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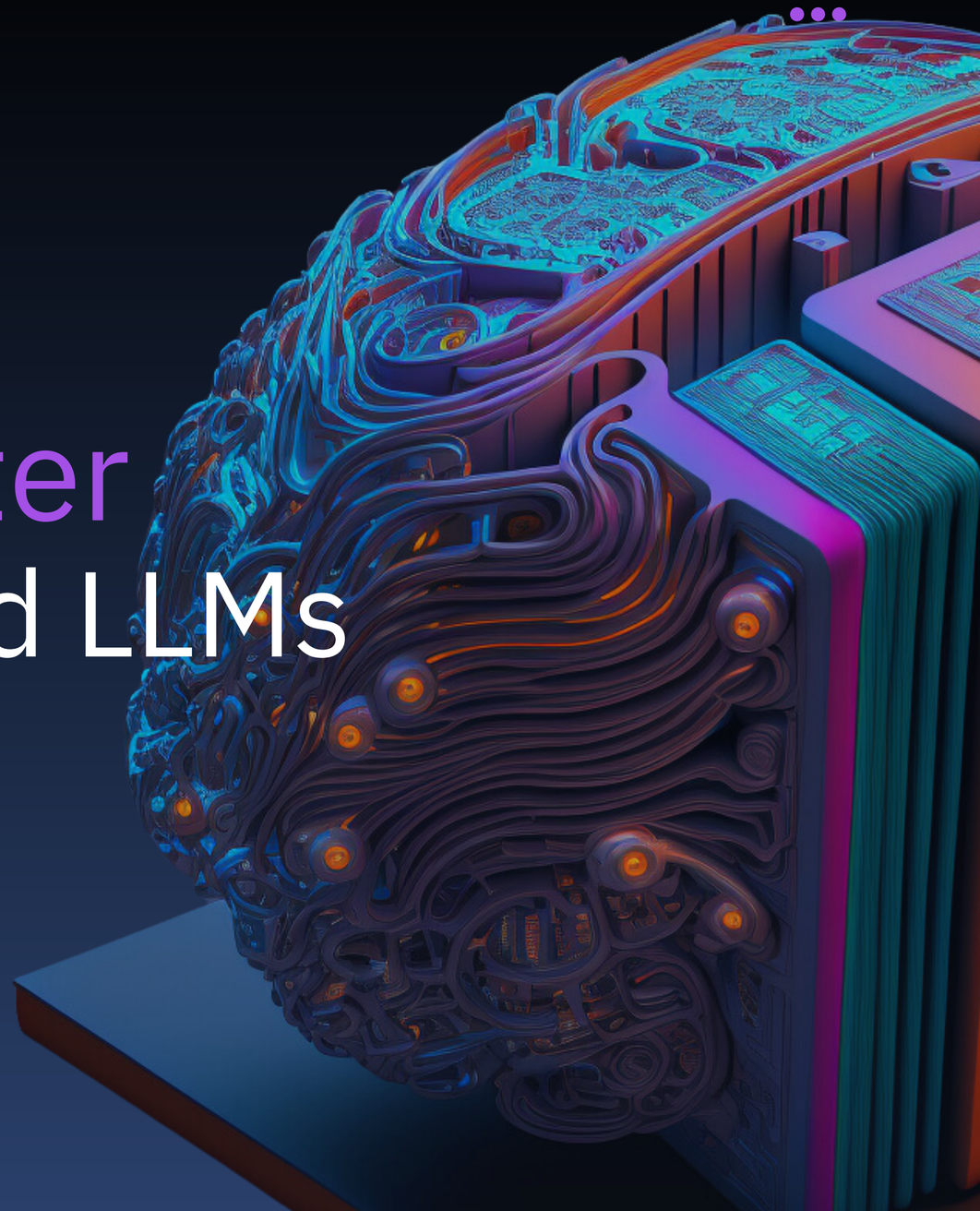
# TUM.ai at TUM Language center

## Introduction to AI and LLMs



# Who are we?

Leading AI student initiative in Germany

Students with all back-rounds

An amazing network of AI enthusiasts!

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# What drives us?

Solving real world problems

Empowering anyone to use AI

Constantly improving our expertise

## Connect

Bring together students and partners through AI

## Execute

Offer students theoretical knowledge and practical experience through collaborative projects

## Learn

Learn more about AI by exchanging with peers and partners, conducting workshops and research

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# What is your Experience with AI?

Do you use it?

If so how?

How do you think about it ?

# What is your vision for AI in the field of Education?

It should encourage students to be more curious by giving them a even easier access to information

Help me with giving acceptable overviews on new topics in reseach

Provide right information at the right time, while stimulating further thinking process of certain field

Useful tool that helps to save time

make learning more individual and thereby more effective

Best practices should be identified on how AI can augment human creativity (e.g. through proper prompting). It shouldn't diminish human creatively

It should identify the strengths and weaknesses of the student and customise the difficulty of the lessons for them

Better quality and faster learning, through individual Digital Tutors

Help understand complex topics correctly in a simpler way.

it should be a training buddy that gives valuable and tailored feedback

I envision the usage of AI for students should revolve around being a private tutor for them. Answering their questions in a way to teach and not just throw answers.

Making students think more by breaking the topic down in simple steps and allowing collaboration by asking the student questions

Please make grading for student exam results

An advanced search method to better to-the-point information, and less unrelated answers. This also can reduce misinformation, and help fact-checking

Depending on the audience asking the query, it should be able to adjust the answer. So that even a kid can understand theory of relativity!

Improving Prozesses all over the world

A lot of complexe information in a short time. So you can learn quickly

Allow people to communicate with computers or other machines in a more natural and organic way instead of having to go through learning code

Good Tutor

I would like the teachers to show us the right way to use AI.

Increase the interest of studying and make it easier to practice( we can use it as frequently as we want)

The use of AI in education seems inevitable to me, students should be informed, however, how to use AI correctly (e.g. always double checking the AI's answers).

