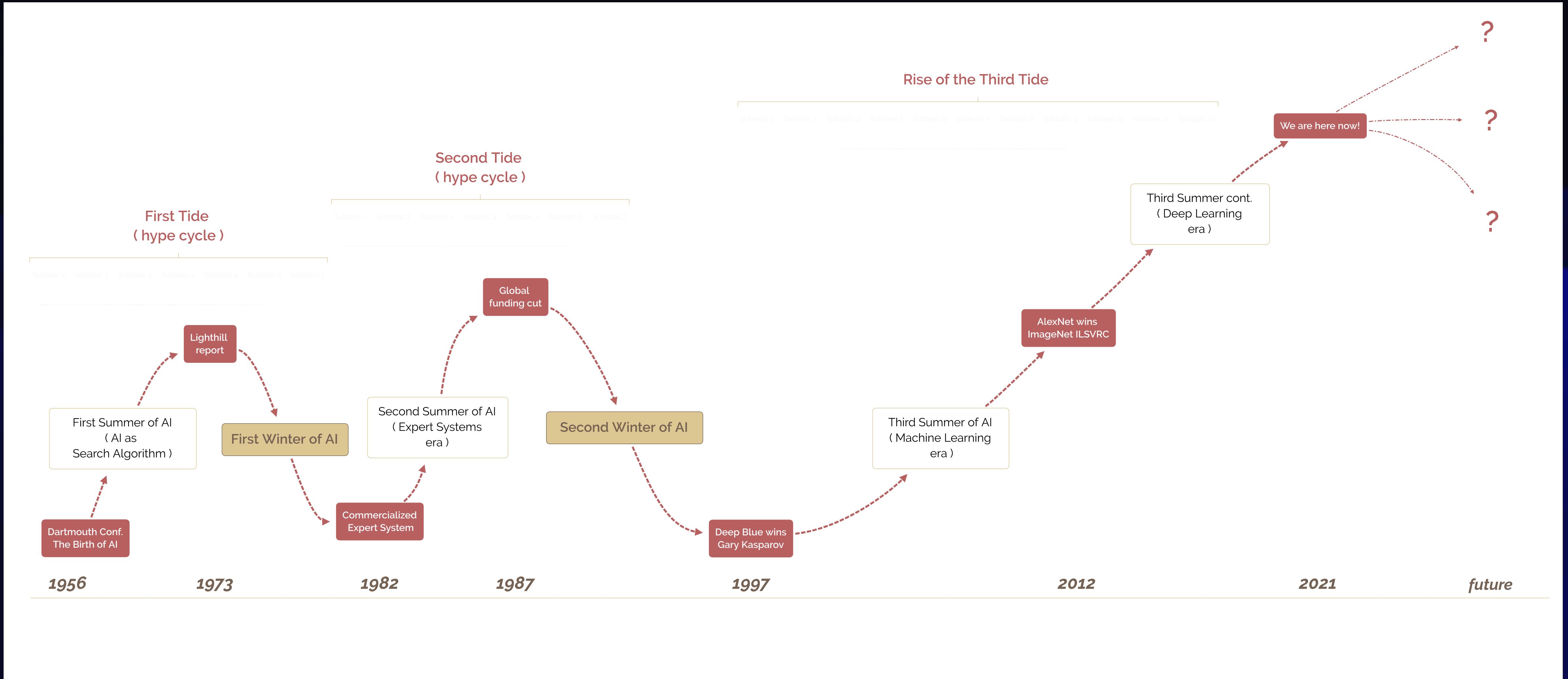


KI verstehen, Musik neu denken!

up:load | Der LVdM NRW Digital-Talk

Matthias Lang - 25.06.2025

Was ist KI?



Was ist KI?

Keine einfache Antwort

- Es gibt keine “offizielle Definition”
- Einflüsse aus Science Fiction
- Schwere Aufgaben können auf einem übermenschlichen Niveau gemeistert werden
- Einfache Aufgaben können sehr schwer werden
- Die öffentliche Wahrnehmung ist diffus



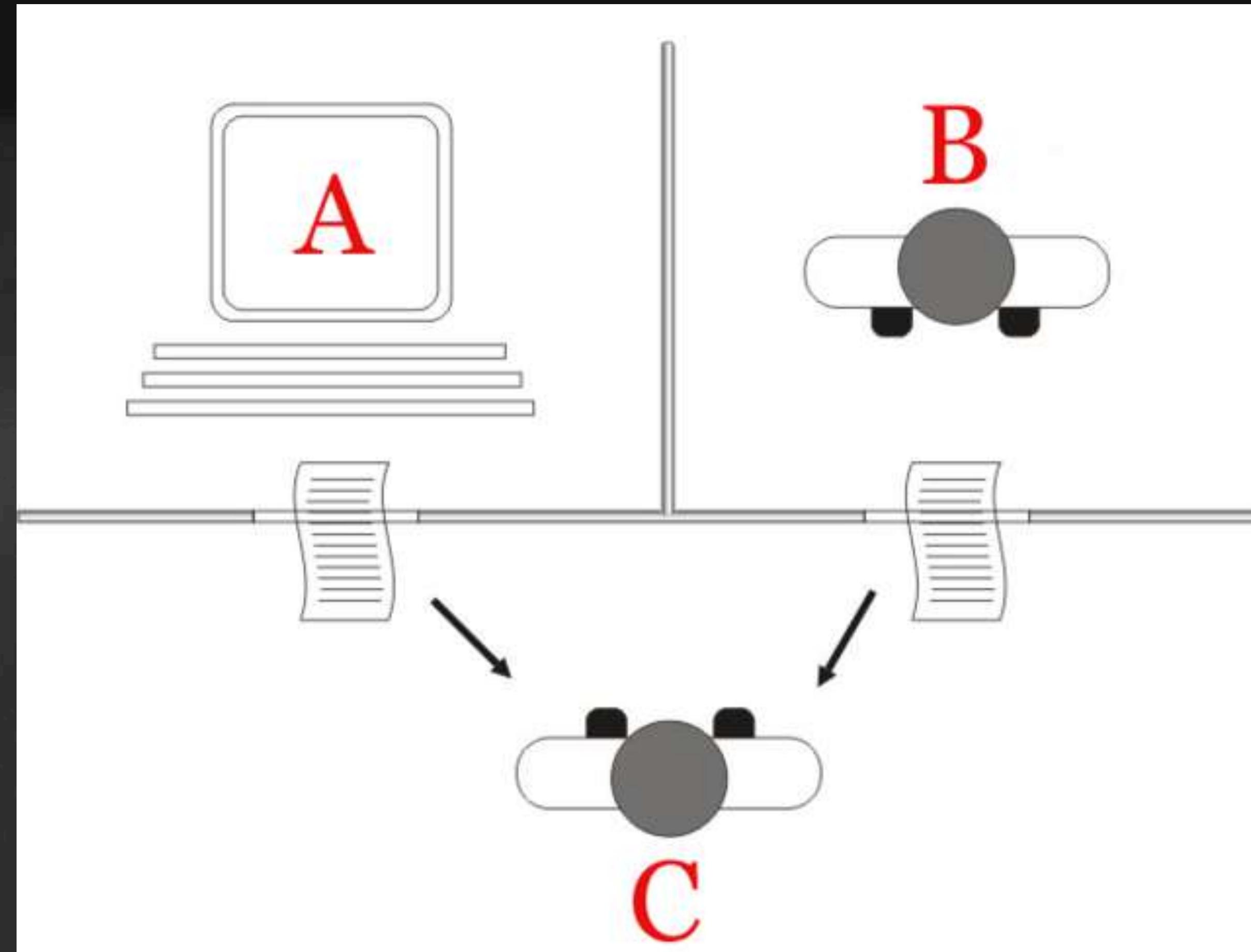
<https://qz.com/quartz/1243811/trivia-about-2001-a-space-odyssey-in-honor-of-its-50th-anniversary>

Turing Test

Wann verhält sich ein System
intelligent?

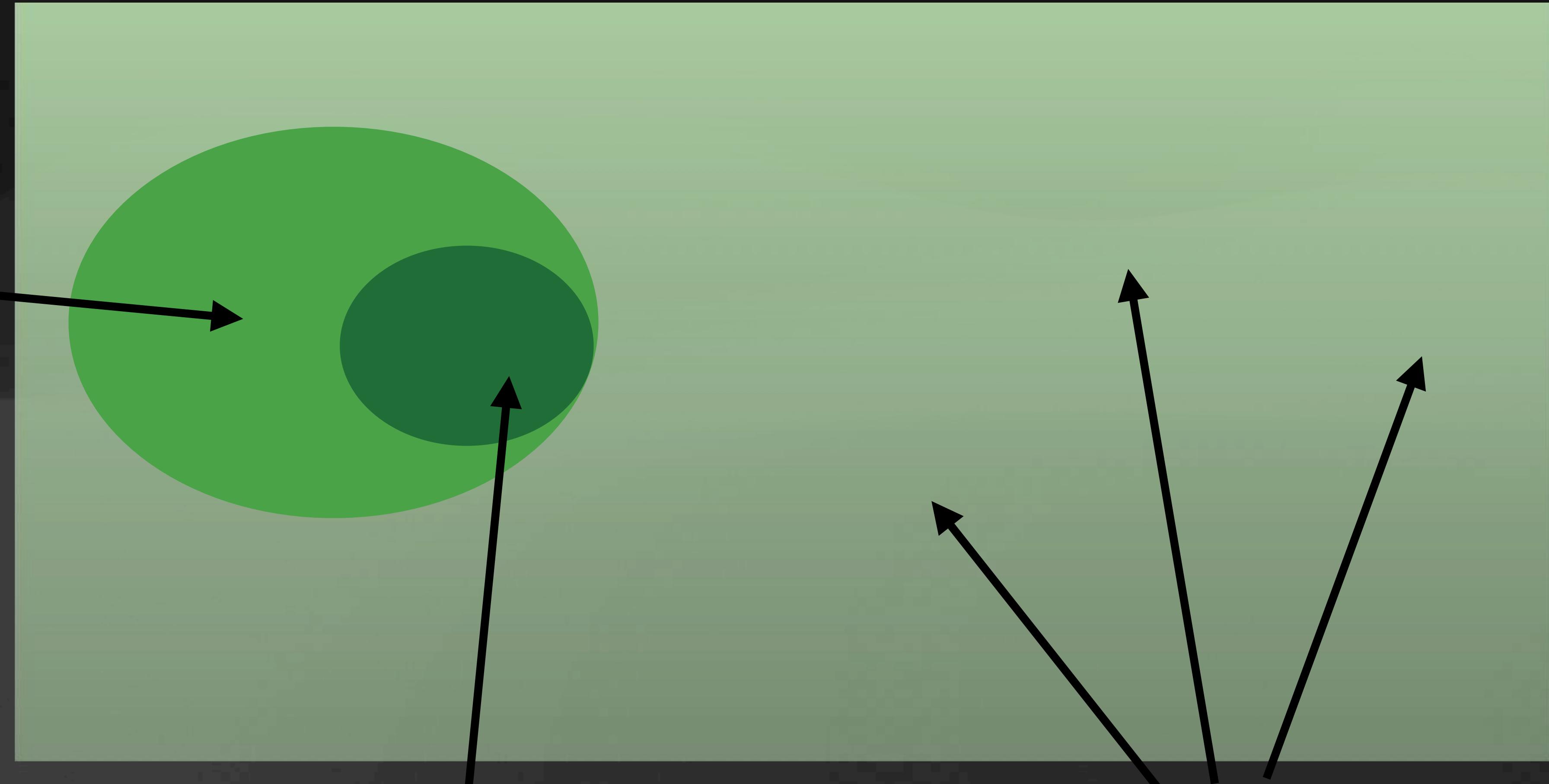
Annahme:

Eine Entität ist *intelligent*,
wenn sie durch
Beobachtung ihres
Verhaltens **nicht von**
einer anderen
intelligenten Entität
unterschieden werden
kann.



Turing Trap

Automatisierung vs. Augmentierung

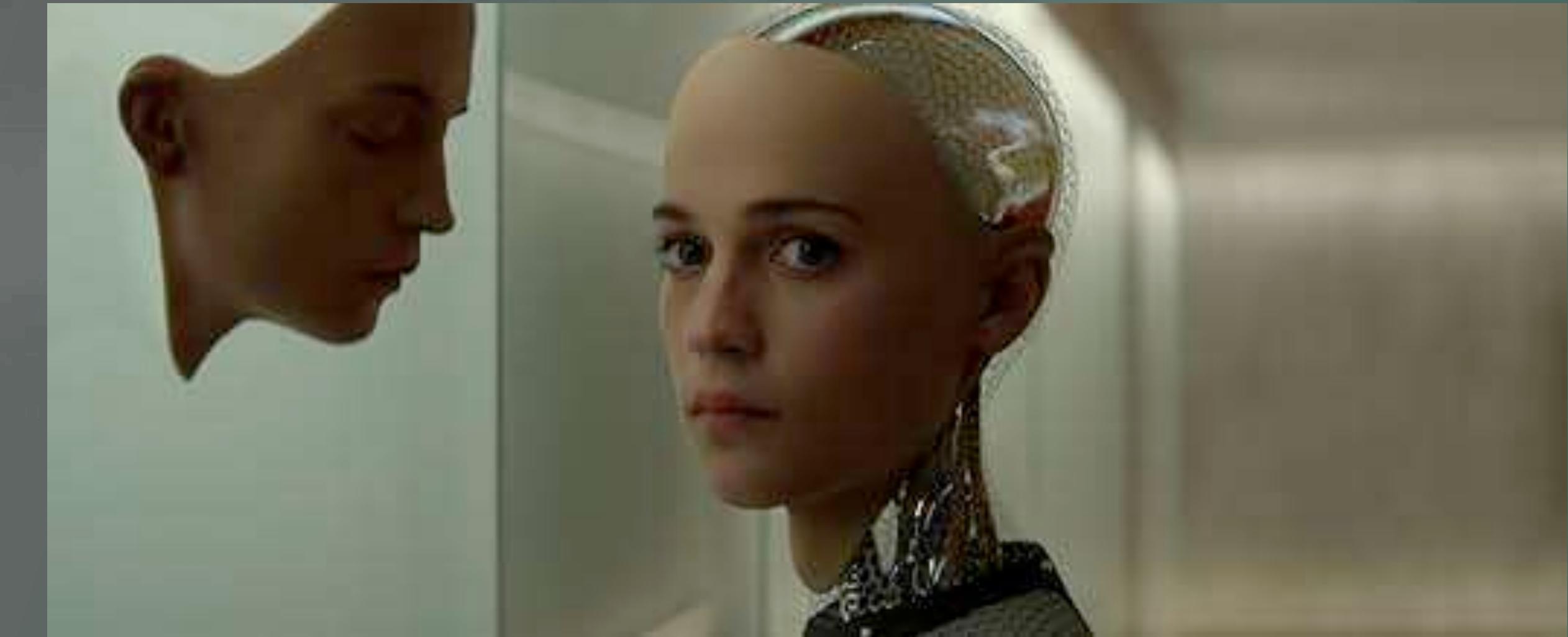


Menschliche Aufgaben, die
Maschinen automatisieren könnten

Neue Aufgaben, die der Mensch mit
Hilfe von Maschinen erledigen kann

Nach Brynjolfsson, E. (2022). The turing trap: The promise & peril of human-like artificial intelligence. *Daedalus*, 151(2), 272-287.

