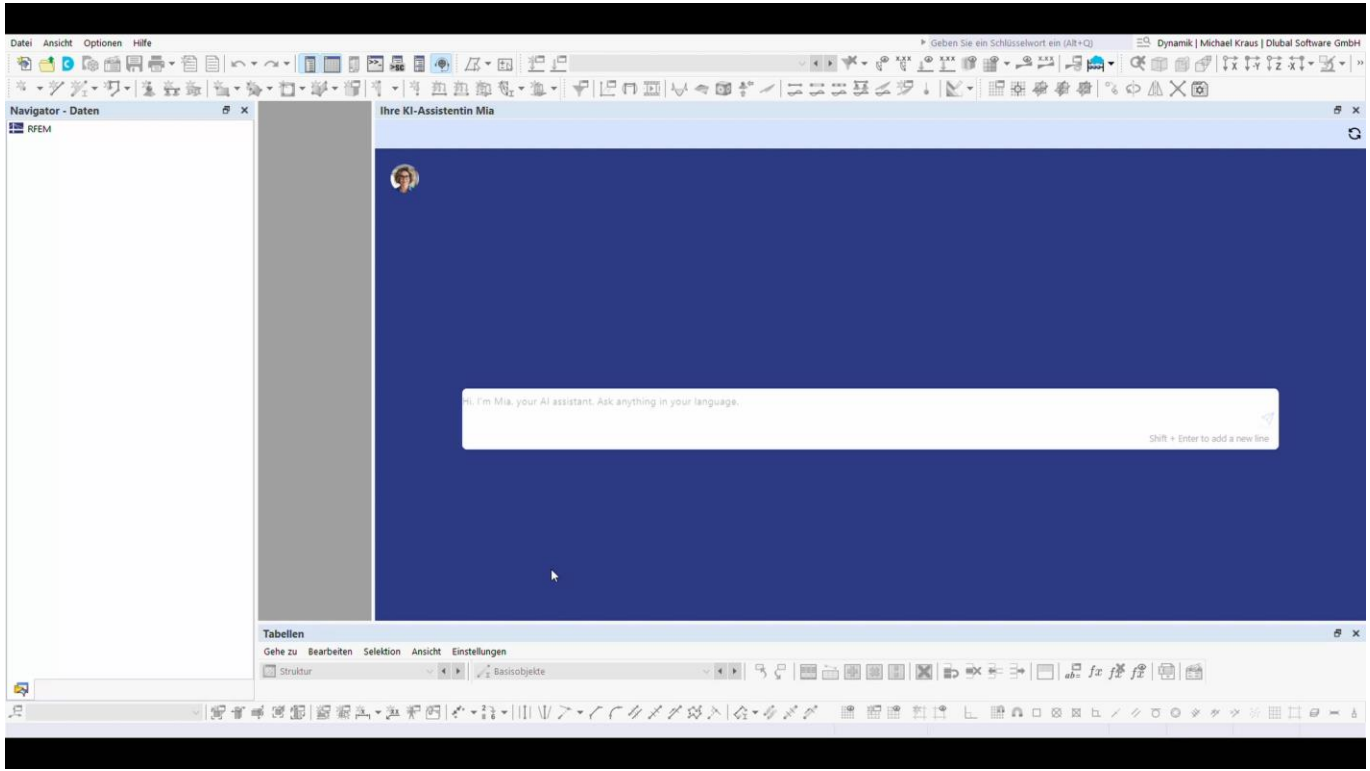
Prompt Engineering – Hands-on: Instability