Neural Networks

large language models

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# Workshop Motivation

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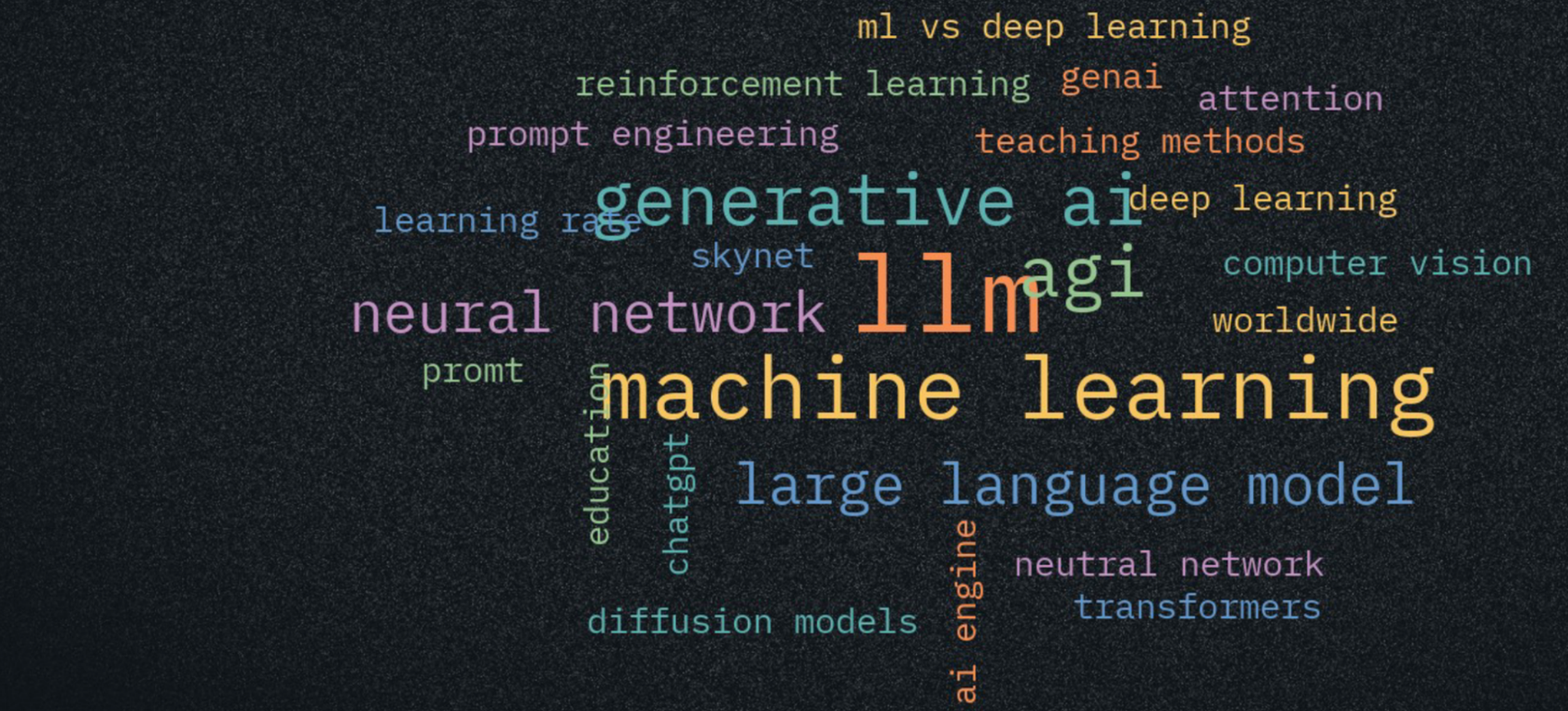
# Artificial Intelligence

## Overcoming Buzzwords

**What buzzwords do you already know?**

39 responses



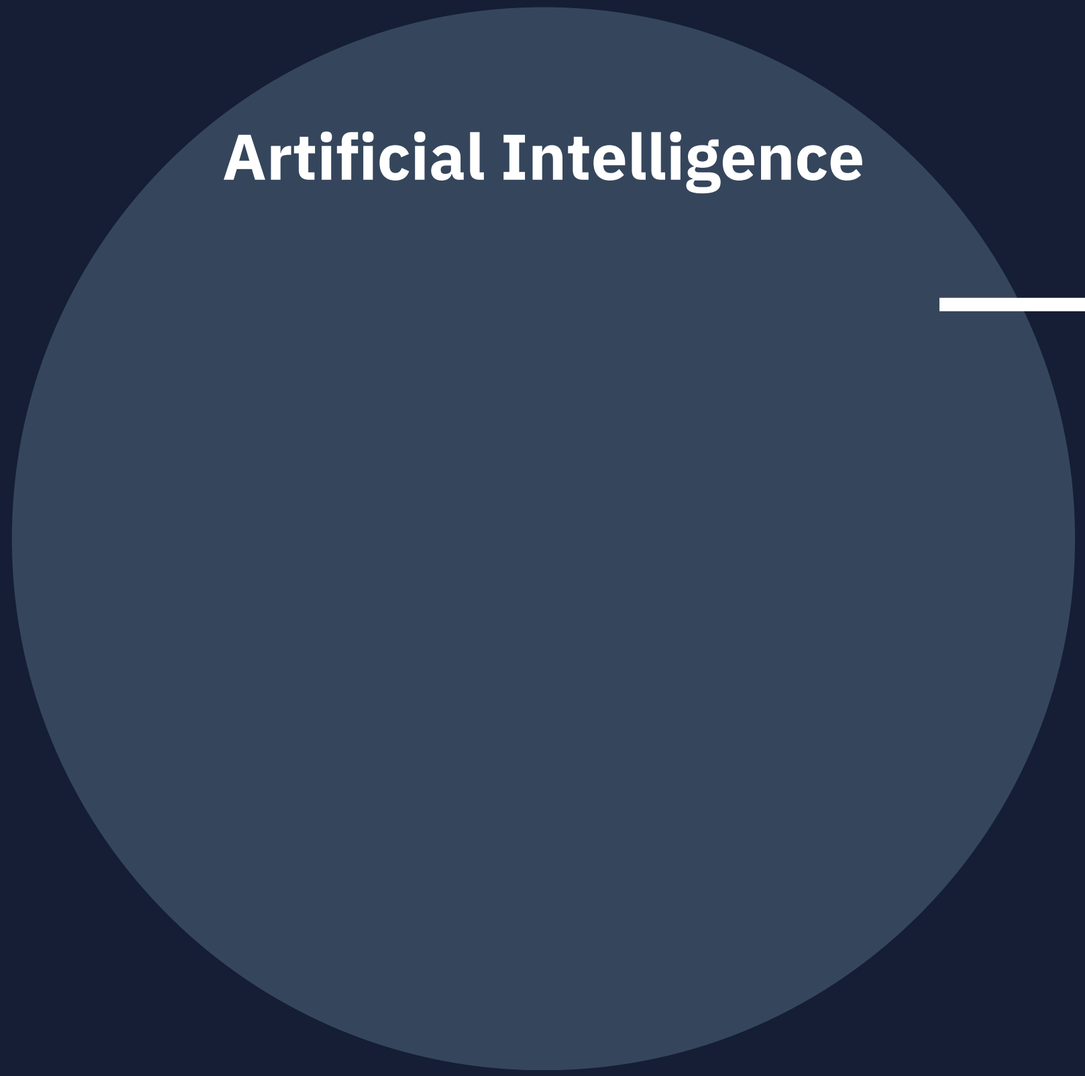
# How is AI Defined?