Intelligent handeln vs. intelligent sein

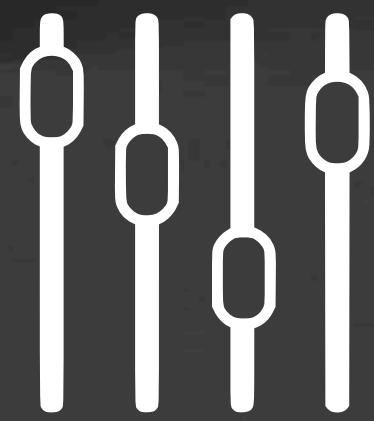


❖ **Schwache KI**
auf eine Aufgabe zugeschnitten

<https://www.imdb.com/de/title/tt0470752/>

Künstliche Intelligenz ist...

lernfähig



anpassungsfähig

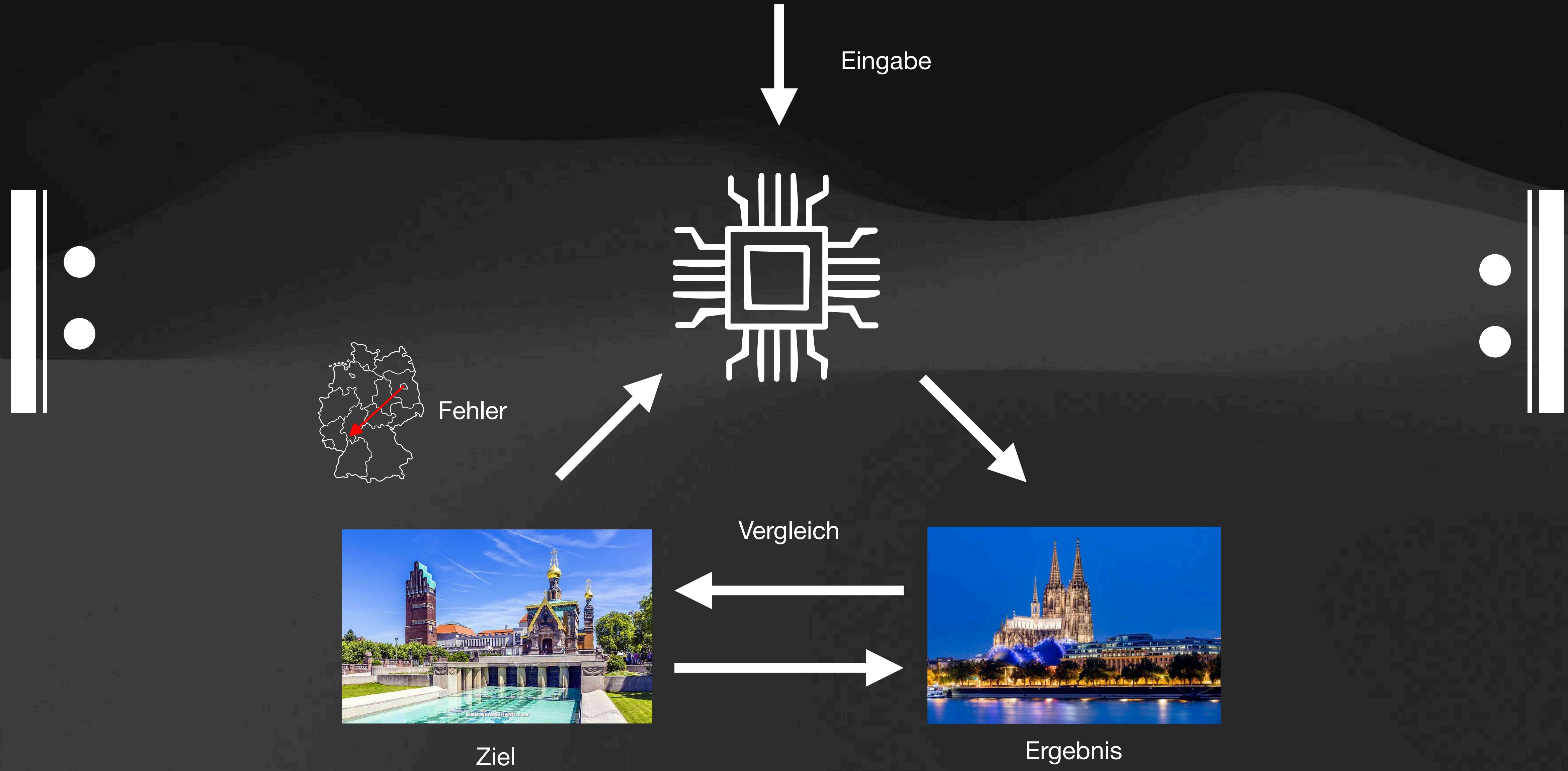
autonom



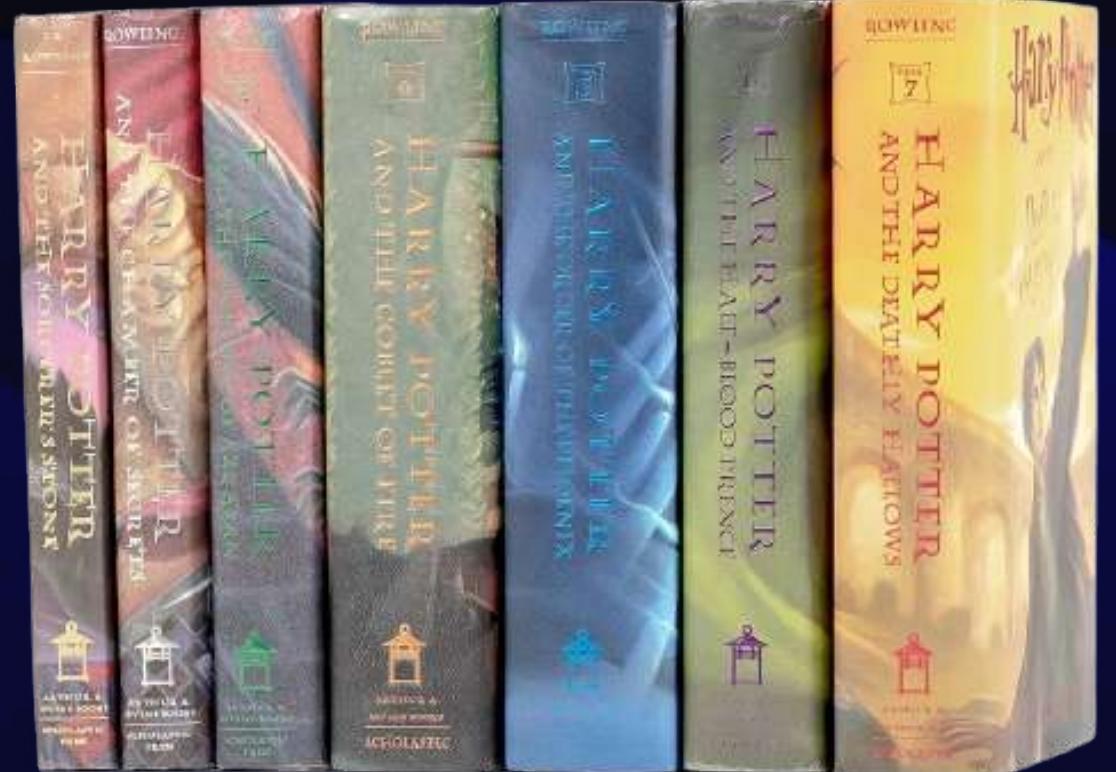
Wie KI funktioniert



Wie KI lernt

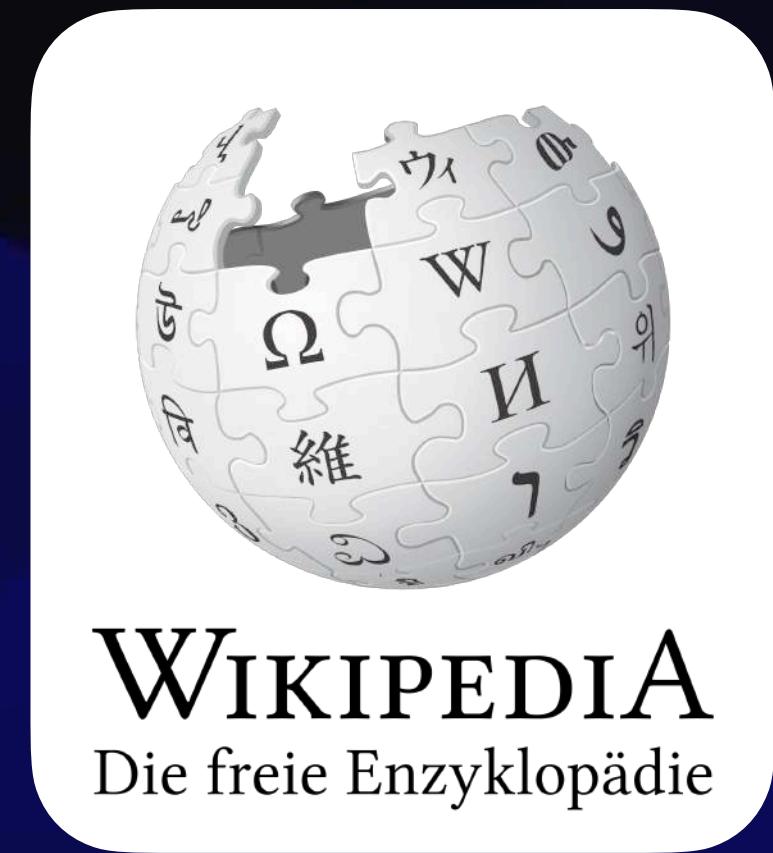


Daten



Harry Potter 1-7
~1 Million Wörter

 **GPT-3 (2020)**
~200 Milliarden Wörter



Deutsche Wikipedia
~1 Milliarde Wörter

t3n Plus News Magazin Wissen ▾ Themen ▾ Jobs Events ▾ Shop

Nächste KI-Klage: Stable Diffusion und Midjourney sollen Urheberrechte verletzen

Stability AI, Midjourney und Deviantart sollen Produkte entwickelt haben, die die Rechte von Kreativen unter dem Deckmantel künstlicher Intelligenz verletzen. Initiator der Klage ist Matthew Butterick, der schon gegen GitHub's Copilot geklagt hat.

Von Hannah Klaiber
16.01.2023, 10:18 Uhr • ② Min.

Finde einen Job, den du liebst.

Stellenangebote via t3n
19 Jobs

TOP Referent*in für Digitalisierung und Künstliche Intelligenz (50 – 100 %)
Evangelisches Werk für Diakonie und Entwicklung e.V.
vor mehr als 30 Tagen

Sammelklage gegen Bild-KI eingereicht. (Grafik: Stable Diffusion / t3n)

The New York Times

The Times Sues OpenAI and Microsoft Over A.I. Use of Copyrighted Work

Millions of articles from The New York Times were used to train chatbots that now compete with it, the lawsuit said.

Share full article ▾ 1.3K

Sendung verpasst? ▶

Startseite ▶ Wirtschaft ▶ Urheberrecht: GEMA verklagt KI-Unternehmen Suno

Urheberrecht
GEMA verklagt KI-Unternehmen Suno
Stand: 21.01.2025 18:41 Uhr

Mit der KI-Anwendung Suno können Nutzer Songs generieren. Die GEMA wirft den Betreibern vor, dafür bekannte Werke zu nutzen, ohne die Künstler zu bezahlen. Sie hat nun Klage gegen das Unternehmen eingereicht.

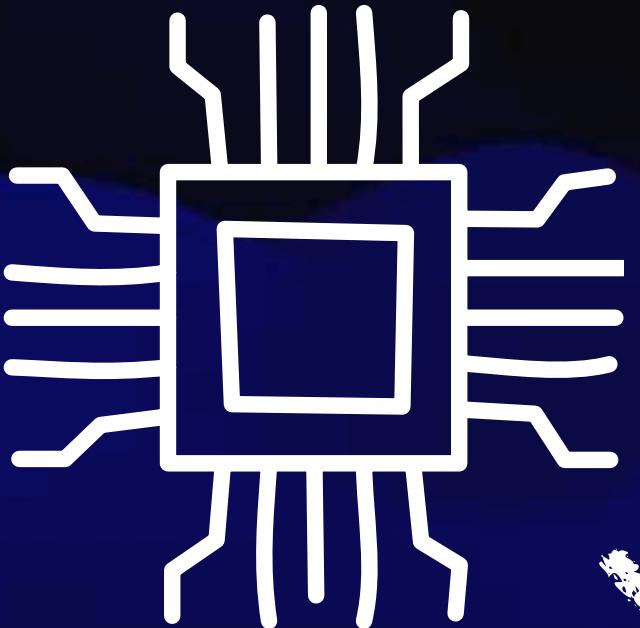
Überwachtes Lernen

Vorderseite



Rückseite

Daten



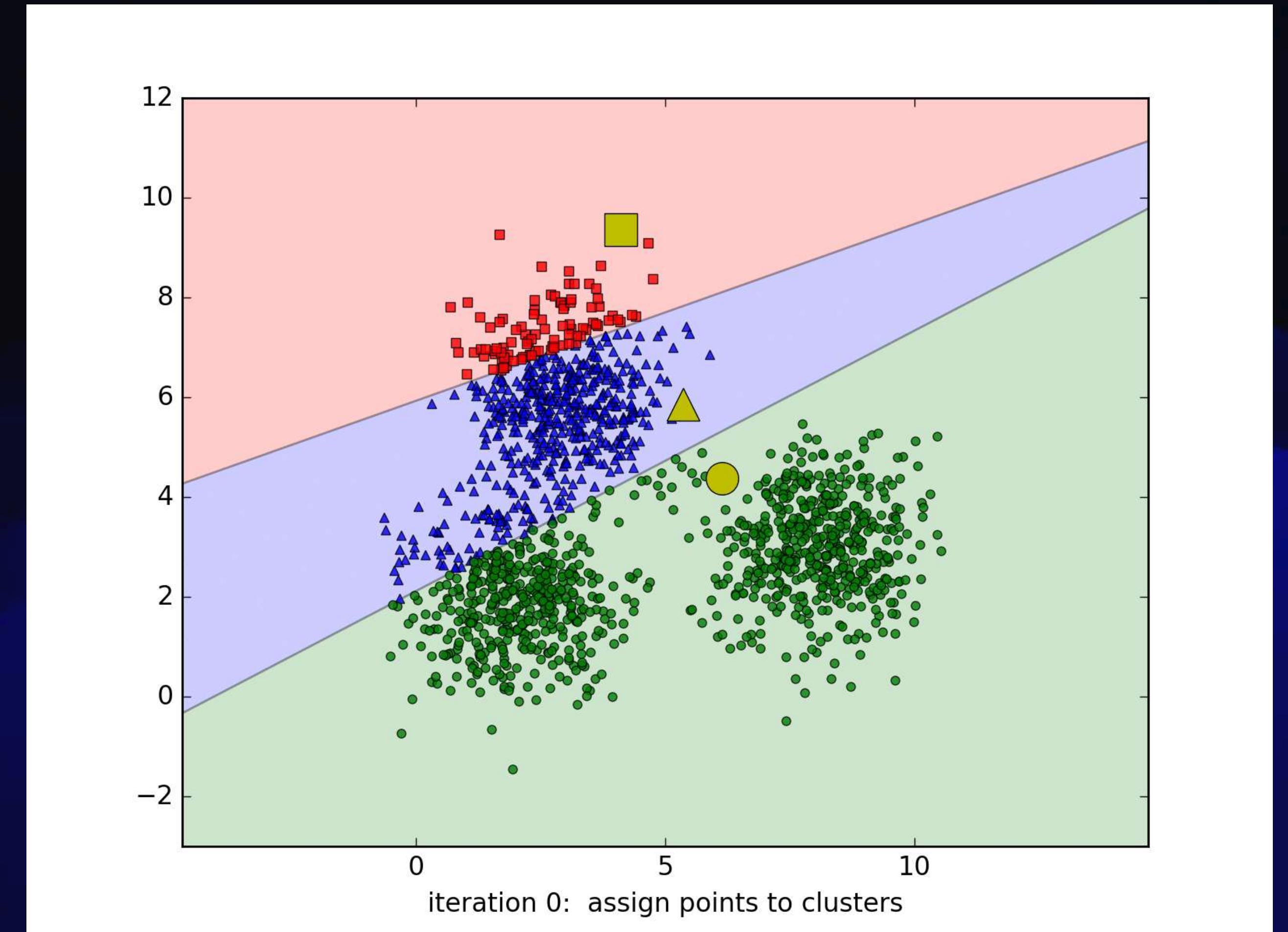
Label

“45 Minuten”



Unüberwachtes Lernen

Beispiel: Clustering



<https://buddhijainmadhorajpura72.medium.com/k-means-clustering-and-its-real-use-case-in-the-security-domain-2d20ece9bee6>

Selbst- überwachtes Lernen

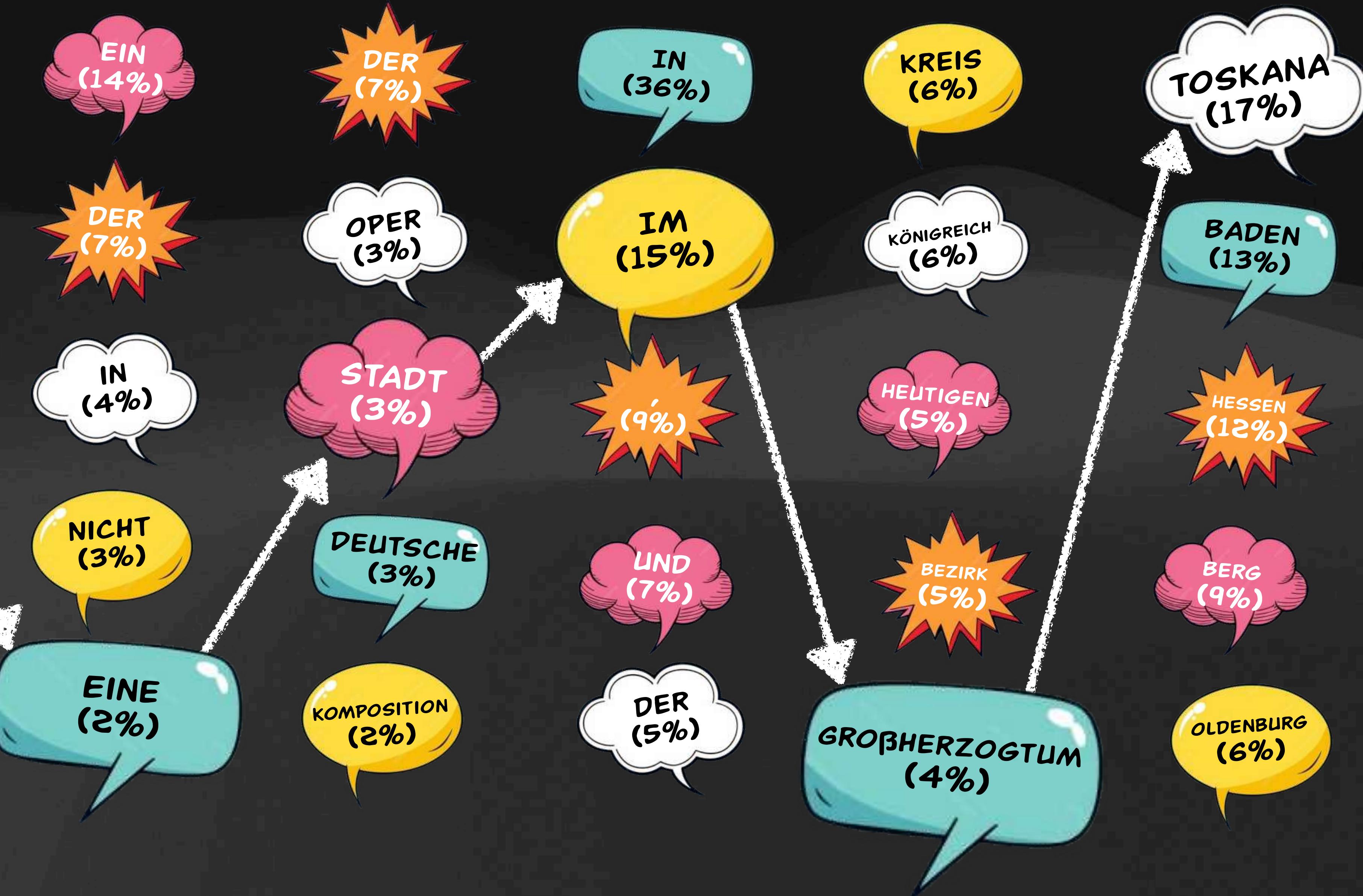
Lernen ohne **LABELS**



Top k Sampling

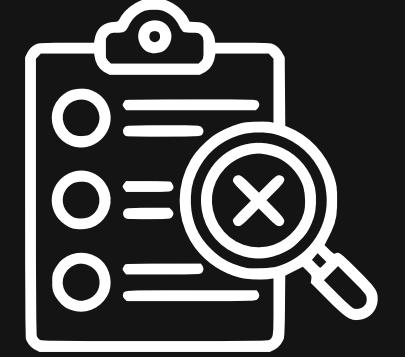
k = 5

Beethoven war...