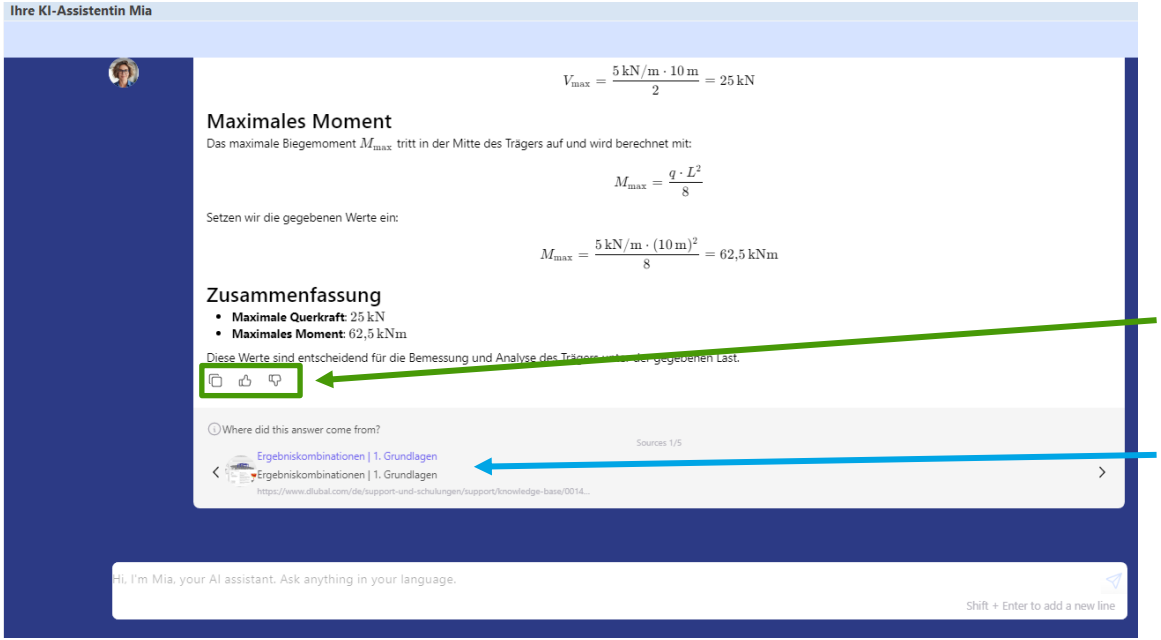
Prompt Engineering – Hands-on: Instability



Prompt Engineering – Hands-on: Formulas



Support Assistant „Mia“ – Feedback and Links



Your feedback on Mia's answers is important!