*“the science and engineering of making intelligent machines”*
(John McCarthy, 1955)

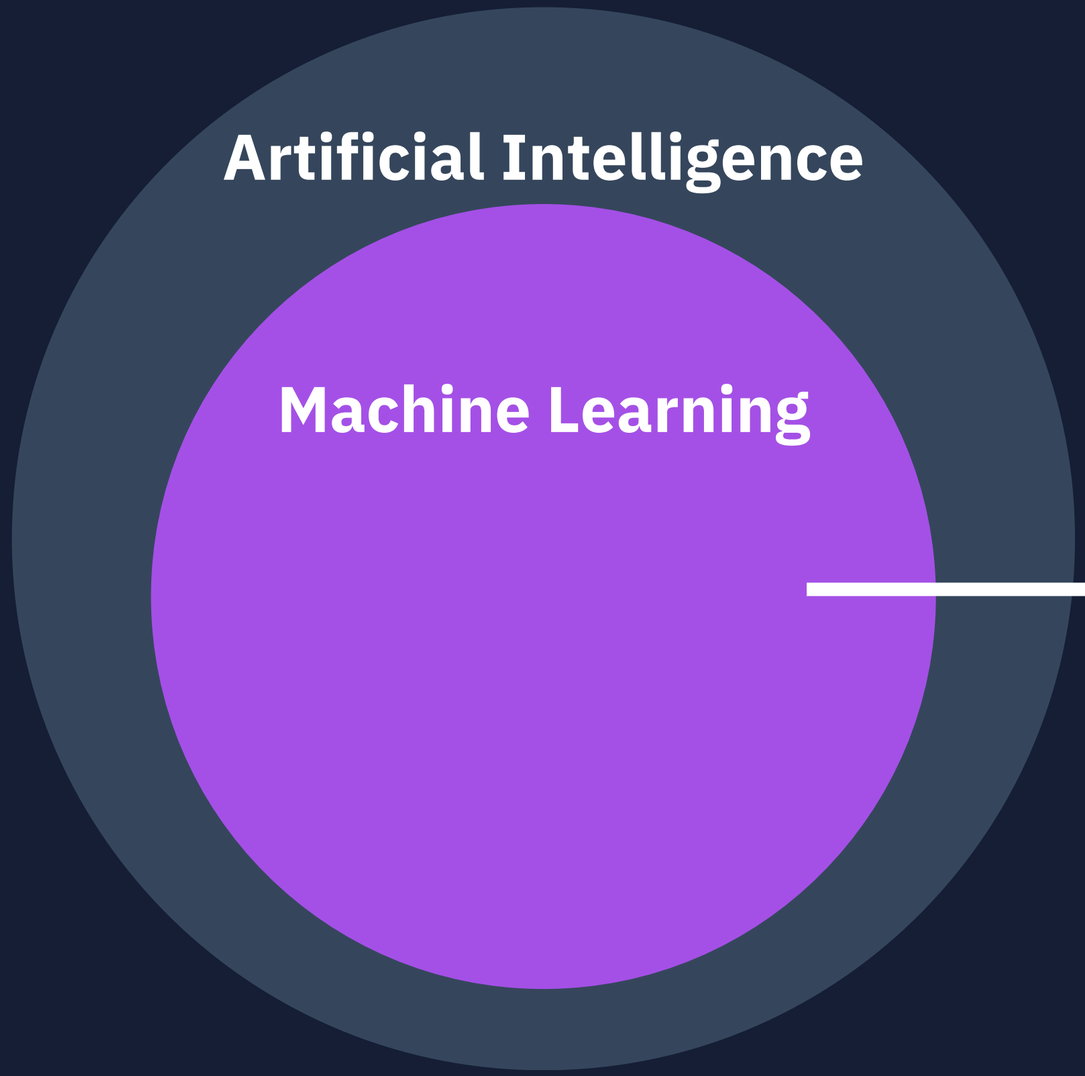
*“the study of how to produce machines that have some of the qualities that the human mind has, such as the ability to understand language, recognize pictures, solve problems, and learn”*
(Cambridge Dictionary)

*“Artificial Intelligence (AI) is the field of computer science dedicated to solving cognitive problems commonly associated with human intelligence, such as learning, problem solving, and pattern recognition. ”*
(Amazon)