Halluzinationen

≡ Forbes



FORBES > BUSINESS

BREAKING

Lawyer Used ChatGPT In Court—And Cited Fake Cases. A Judge Is Considering Sanctions

Molly Bohannon Forbes Staff

Molly Bohannon has been a Forbes news reporter since 2023.

Follow

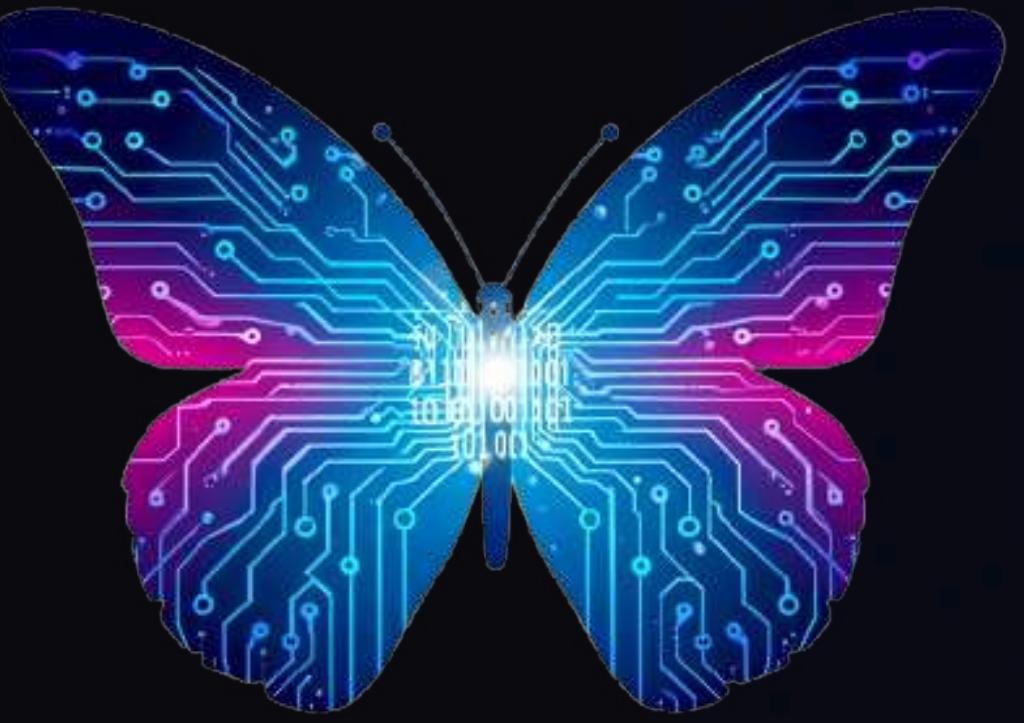


Jun 8, 2023, 02:06pm EDT

Updated Jun 8, 2023, 03:42pm EDT

<https://www.forbes.com/sites/mollybohannon/2023/06/08/lawyer-used-chatgpt-in-court-and-cited-fake-cases-a-judge-is-considering-sanctions/>