Ctrl + C calls up the hyperlink

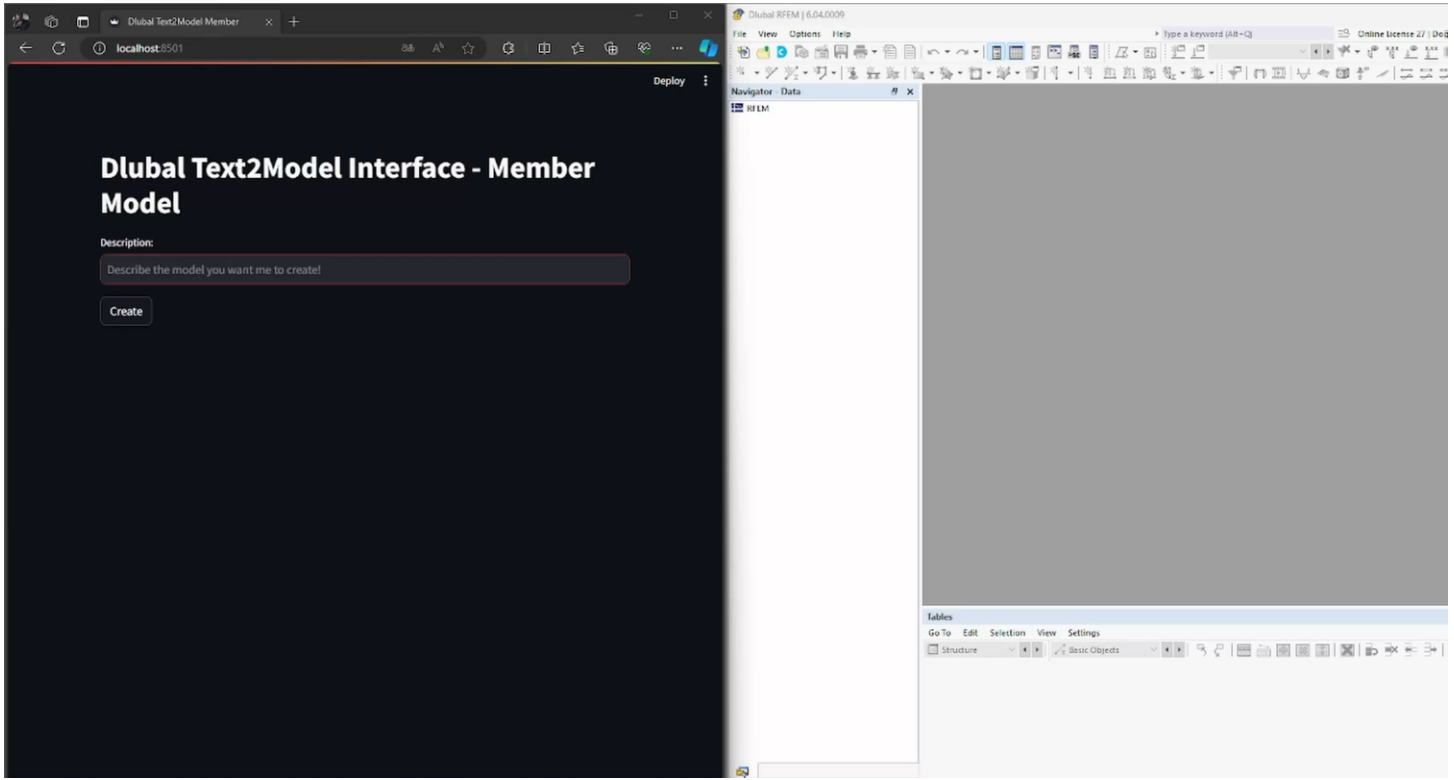
Creating models with GPT

Schritt 1: Erstellen eines openAI Kontos und finden des Keys

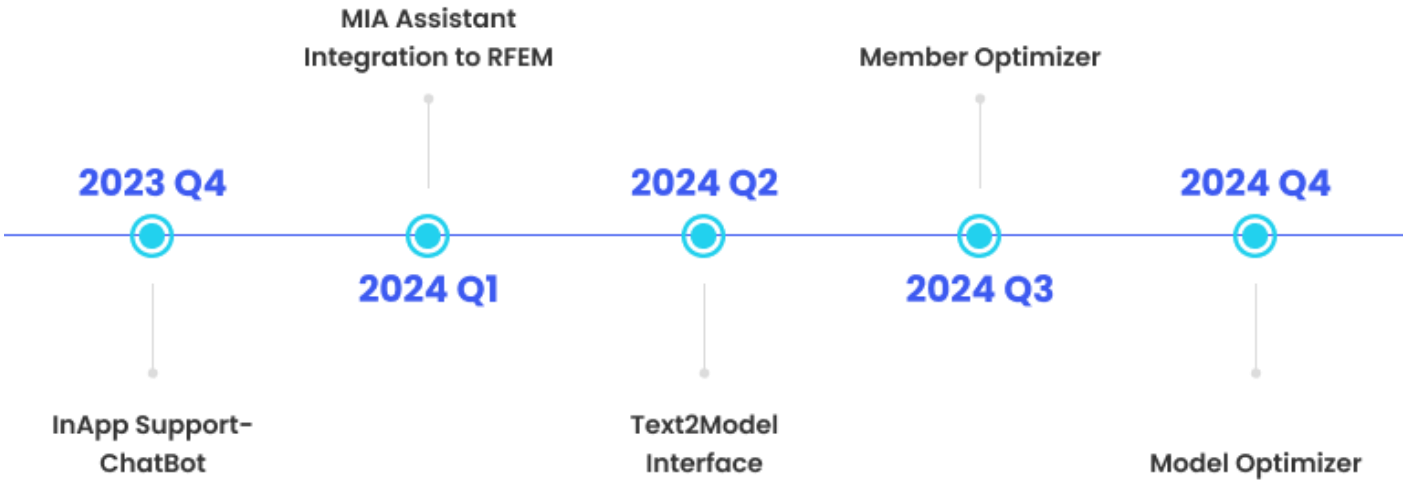
Step 2: Download the files for the RFEM bot in the “ChatGPT_Tank” folder
https://github.com/Dlubal-Software/RFEM_Python_Client/tree/main/Examples

Step 3: Open the file “ChatGPT_Tank_E.ipynb ”

Erstellen von Modellen mit GPT



Timeline of our future developments



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Daniel Dlubal, M.Sc.
COO of Dlubal Software GmbH

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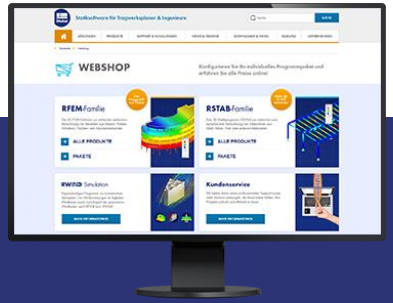

Trial Licenses

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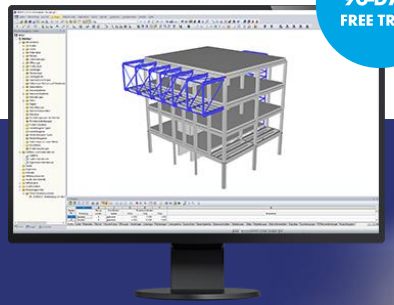

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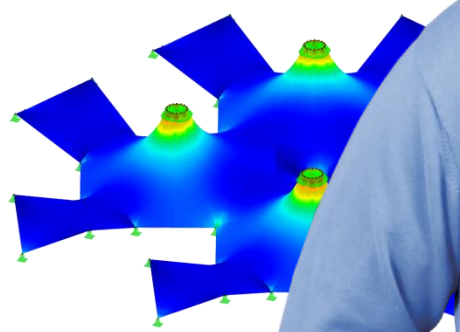

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