# AI, Machine learning, & Deep learning

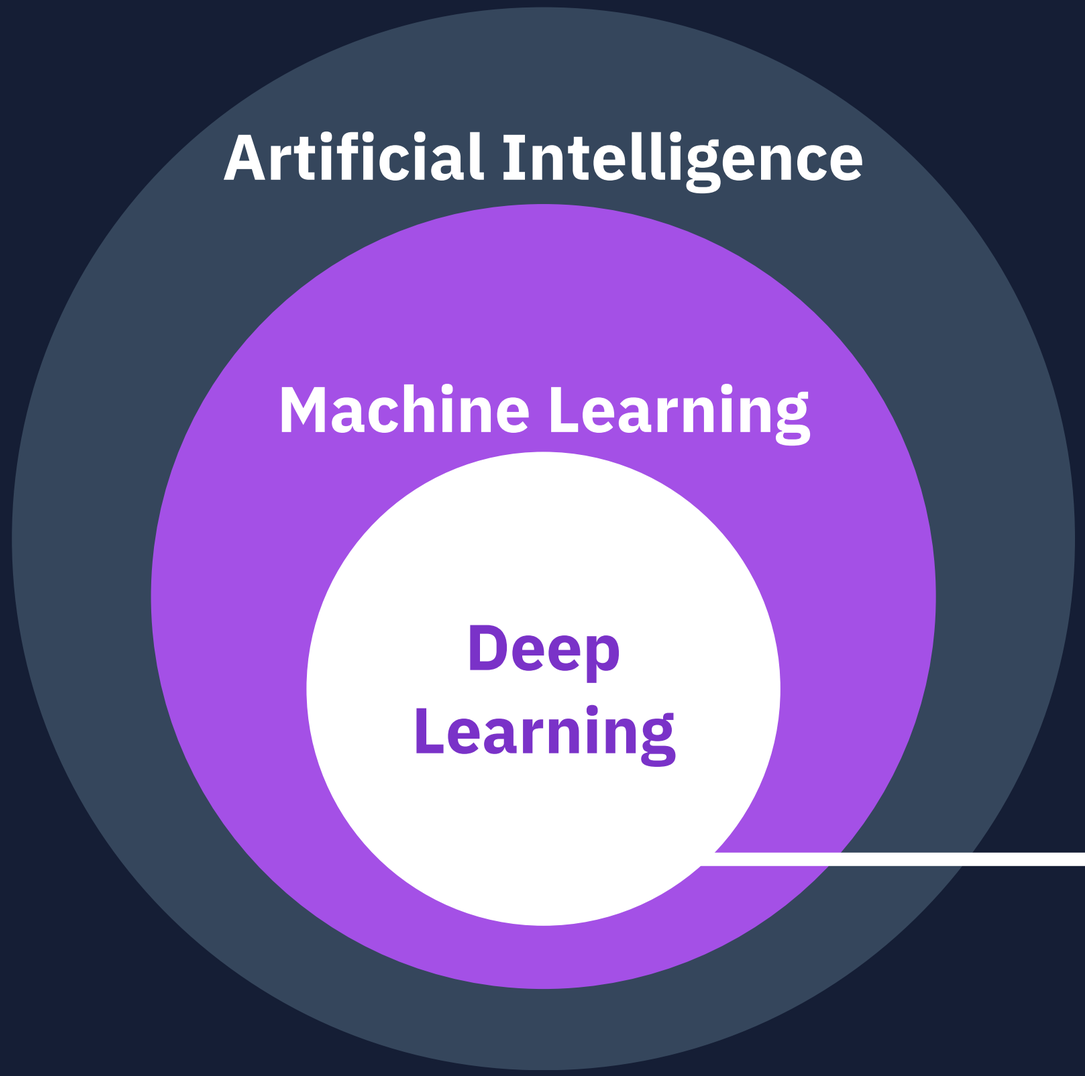


# AI, Machine learning, & Deep learning




**Learning to solve cognitive problems from experience/with data**

# AI, Machine learning, & Deep learning




Machine Learning with Neural Networks

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# How does it work?

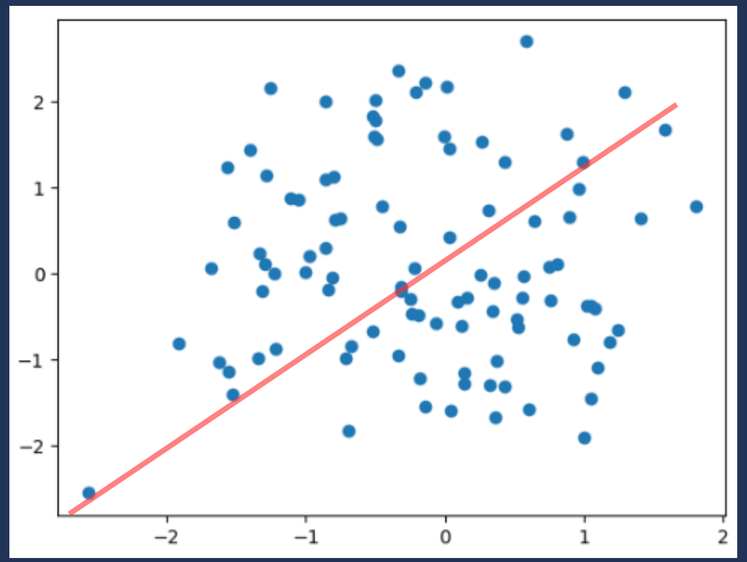
- Basically, a complex mathematical function derived from the simplest equation

$$Y = MX + C$$

The equation of a line

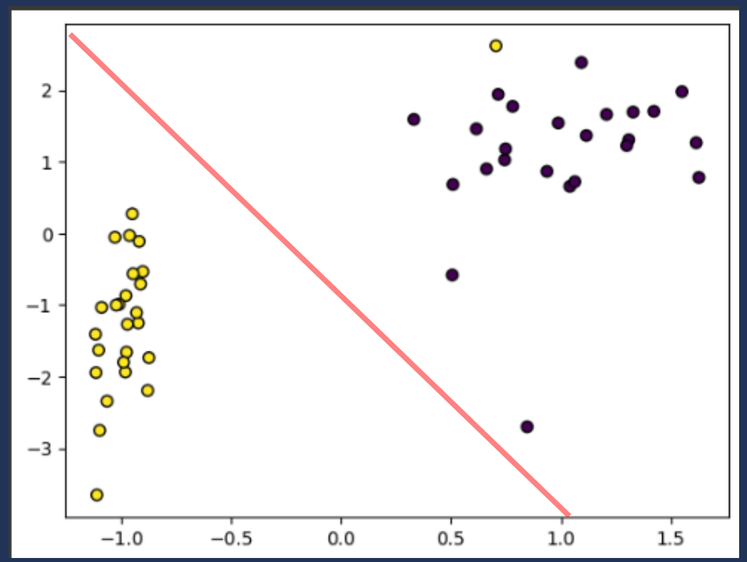
# What sort of problems can it solve?