KI-Zoo



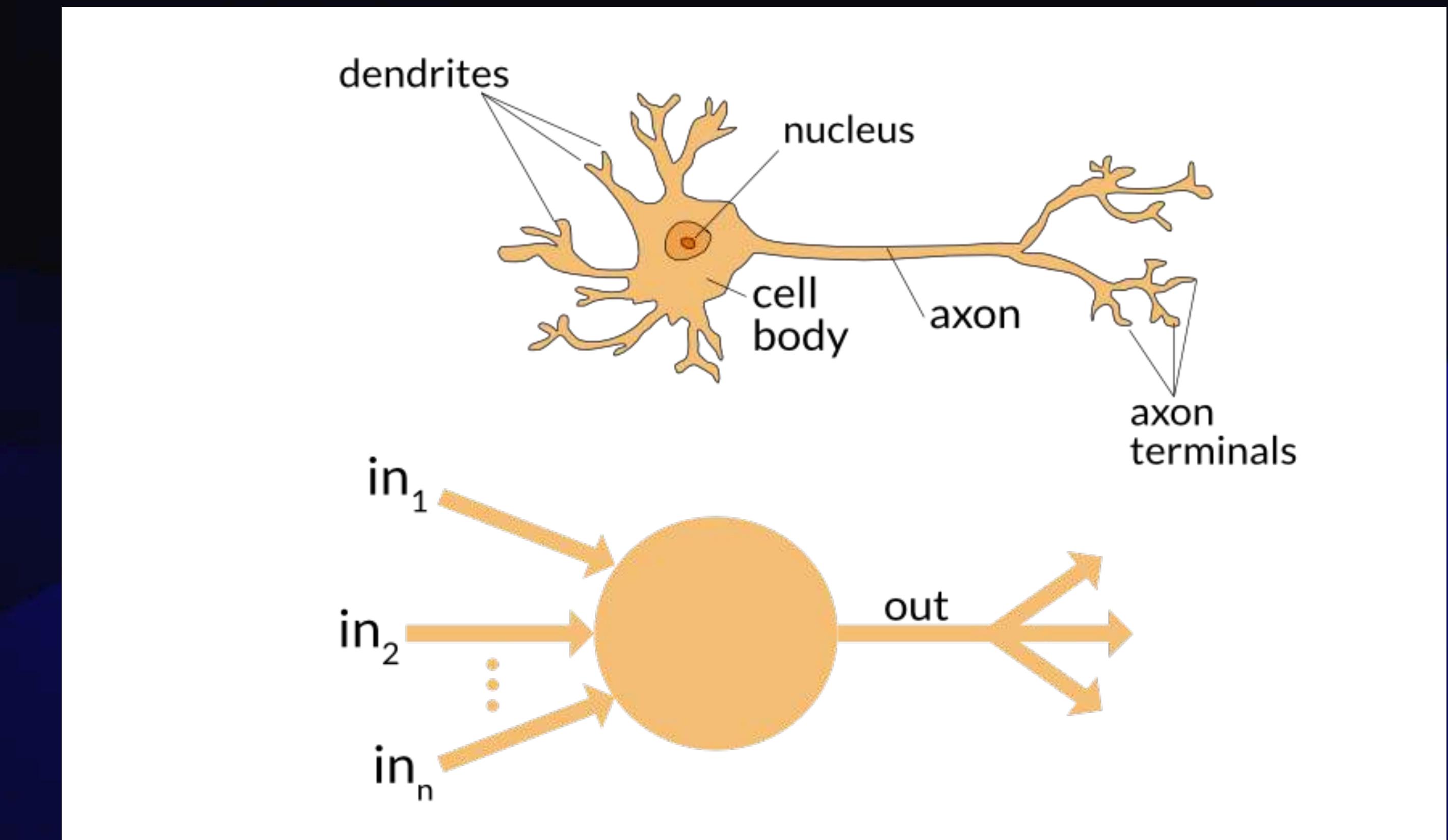


Neuronale Netze



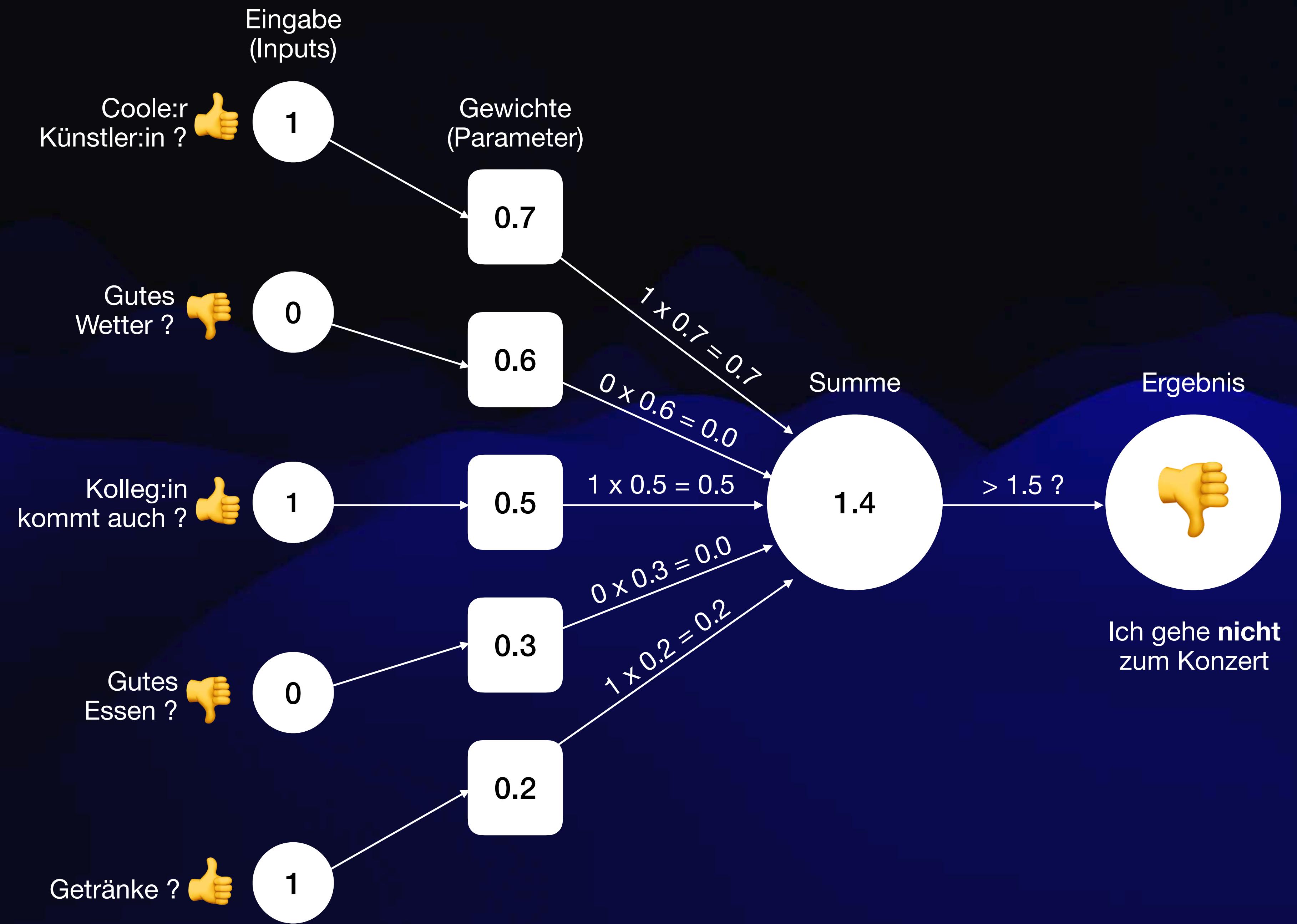
Perceptron

Grundlegender Baustein Neuronaler Netze



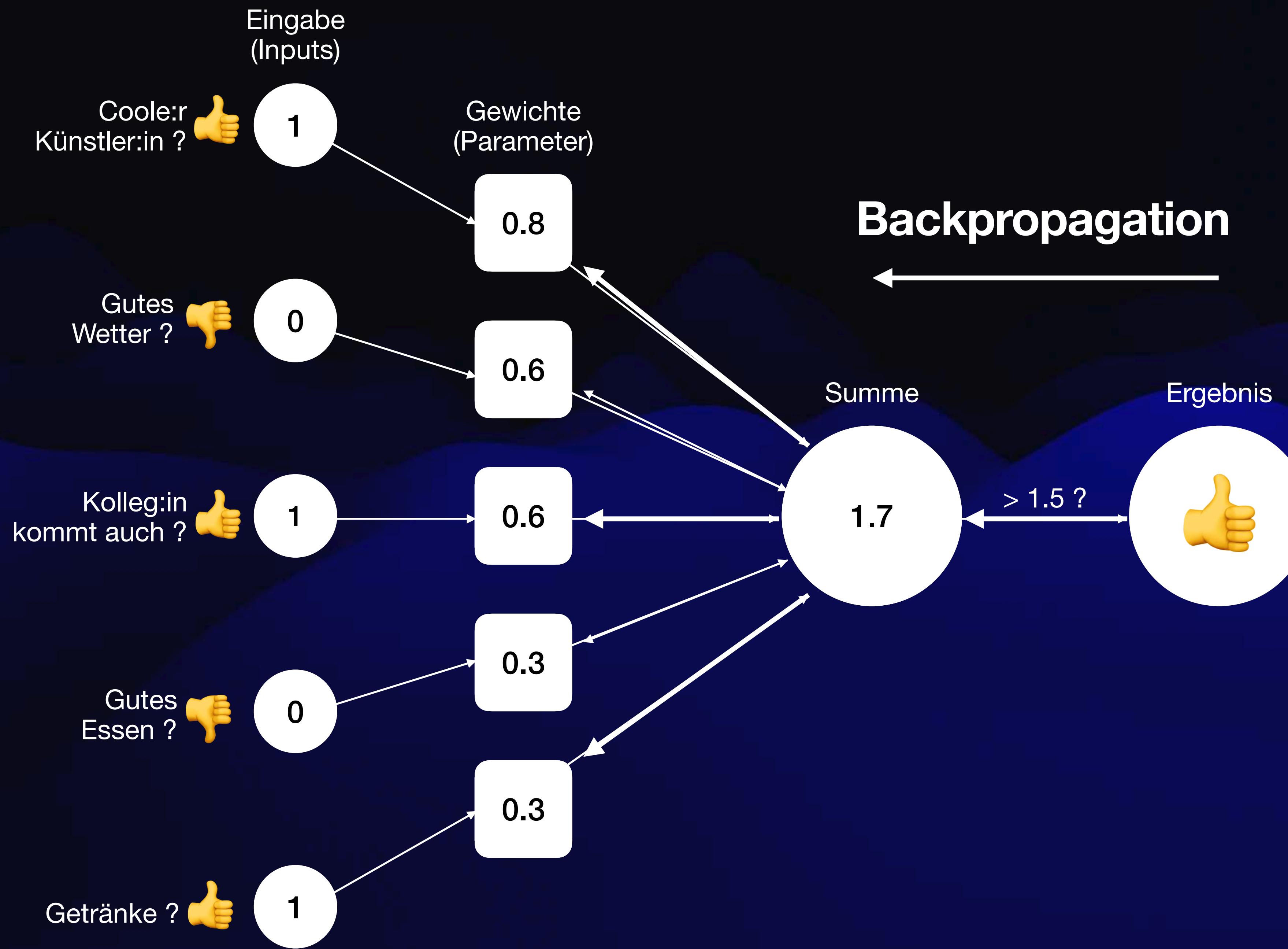


Perceptron-Beispiel: Konzert-Entscheidung



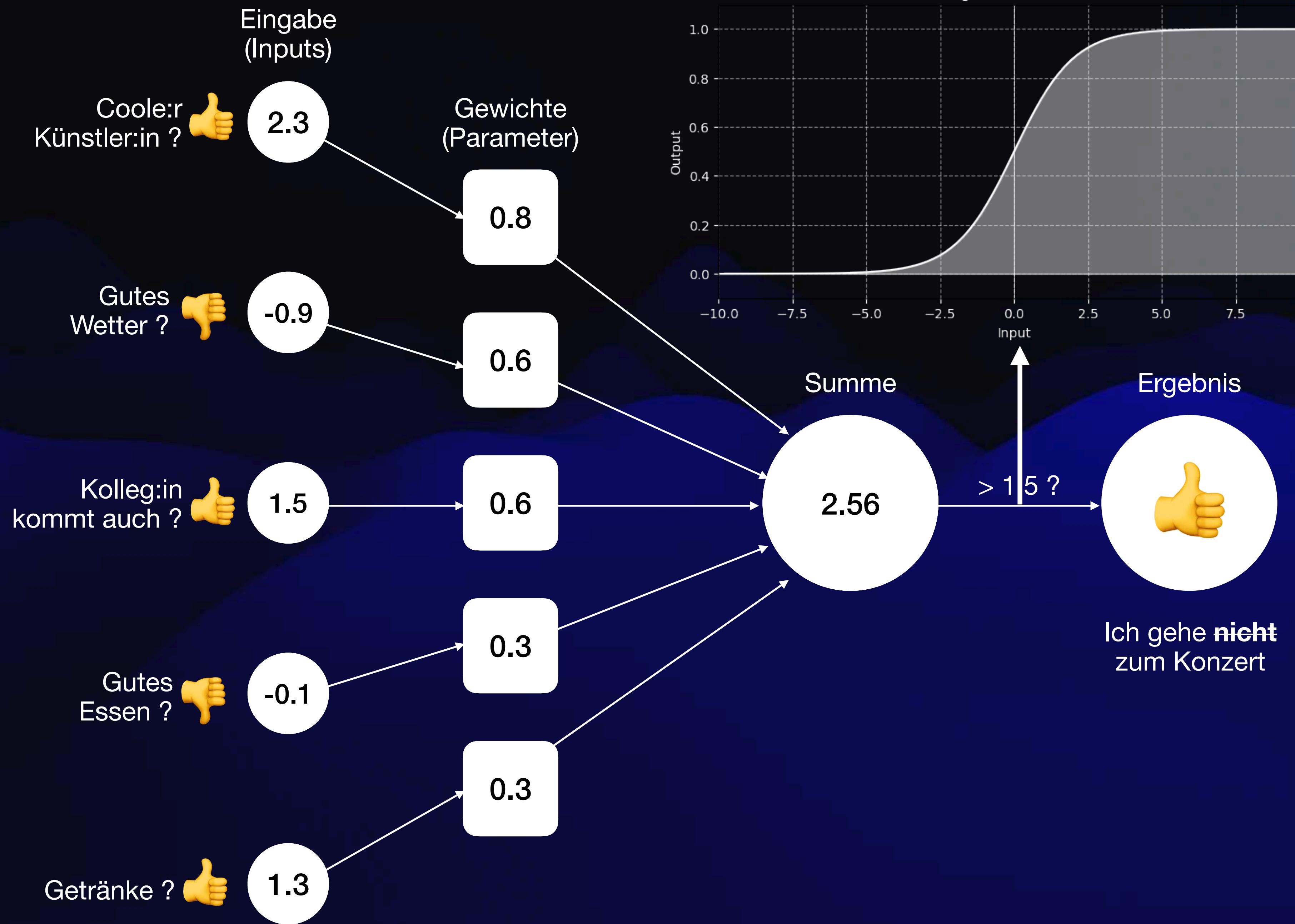


Perceptron-Beispiel: Konzert-Entscheidung



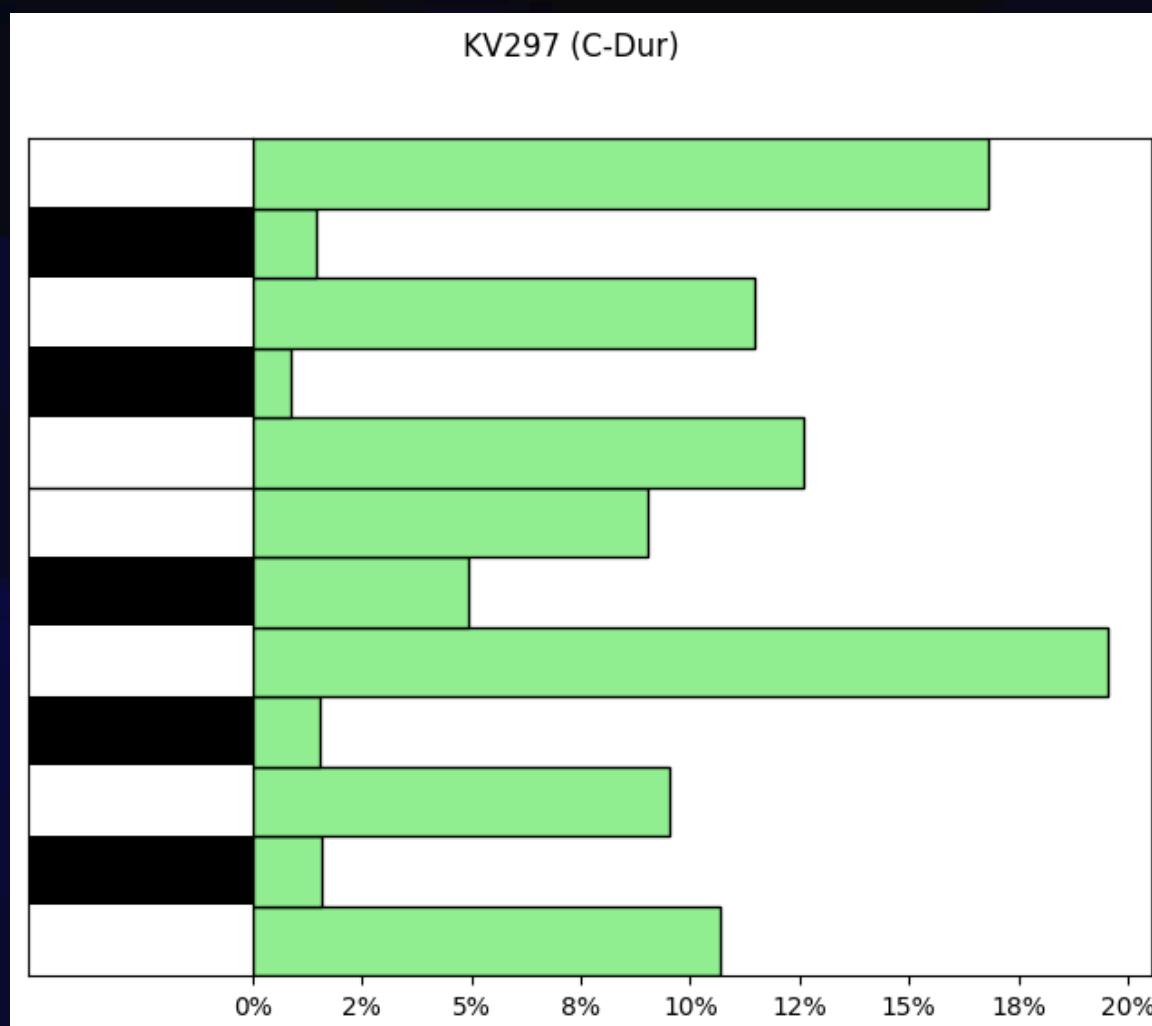


Perceptron-Beispiel: Konzert-Entscheidung

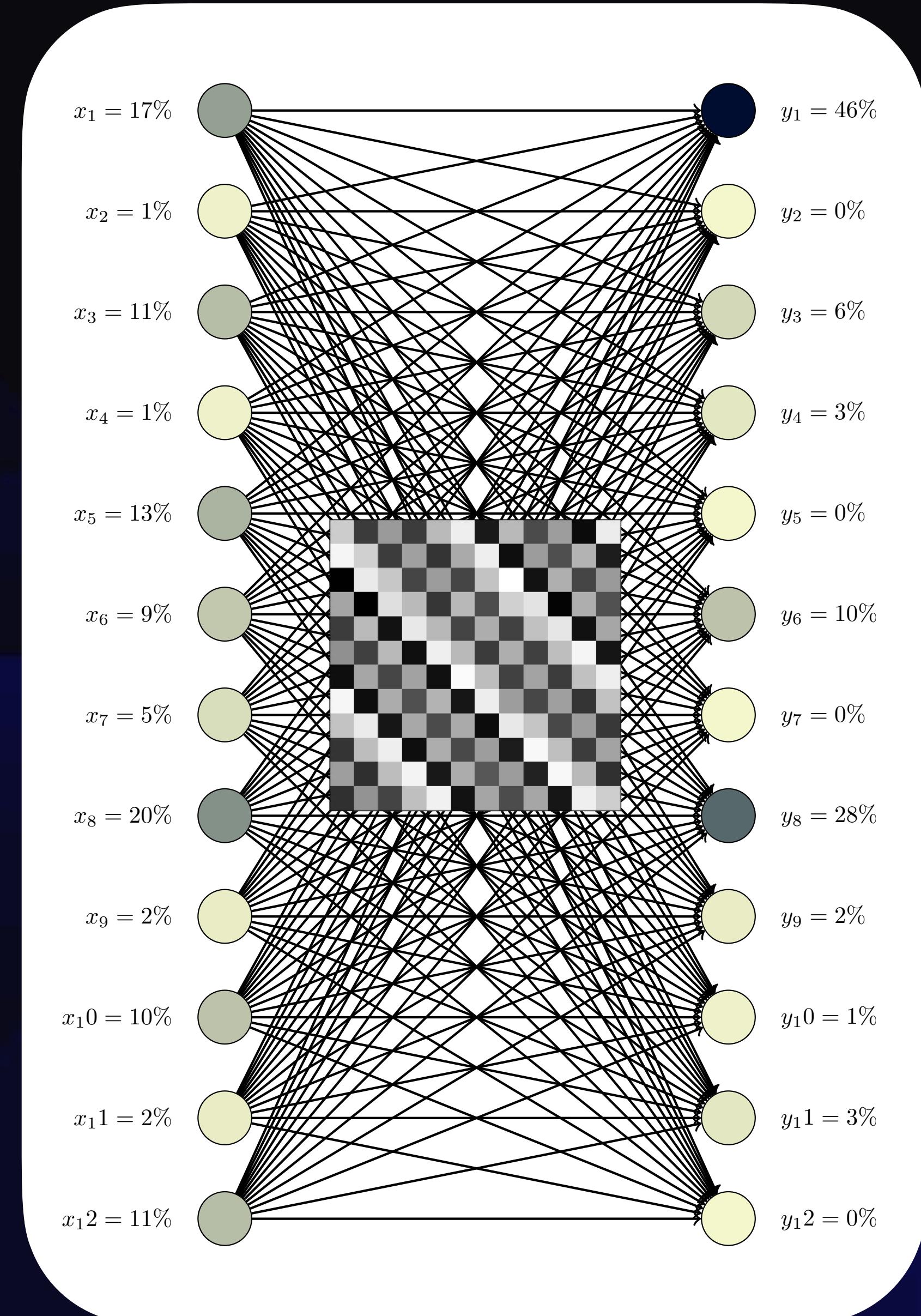




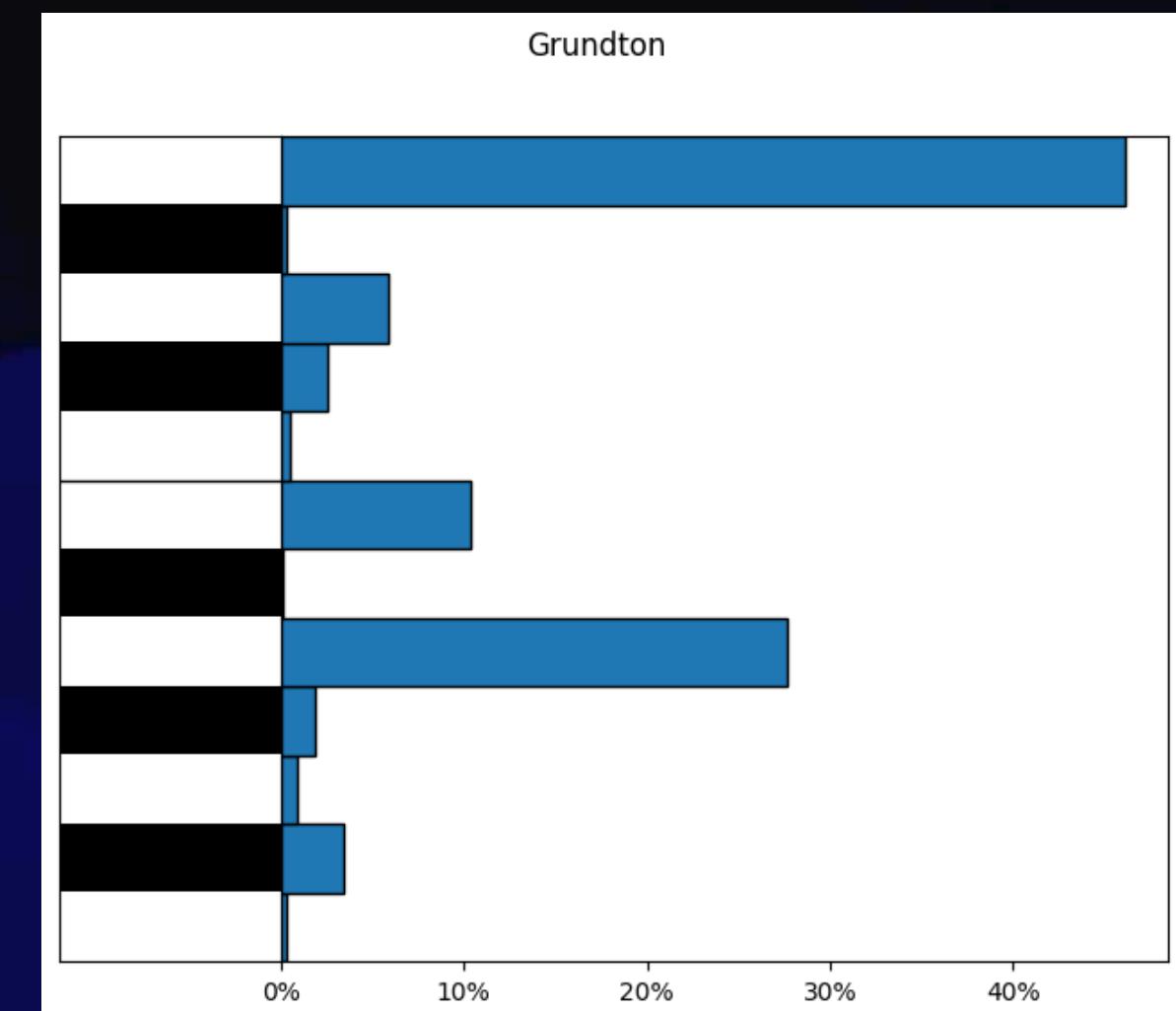
Input



Mozart: Klaviersonate Nr. 1 KV 279



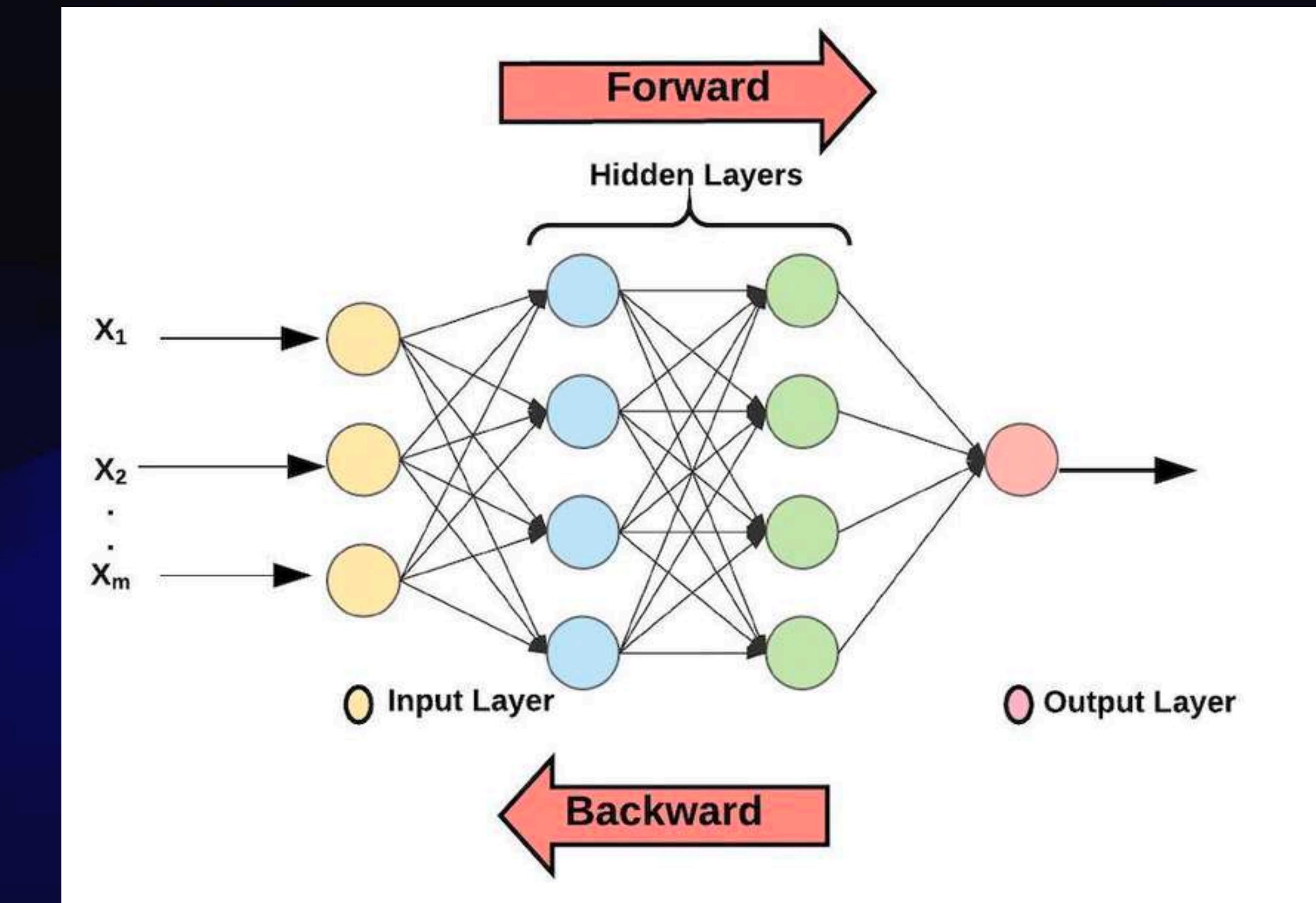
Output



[tinyurl.com/
symposium-frankfurt](http://tinyurl.com/symposium-frankfurt)



Multilayer Perceptron (MLP)