## Regression



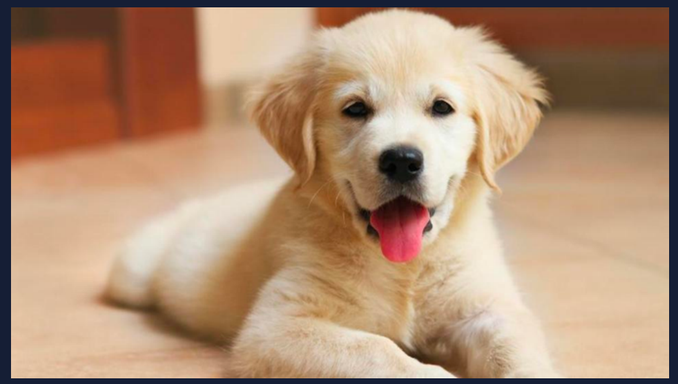

Best fit line

## Classification

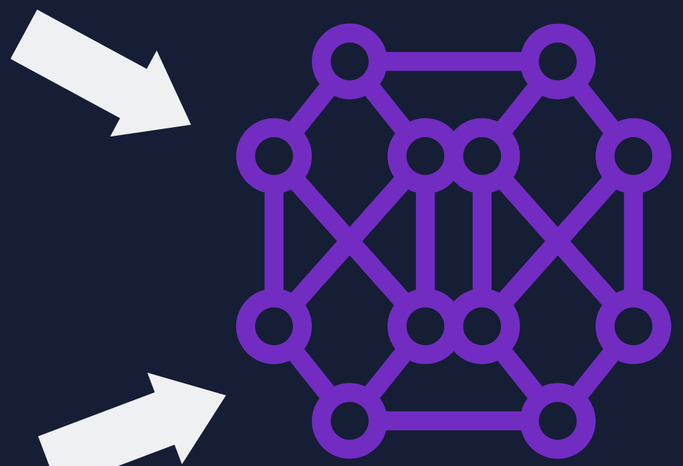



Best divider line

# More complex example



Is this a photo of a cat?



Yes

No

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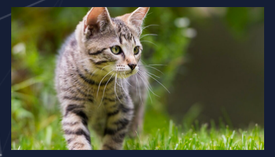
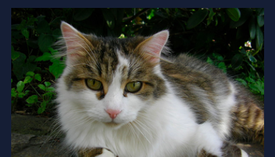
# But how does it learn?

## Training

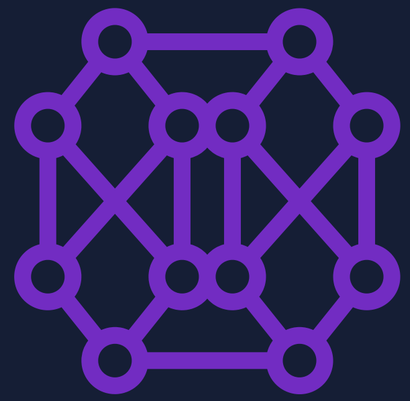

→ Yes

→ No


→ Yes

→ Yes

→ No



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# Large Language Models (LLMs)

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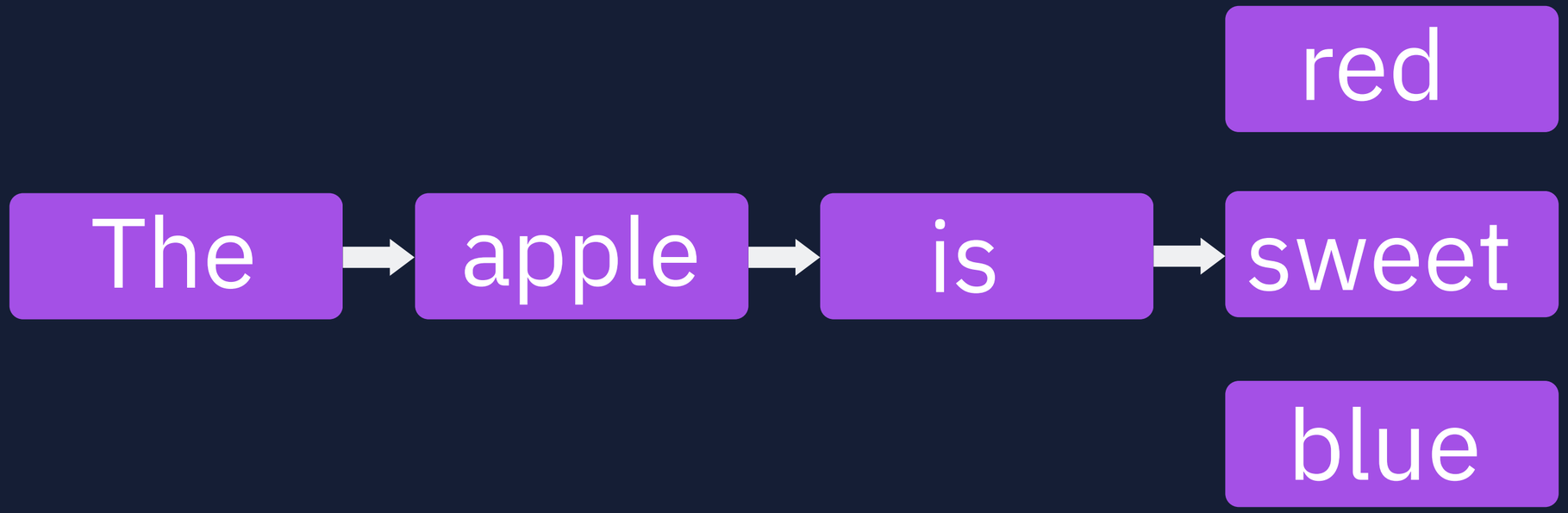
# What exactly are LLMs ?