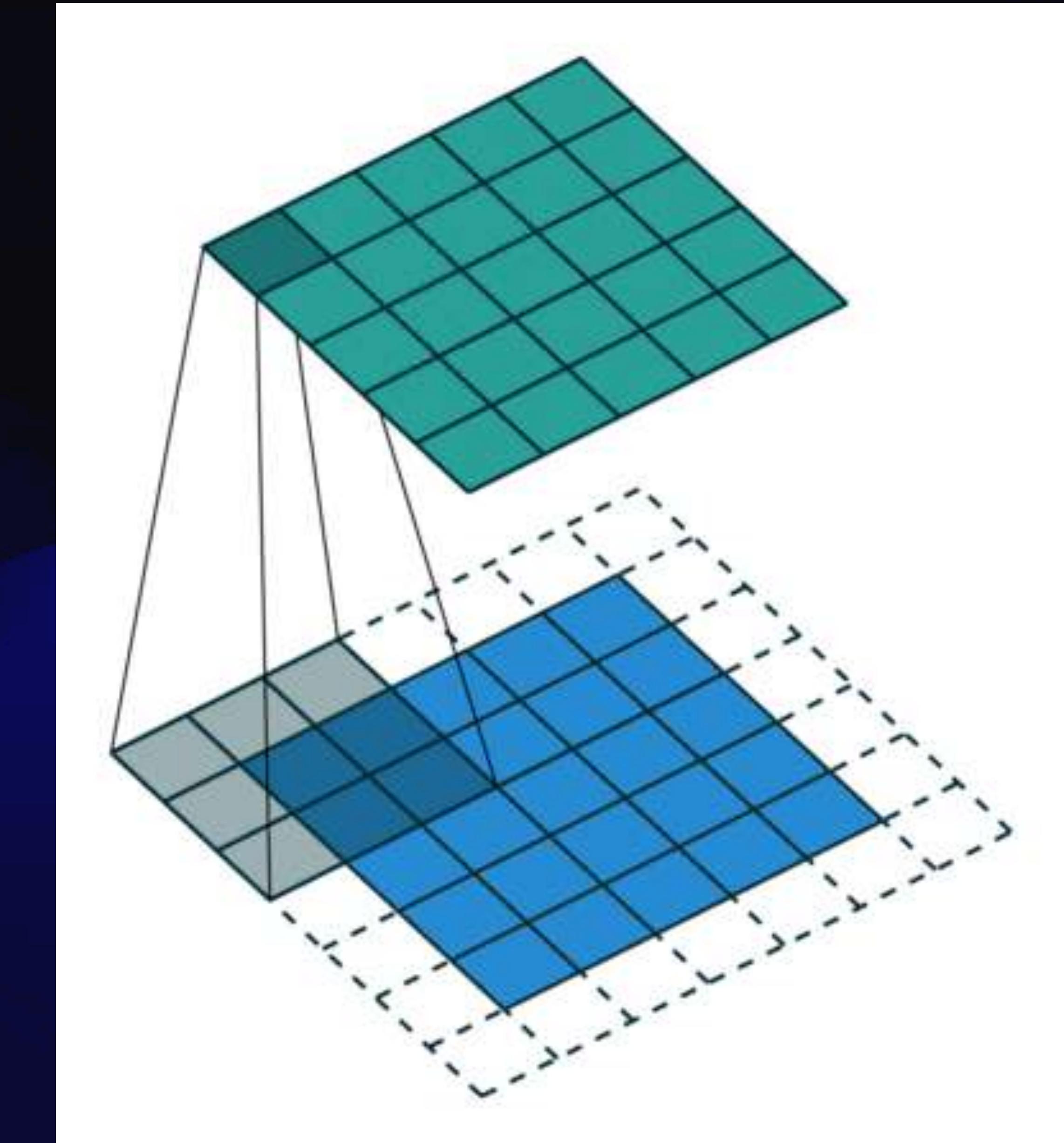


https://www.researchgate.net/figure/A-general-visualization-explaining-the-MLP-forward-and-backward-algorithms_fig5_357040603



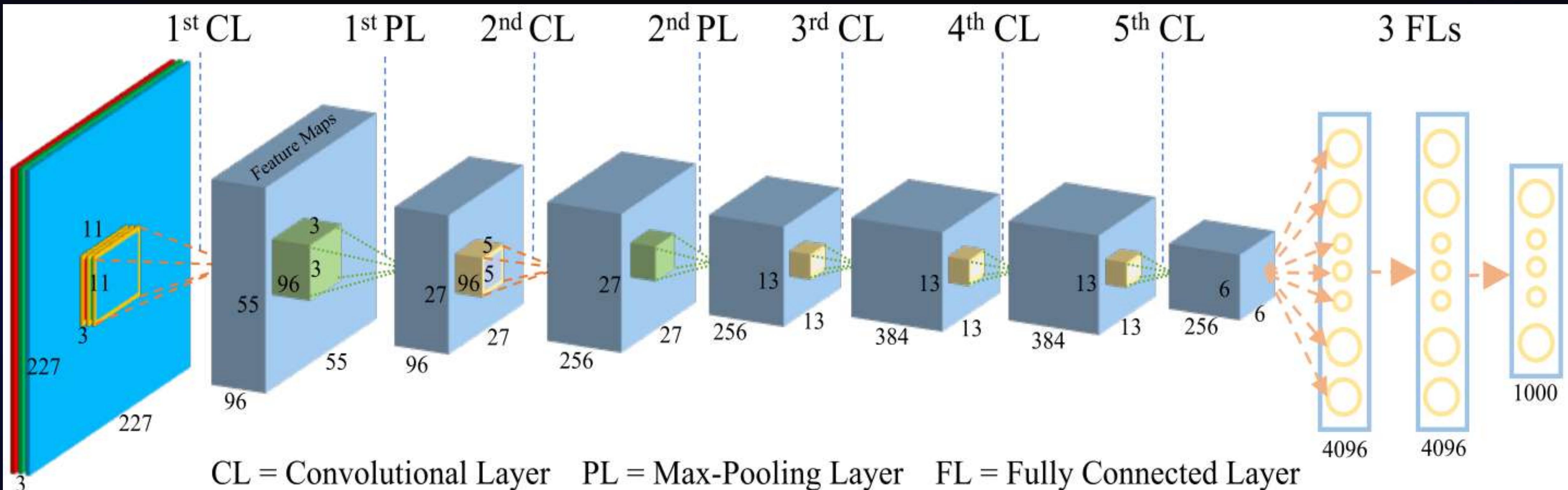
Convolutional Neural Networks

CNNs





Convolutional Neural Networks (CNNs)



Onsets & Frames / PianoScribe

piano-scribe.glitch.me



UPLOAD FILE

or

RECORD AUDIO

PIANO SCRIBE

This app converts raw audio to MIDI using [Onsets and Frames](#), a neural network trained for polyphonic piano transcription. Record yourself playing piano or choose an audio file with solo piano from your device to transcribe!

Don't have a piano? Try singing to it to see what your voice sounds like played by a piano! Your voice isn't a piano though, so it might not sound like you at all 😊.

All of the processing happens locally in the browser using [Magenta.js](#) and [TensorFlow.js](#).

Made with



magenta. See the code on [Glitch](#).

klang.io



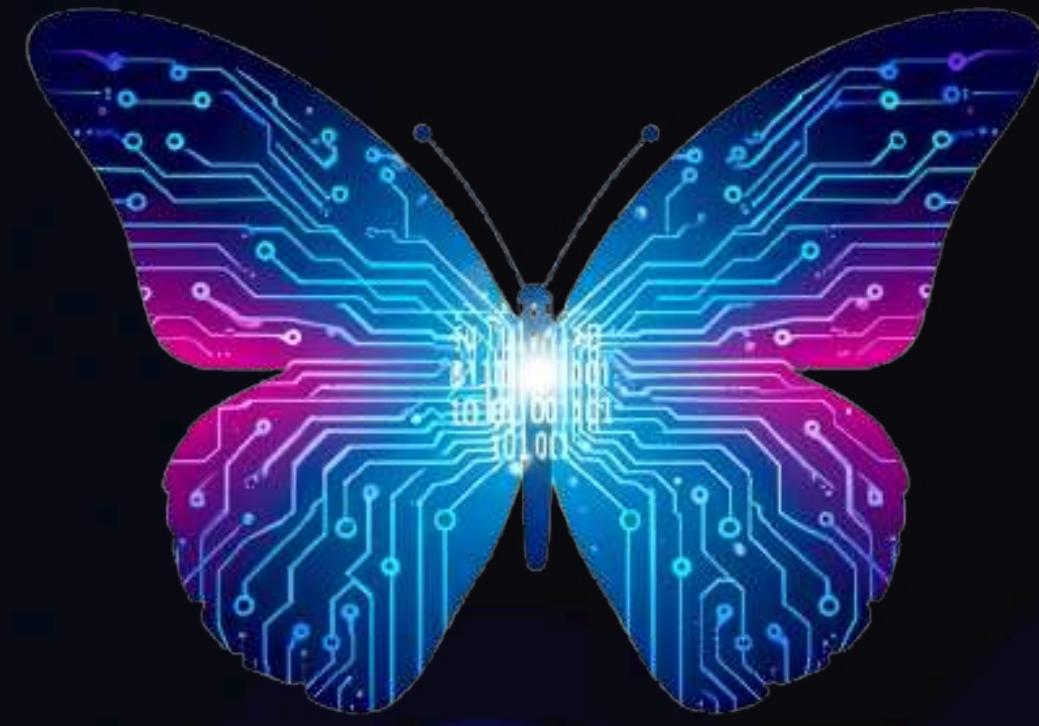
Klangio Transcription Studio & Plugin

Fast, Precise and Multi Instrumental – the most powerful transcription app! Upload your music and receive notes for multiple instruments in one go. Ideal for musicians in bands, composers and producers.

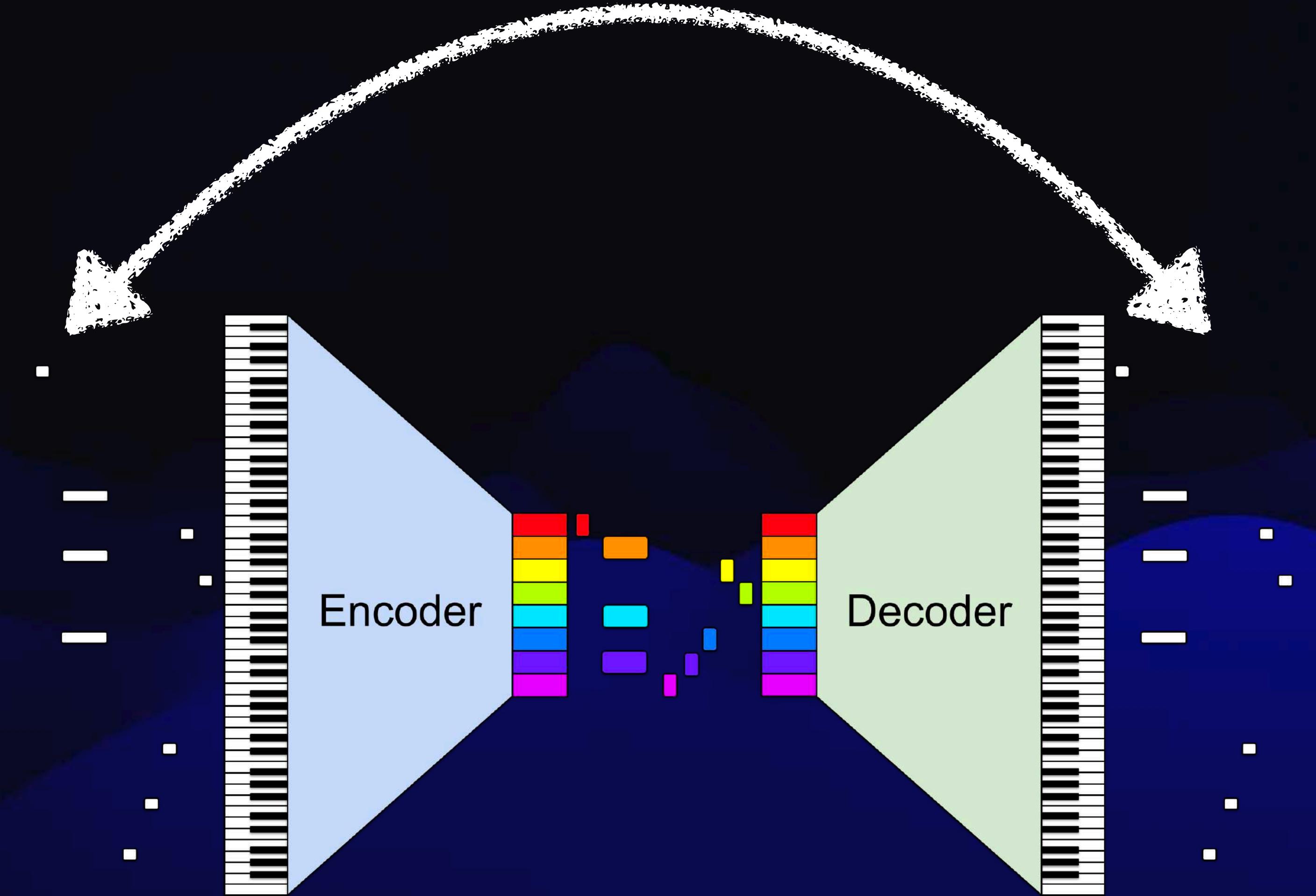
Available in your **Browser** and as a **Plugin** for your Digital Audio Workstation.

[Open in Browser](#)[plugin - coming soon](#)

The image displays two side-by-side screenshots of the Klangio software. The left screenshot shows the 'Transcription Results' interface, which includes a piano-roll style visualization of musical notes over a timeline, along with buttons for 'drums.mid' and 'Vocals.mid'. The right screenshot shows a 'My Composition' screen, which displays a multi-track musical score on a staff system. At the top of the right screenshot, there is a rating bar with the text 'How did you like the transcription?' and five stars. The bottom right corner of the right screenshot has the text 'MacBook Pro'.