- Basically, an over-glorified classifier

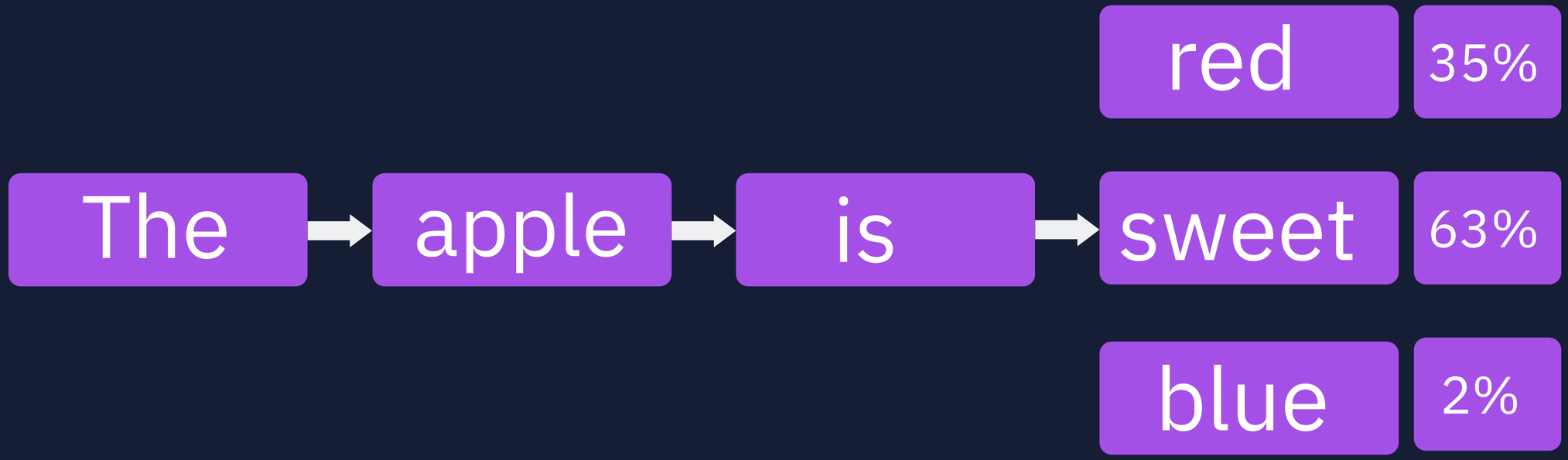
Learns to predict the next word

# Example

# Example



# Example



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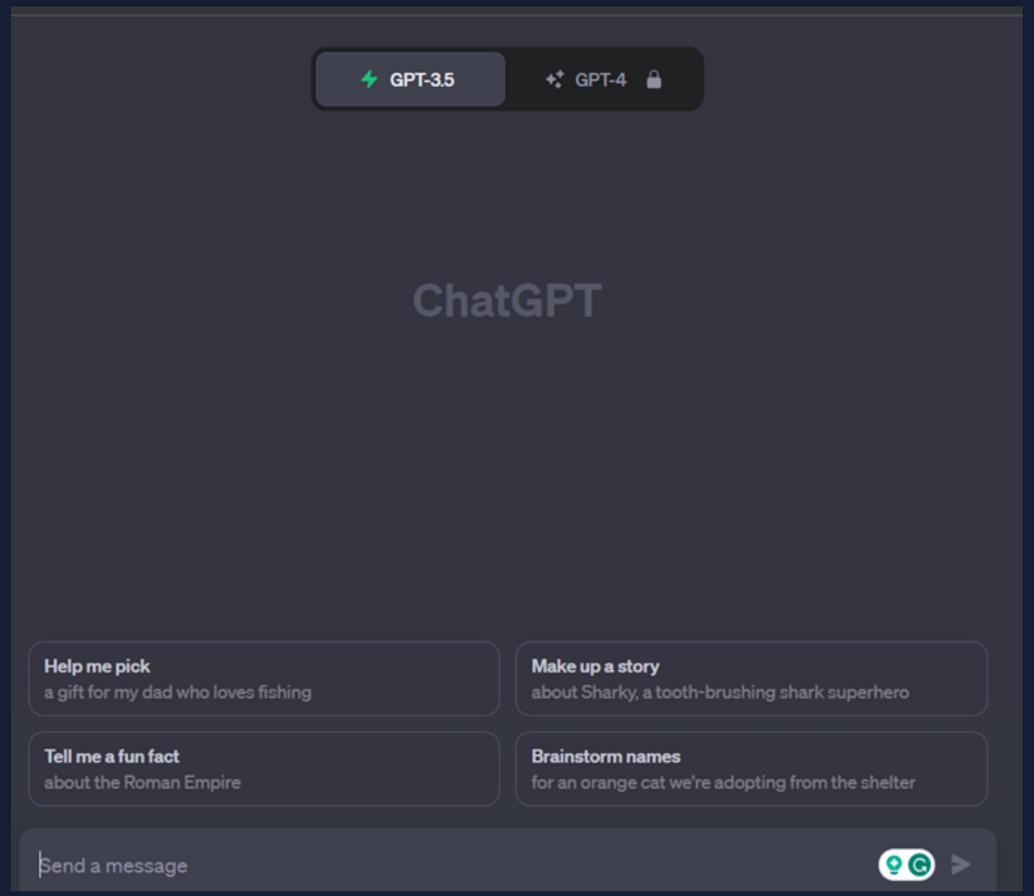
# How do people use LLMs ?