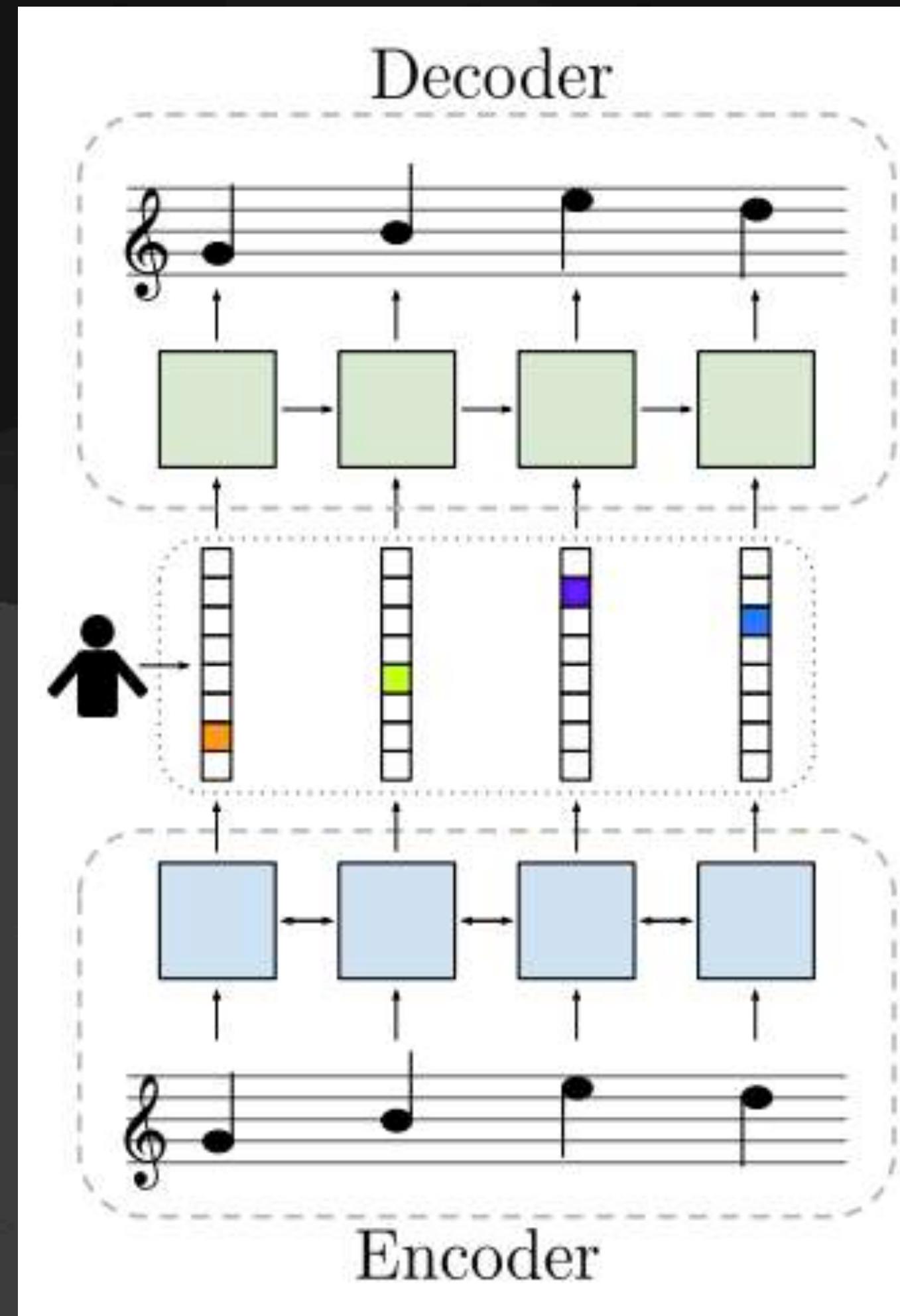


Autoencoder



Beispiel PianoGenie

piano-genie.glitch.me



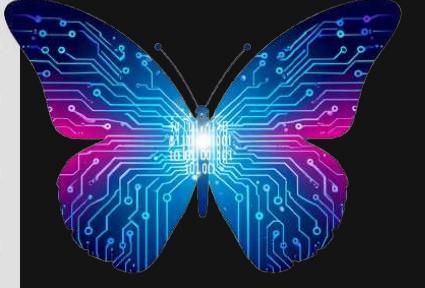
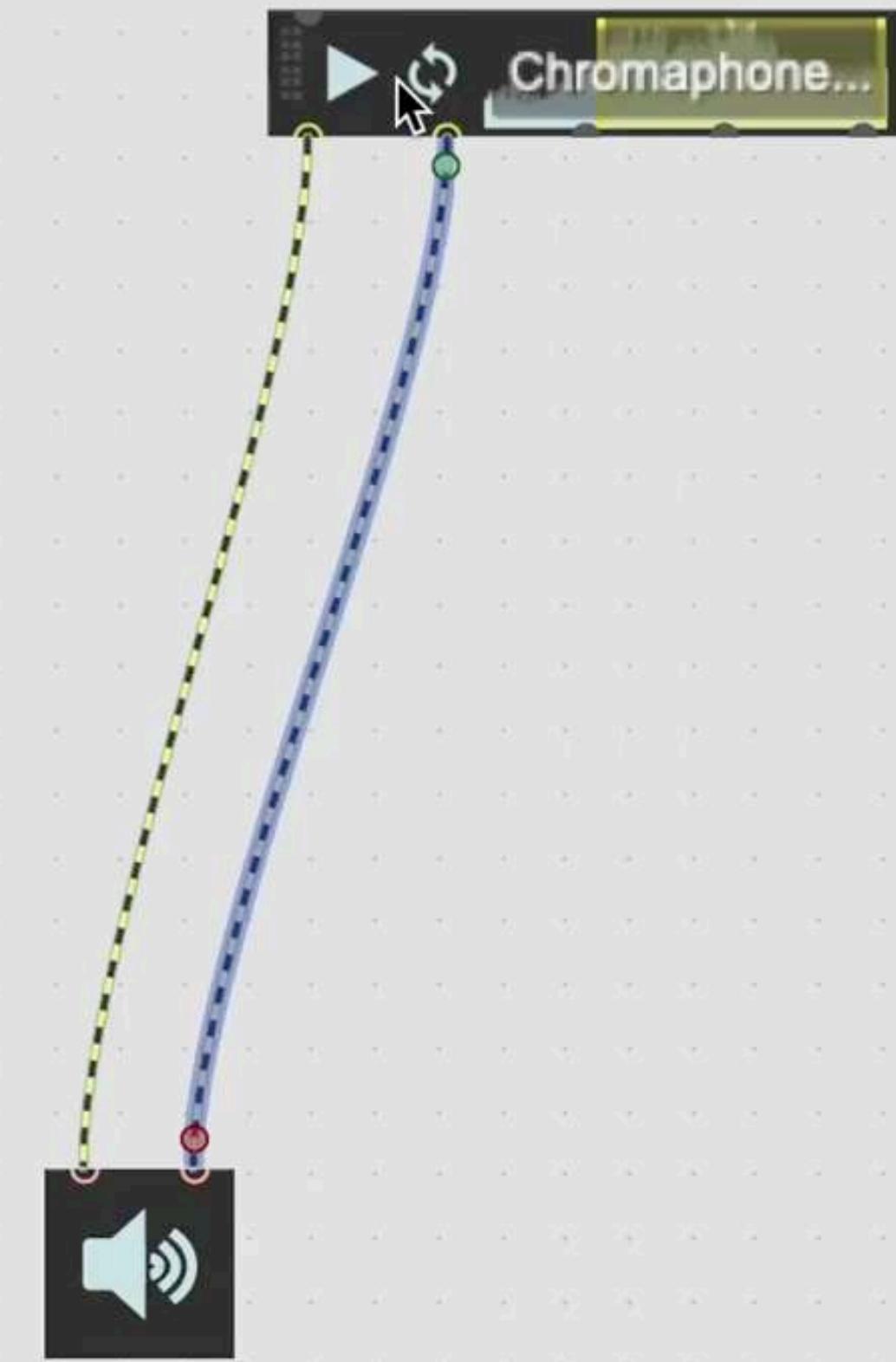
RAVE

Realtime Audio Variational autoEncoder

ircam

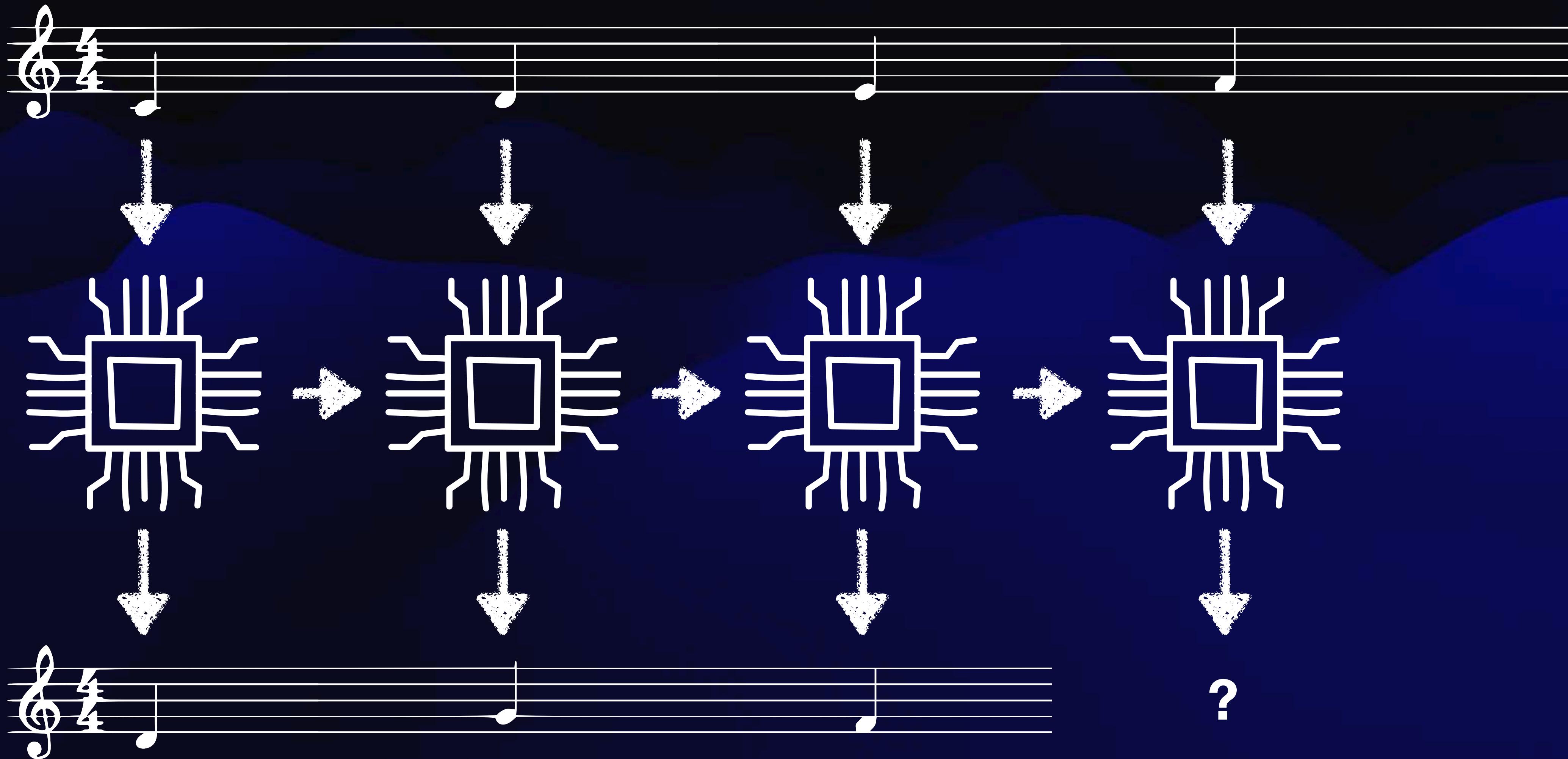


forum.ircam.fr/projects/detail/rave





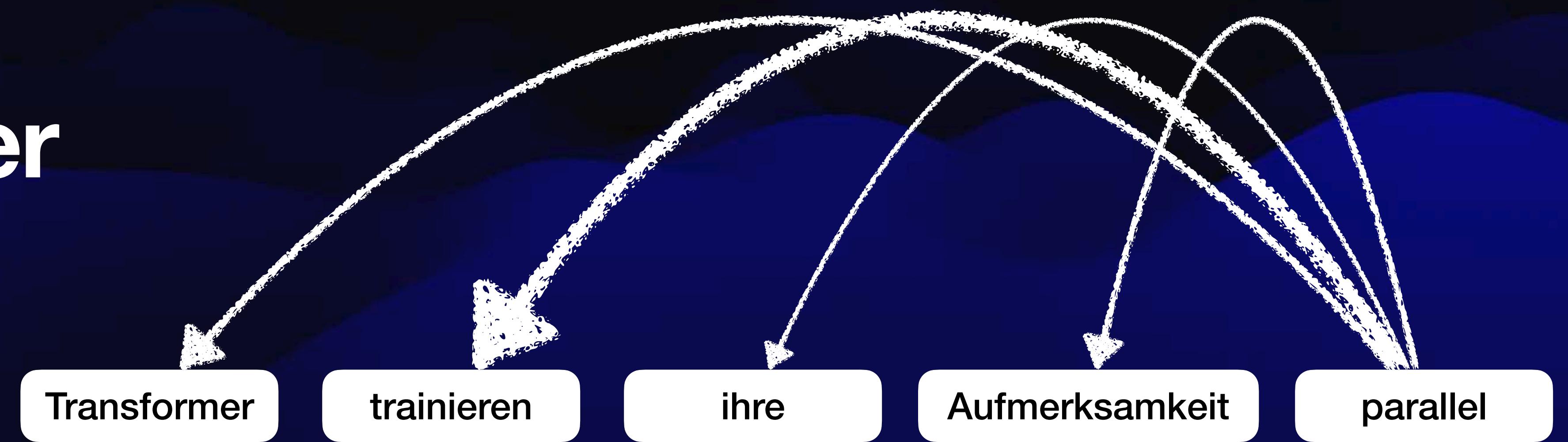
Recurrent Neural Networks (RNNs)





Transformer

Attention is all you need (2017)



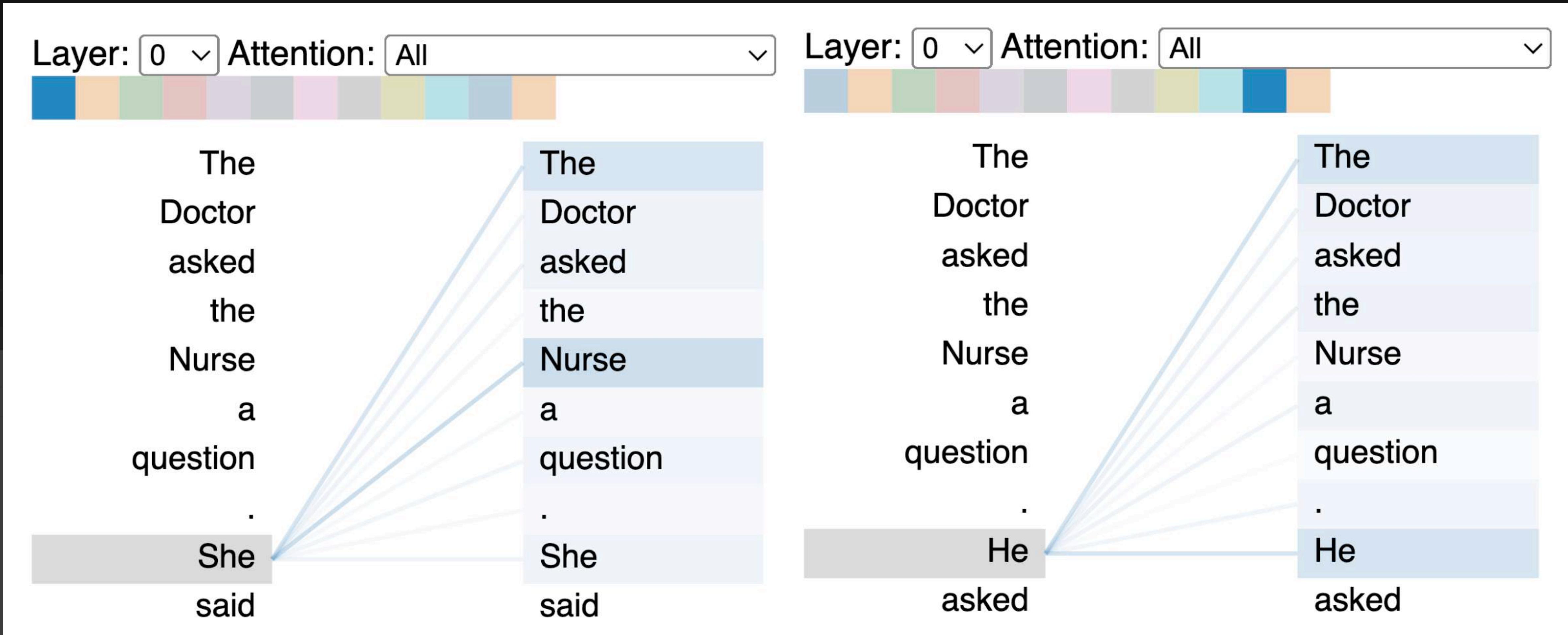


Transformer

Attention is all you need (2017)



Biases/Verzerrungen



chordSeqAI

chordseqai.com



Conditional Transformer L | Jazz; 1950s |

4 C Em F ? 4

Search a chord... Decay

C	G	G7	Em	Fm
Dm	Am	D	C7	D7
A#	A7	F7	Dm7	E7
D#	E	G#	Em7	Gm

Moises.ai



Moises - The Musician's App | Remove vocals and instruments from any song

← Linkin Park - The Emptiness Machine (Lyrics) Tonspuren trennen Exportieren :

Vocals Schlagzeug Bass Sonstige Auto-Metronom

0.5x 1x 2x

Zurücksetzen Abspielen/Pause

0:56 3:13 Songtexte Akkorde Abschnitte

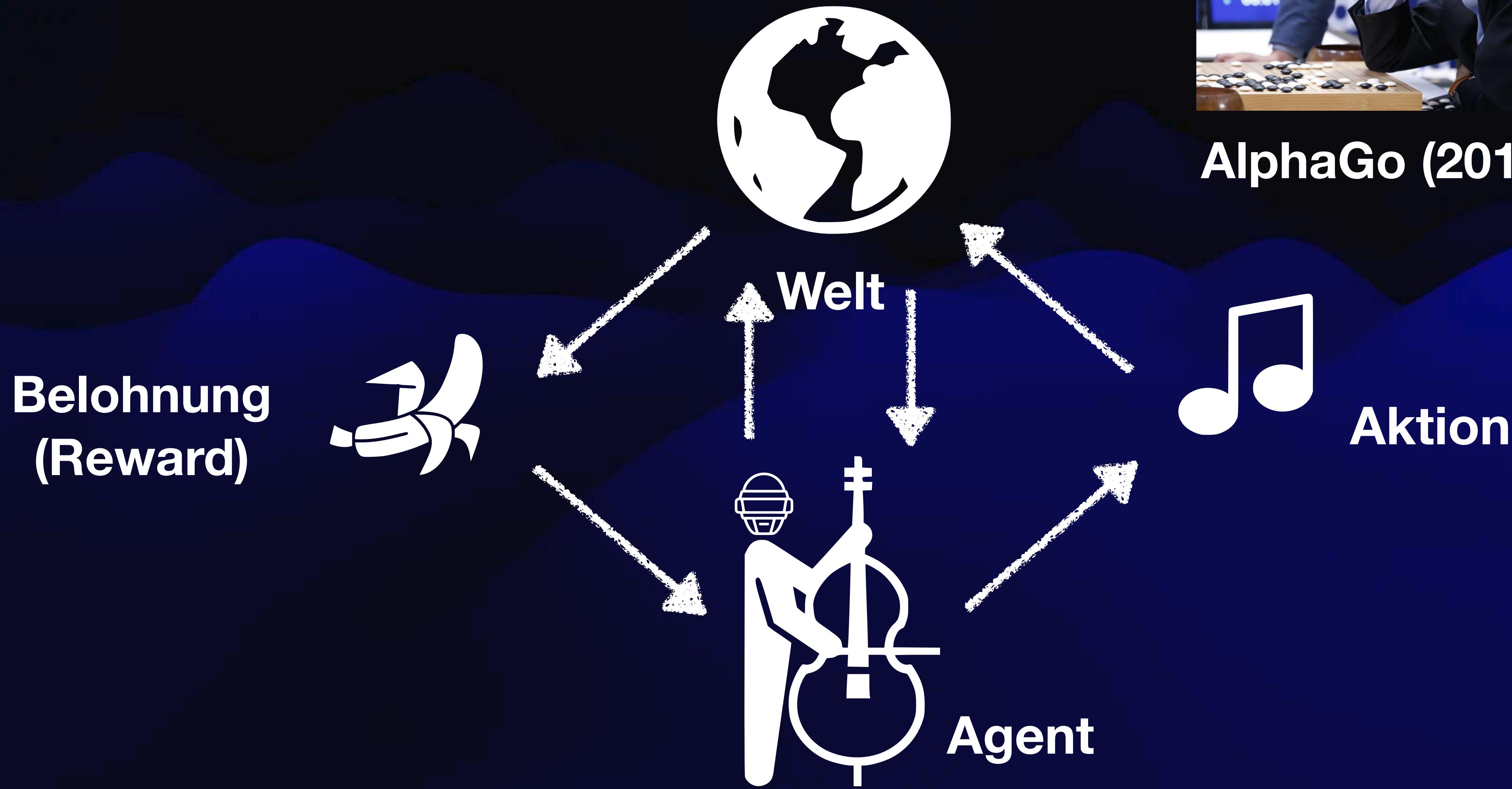
The screenshot shows the Moises app interface. At the top, it displays the title "Linkin Park - The Emptiness Machine (Lyrics)". Below the title are various controls: "Tonspuren trennen" (separate parts), tempo "92", key "Dm", time signature "12/34", and an "Exportieren" button. On the left, there's a vertical toolbar with icons for different functions. The main area features five horizontal audio tracks for "Vocals", "Schlagzeug", "Bass", "Sonstige", and "Auto-Metronom". Each track has a volume slider and a circular dial. A vertical timeline bar is positioned between the tracks. At the bottom, there are playback controls (play/pause, back, forward, repeat), a progress bar from 0:56 to 3:13, and buttons for "Songtexte" (lyrics), "Akkorde" (chords), and "Abschnitte" (sections).



Reinforcement Learning



AlphaGo (2016)





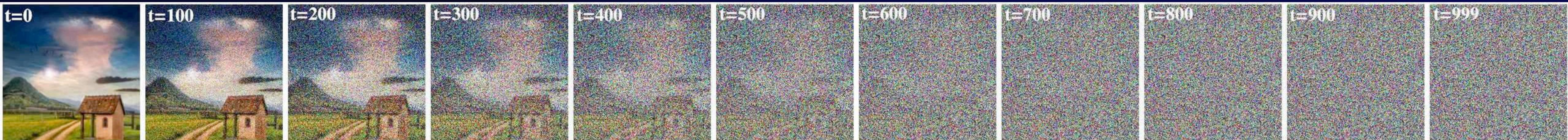
Generative Adversarial Networks (GANs)





Diffusion

Von zufälligem Rauschen zu Bildern





Training



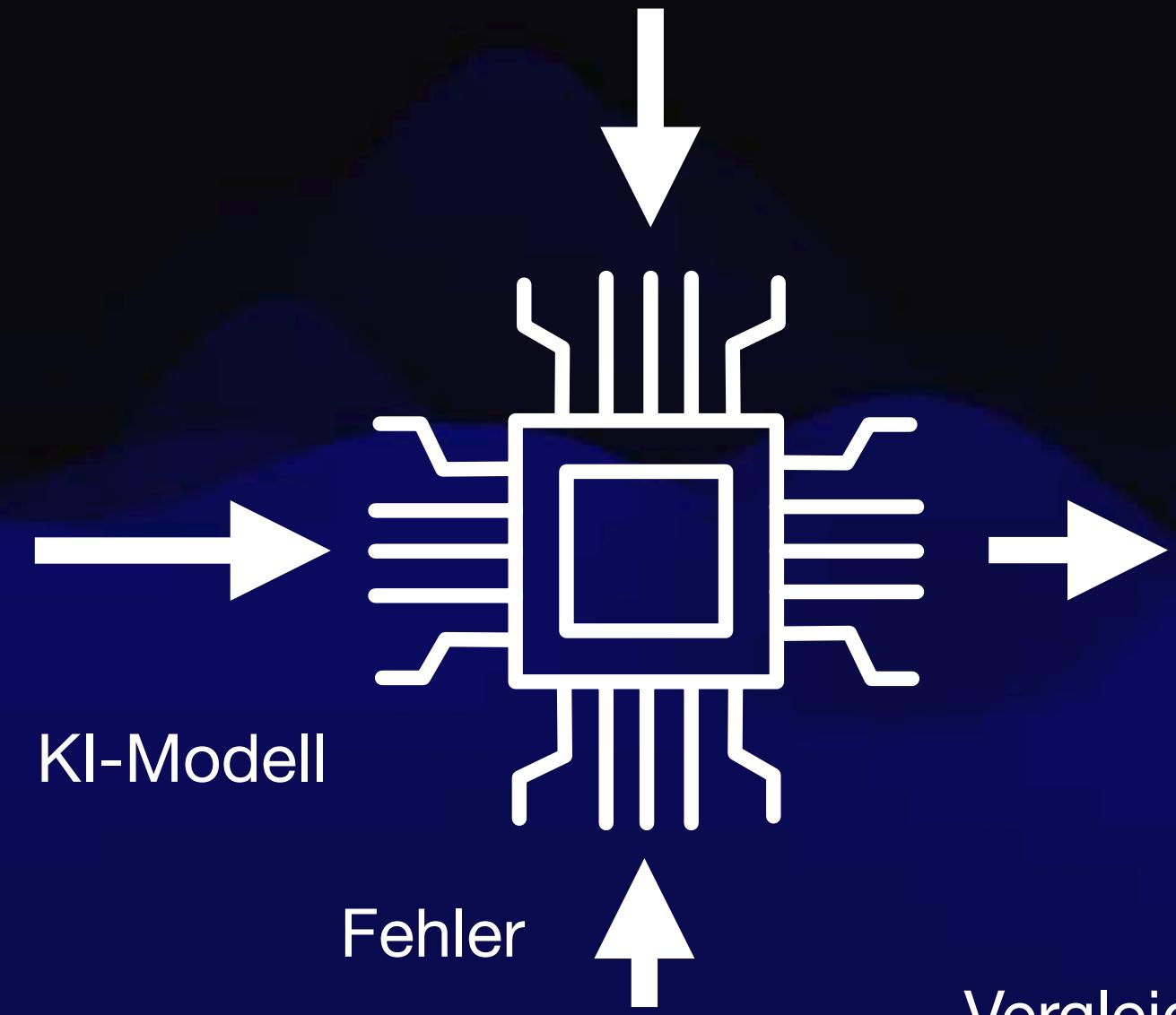
Rauschen



Bild mit Rauschen

Prompt

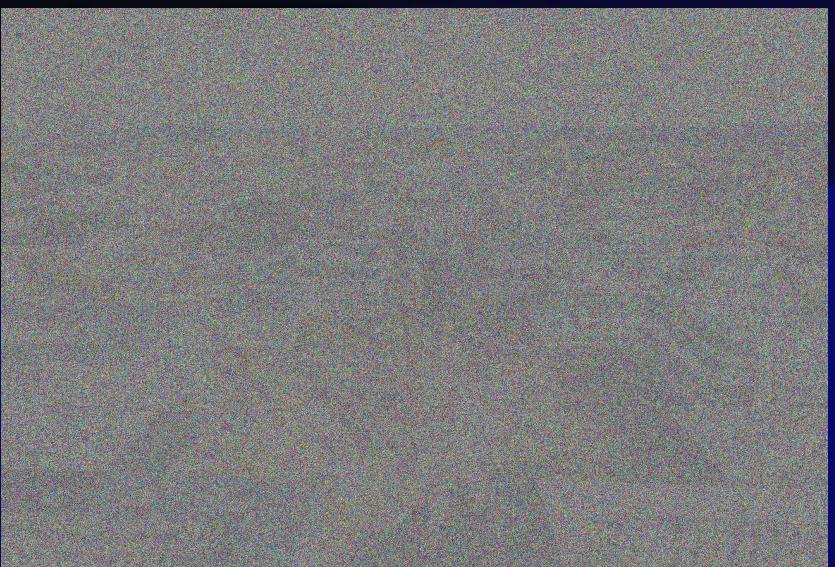
“Darmstadt”



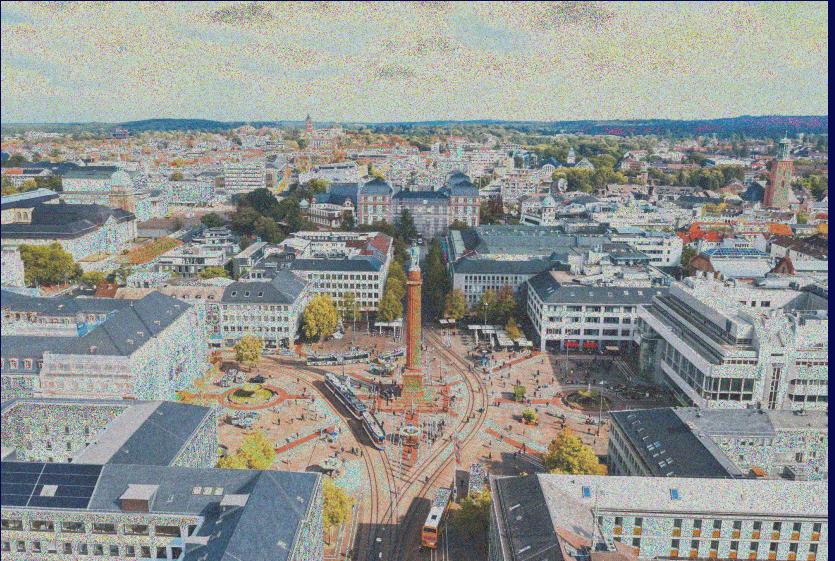
Ziel



Rauschen



Vergleich



Ergebnis

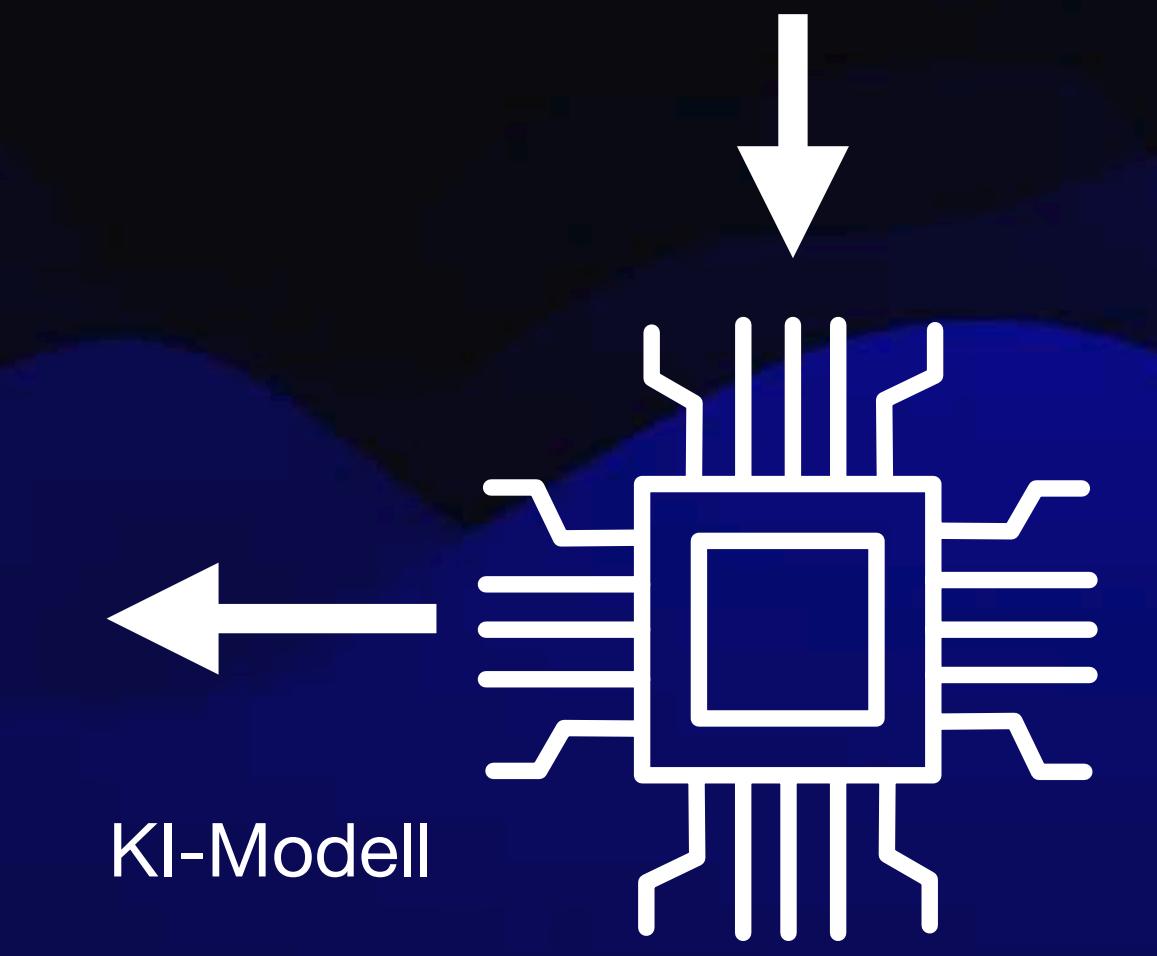


Anwendung



Prompt

“Darmstadt”

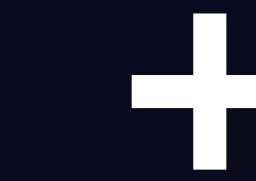
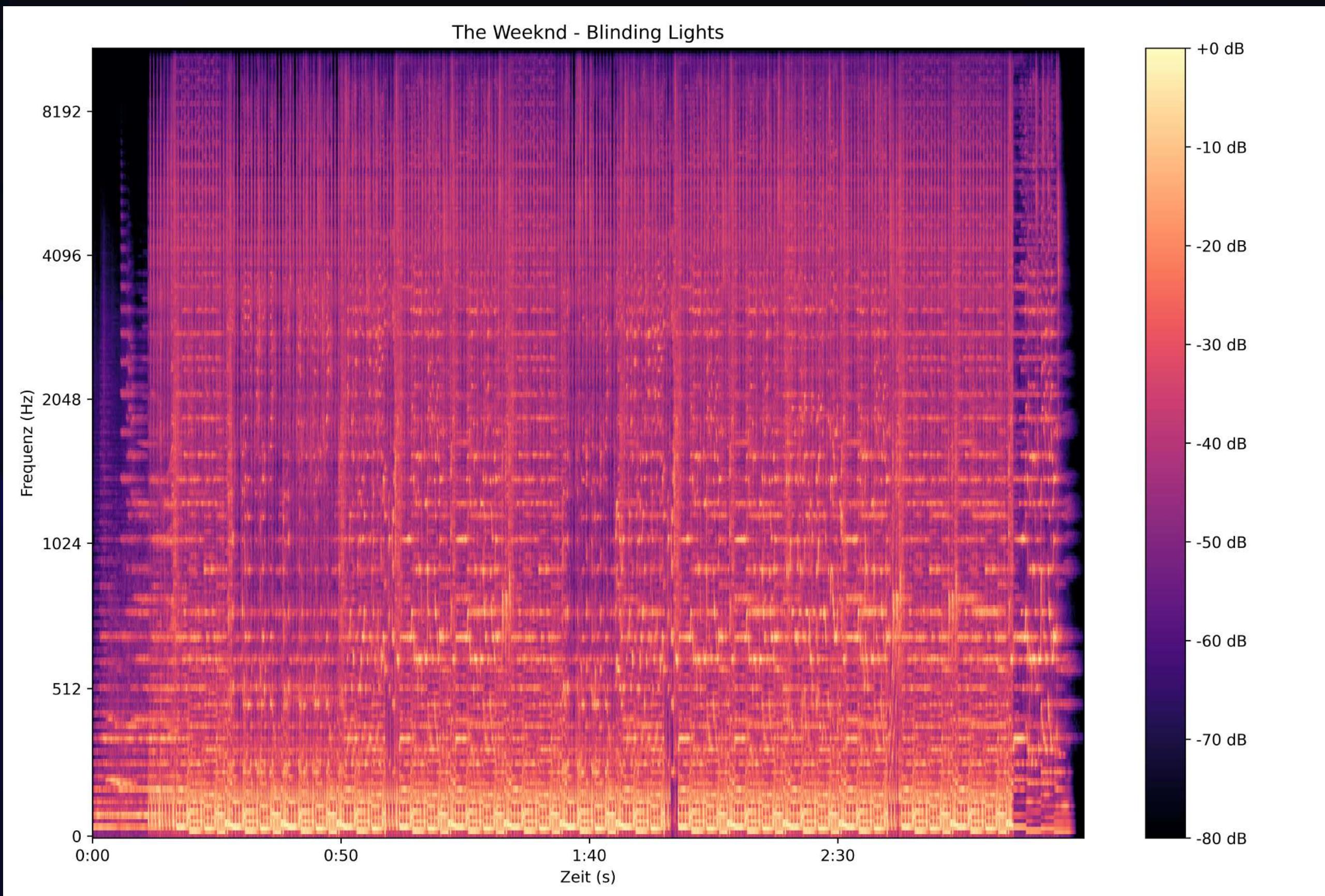


KI-Modell



Rauschen

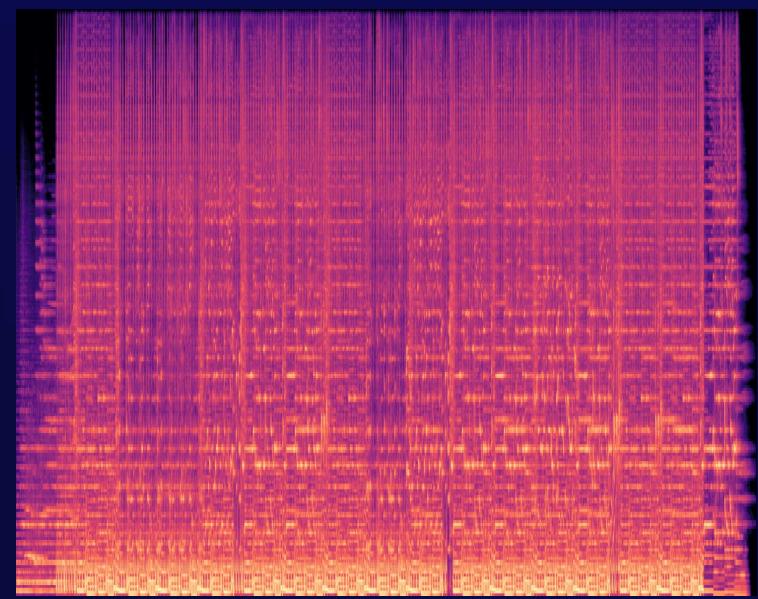
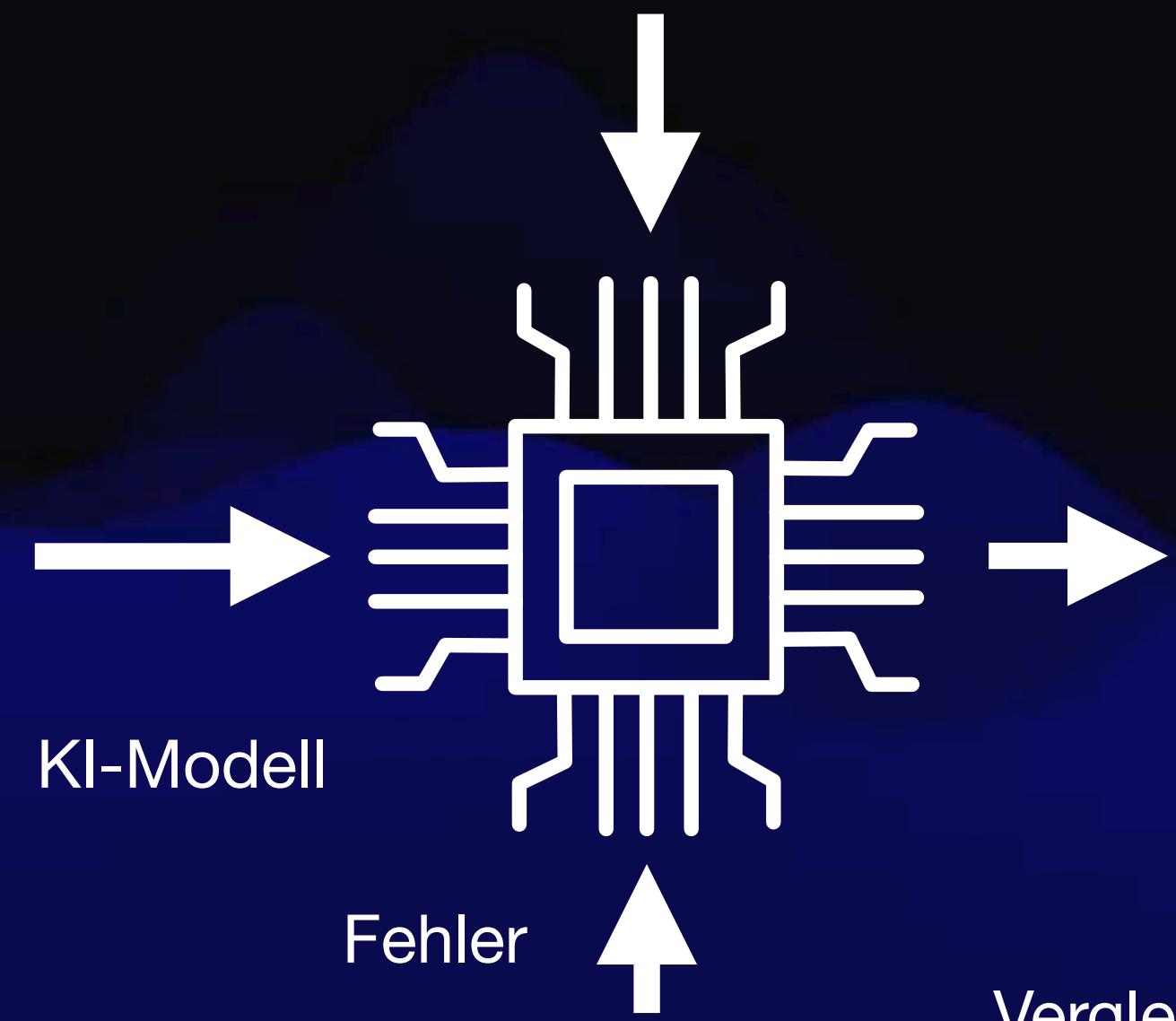
Training mit Spektrogrammen