- Currently most easiest way to access:

Chat GPT



# LLMs use cases

## What can it do?

- Text generation
- Language Translation
- Question Answering
- Text Summary

## What it can’t do?

- True Understanding
- Common sense reasoning
- Ethical Decision Making

# How can LLMs be leveraged for learning?

| | | | |
|---|---|---|---|
| individual learning experience | Can be implemented in devices used by people who are disabled so that they get right inputs in their learning journey | Personalized tutor | They can be used as a starting point, e.g., to get an overview about a topic, or get some "inspiration". |
| Understand and sumarize new concepts | learn types are taken into account: visual, auditive, reading types | LLMs can support personalized learning experiences and provide educational content tailored to individual needs. | They should be used to augment the breaking down of complex topics into digestible chunks that are easier to learn |
| Summarise topics. important concepts | They can be used to create intelligent tutoring systems. | Can be used to generate quick overviews of topics new to the user | can structure a learning plan for specific topics, aswell as give information about the most important sources |
| Help to translate contents in different languages so more people have access to it | To analyse the relevance of the learning materials to provide motivation to the student | I believe training the model on giving the least amount of information, in a teaching manner, that would prompt the user to start thinking about the solution or to research based on given hints. | Get taught by important and Good teachers/professors. For example Gilbert Strang, Albert Einstein |

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# A comparison of

## Translators

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# Chat GPT as a Translator

**Technology:**
GPT model; context-aware language generation.
**Best For:**
Conversational, nuanced translations.
**Limitations:**
Speed/accuracy for some languages; fixed knowledge base.

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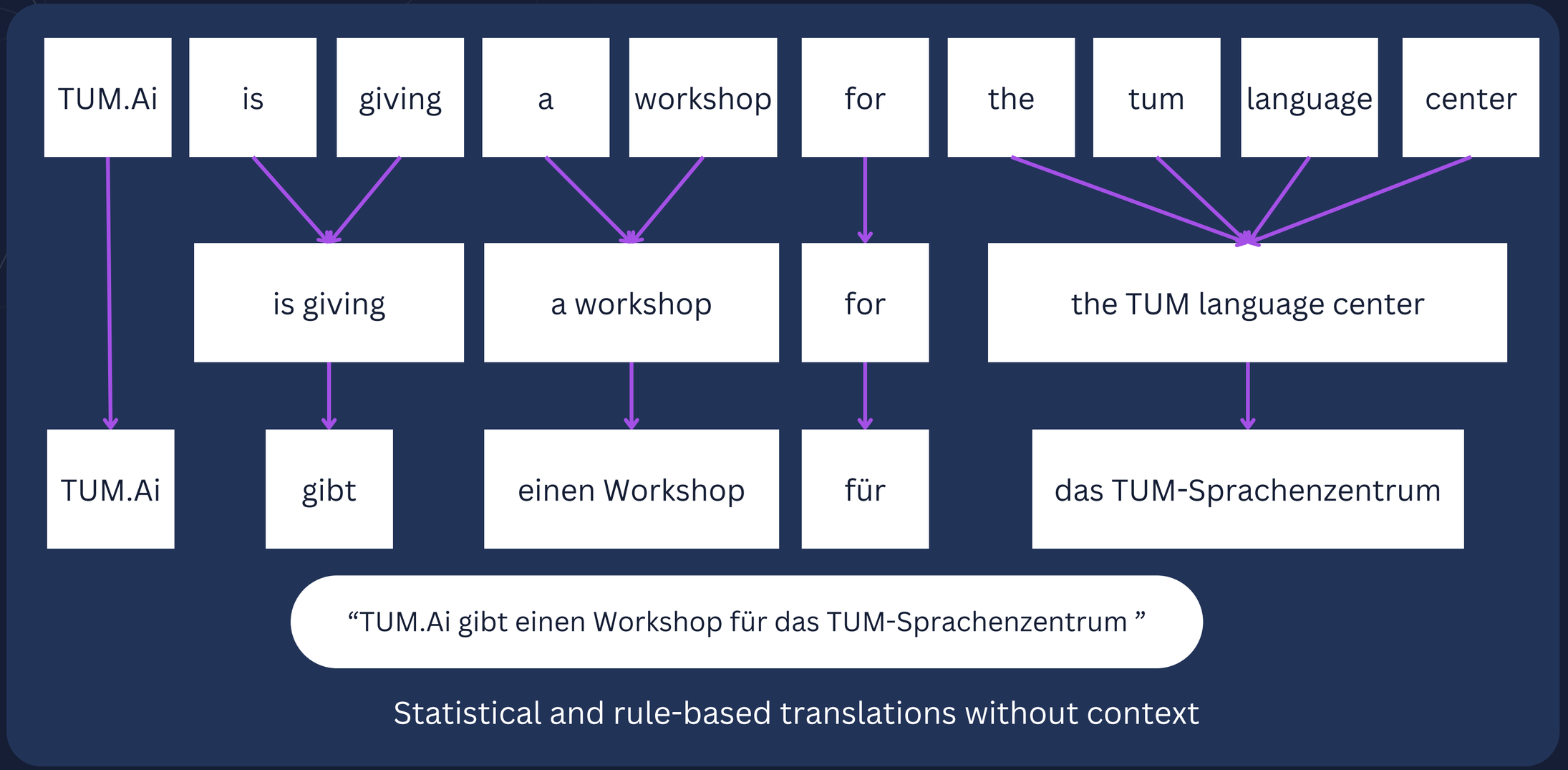
# Google Translate as a Translator




Statistical and rule-based translations without context

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# Google Translate as a Translator

**Technology:**
Statistical Machine Translation (SMT); broad context translation.
**Best For:**
Quick, versatile language translations.
**Limitations:**
Idioms, and dialects; inconsistent across languages.

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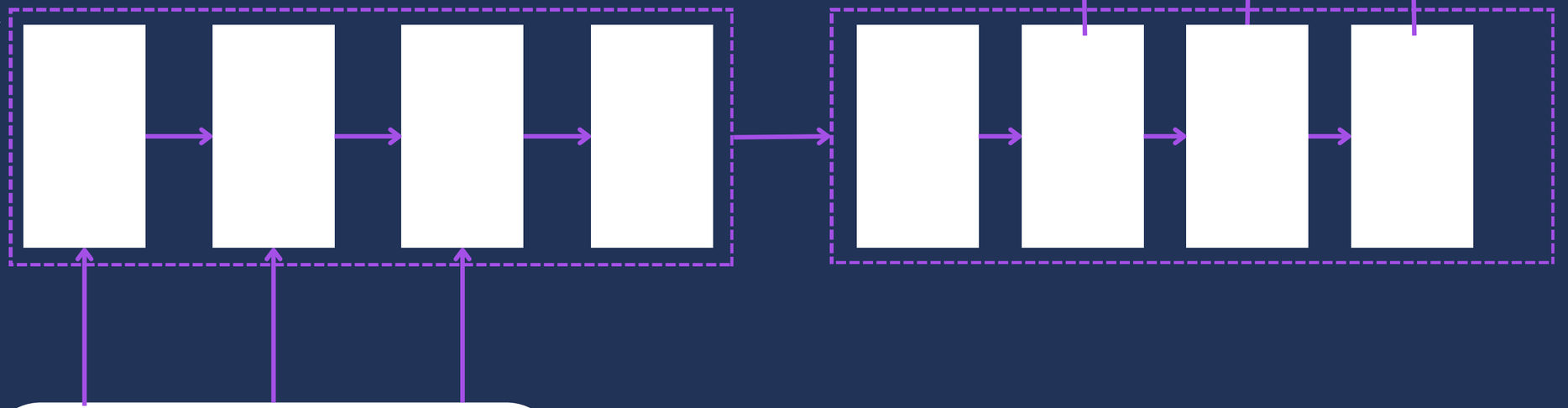
# DeepL as a Translator

Long short-term memory (LSTM)



“TUM.Ai gibt einen Workshop für das Sprachenzentrum der TUM”

“TUM.Ai is giving a workshop for the TUM language center”

Deep neural network based translations with learned context

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# DeepL as a Translator

**Technology:**
Proprietary deep learning NMT; quality-focused.
**Best For:**
High-quality, natural-sounding translations.
**Limitations:**
Fewer languages; limited with specialized jargon.

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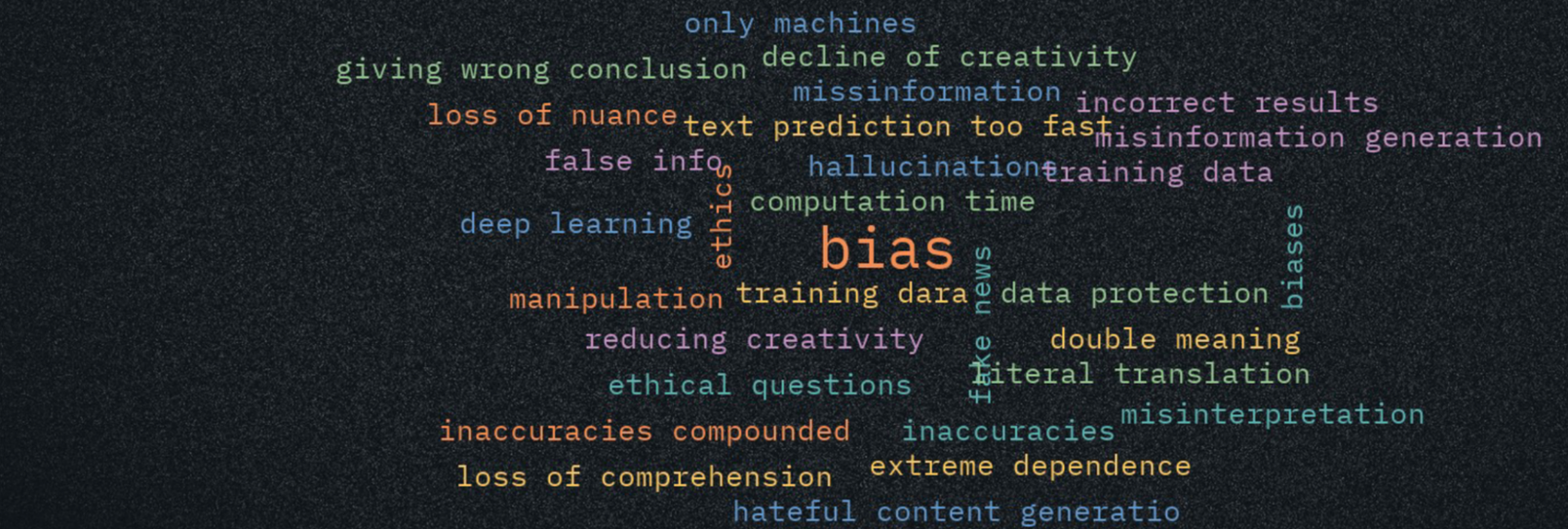
# Risks of LLMs

**What concepts come to mind when you think about possible Risks of LLMs?**

32 responses



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# Wrap-Up and the Future

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# What did we discuss

1. What's your experiences with AI in your daily life?
2. What is Artificial Intelligence?
3. What are LLMs - A glorified Classifier?
4. Translator comparison
5. Possible dangers of using LLM
6. *How can you use LLMs for your teaching?*

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# What might be the future of LLMs?

- **Revolution** in various **industries** because of human-like text generation.
- Deployment of LLMs on edge devices for **smarter applications**.
- Current **challenges** include **bias, inaccuracy, and toxicity.**
- Approaches like **self-training** and **fact-checking** are being explored to improve LLMs.

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# How can LLMs be used for learning?

1. Assess how LLMs can complement existing teaching methods.
2. Explore ways to enhance subject-specific teaching with LLMs.
3. Consider how LLMs can support personalized learning.
4. Explore collaborative learning opportunities using LLMs.
5. How can you educate students about the responsible use of technology and AI?

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# Thank you!

for your Attention