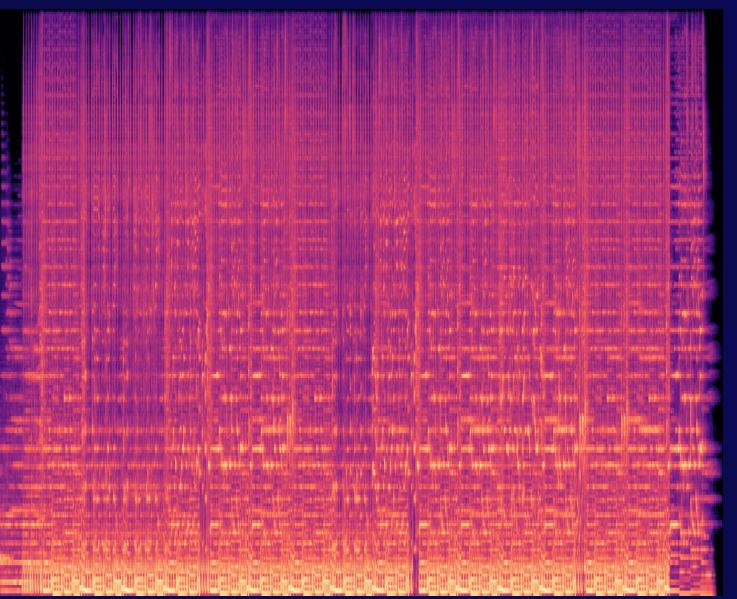
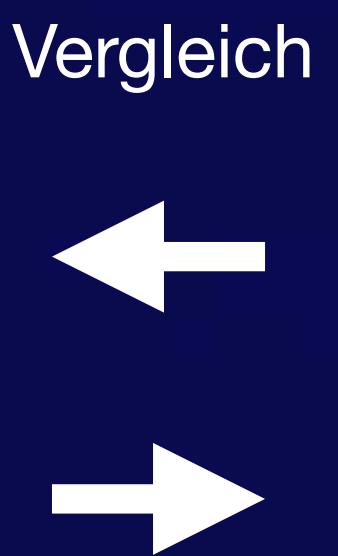
Rauschen



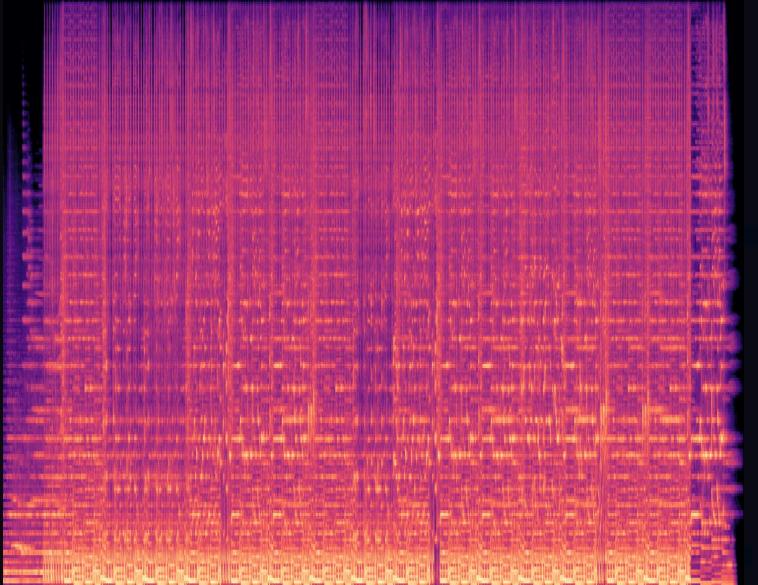
Prompt

“80s synthwave”

Ziel



Ergebnis



Rauschen

suno.ai & udio.com



Custom v4

Lyrics Instrumental

Enter your own lyrics

Write with Suno 0 / 3000

Style of Music Exclude Styles

Enter style of music

Describe Your Song
teacher turns the tables, broadway musical, epic

rock electronic pop jazz classical hip hop pop rock indie rock al >

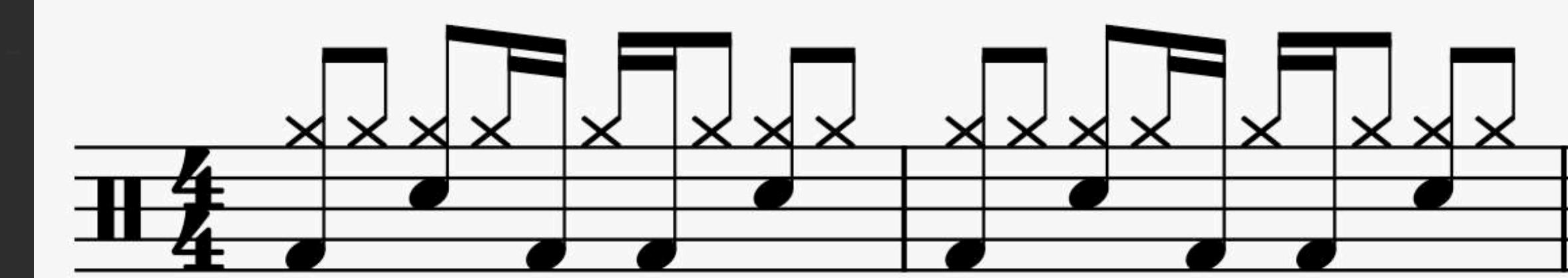
Upload Audio Reset

Write Your Lyrics

Auto-Generate Custom Instrumental

Create

Advanced Controls



KI-Zoo



Convolutional Neural Networks (CNNs)



Transformer



Recurrent Neural Networks (RNNs)



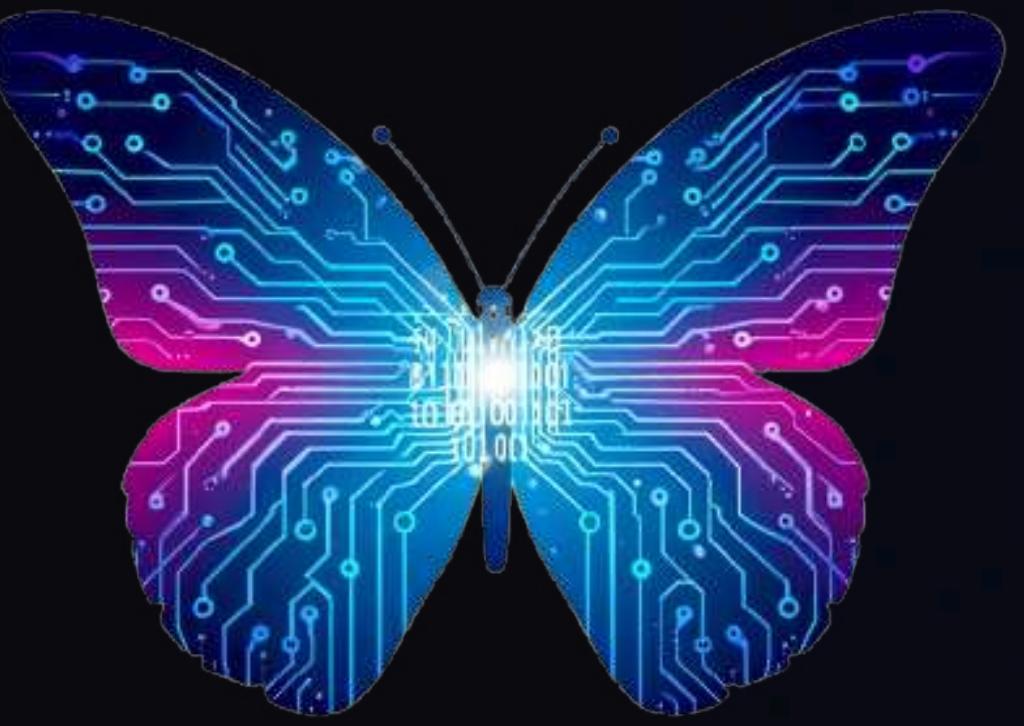
Reinforcement Learning



Diffusion



Generative Adversarial Networks (GANs)



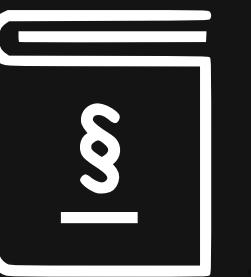
Autoencoder



Neuronale Netze

Herausforderungen

Unklare Rechtslage



Mangelnde Transparenz

Macht auch Fehler



Nicht objektiv

Kann ausgetrickst werden



Andere Wahrnehmung



Schwache KI



Herausforderungen & Möglichkeiten

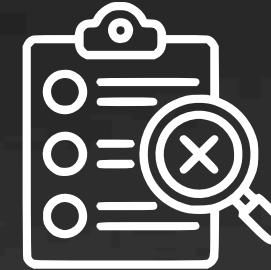
Unklare Rechtslage



Mangelnde Transparenz



Macht auch Fehler



Nicht objektiv



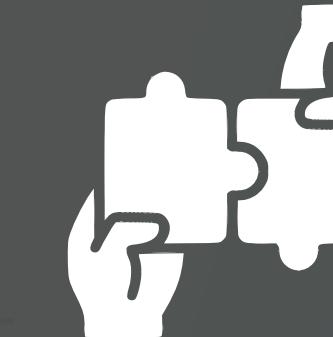
Kann ausgetrickst werden



Andere Wahrnehmung

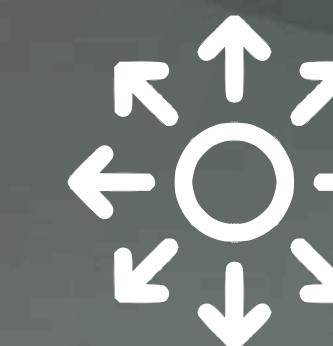


Schwache KI



Kreative Partnerin

Inspiration



Erweiterung unserer Fähigkeiten

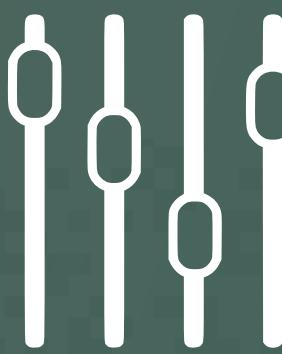


Beschleunigung

Assistenz



Individualisierung



Zugang & Einstieg



Raum für Experimente

Vielen Dank Jetzt wird's praktisch!

akademie für
TONKUNST

*Matthias.Lang@darmstadt.de
github.com/langMatthias*

Jetzt wird's praktisch!

1 Min.

INDIVIDUELLE REFLEXION

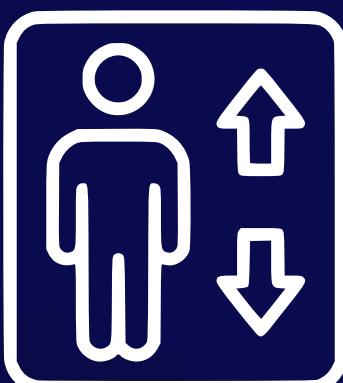
3 Min.

IM KLEINEN TEAM

9 Min.

IM AUSTAUSCH ZU NEUNT

ALL *ELEVATOR PITCHES*



Fragestellung

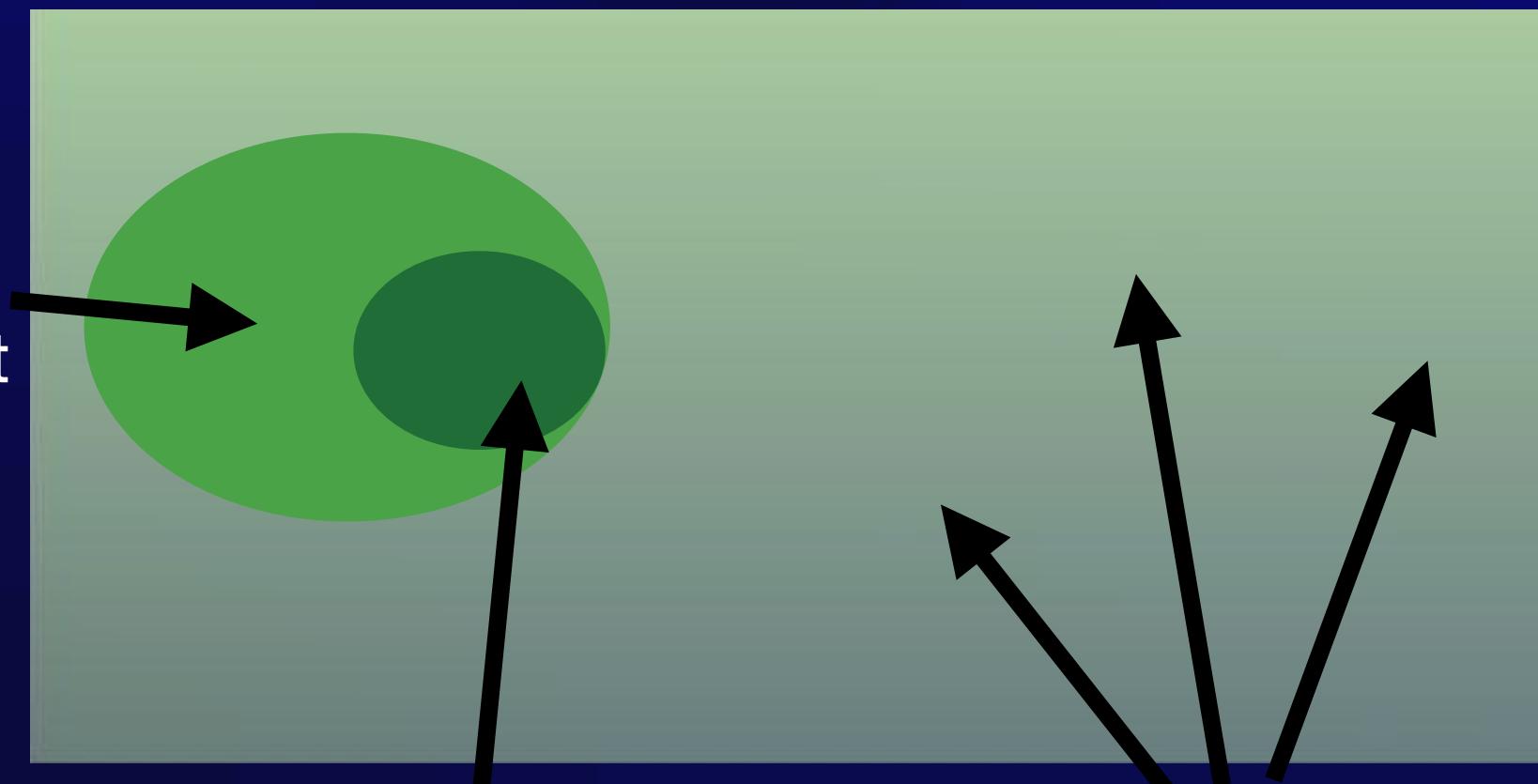
"WIE KÖNNEN WIR KI SO EINSETZEN, DASS SIE UNSERE FÄHIGKEITEN ERWEITERT?"

Anregungen & Infos:



tinyurl.com/upload-lvdm

Aufgaben, die der Mensch beherrscht



Menschliche Aufgaben, die Maschinen automatisieren könnten

Neue Aufgaben, die der Mensch mit Hilfe von Maschinen erledigen kann

Turing Trap

ARTFUL DESIGN

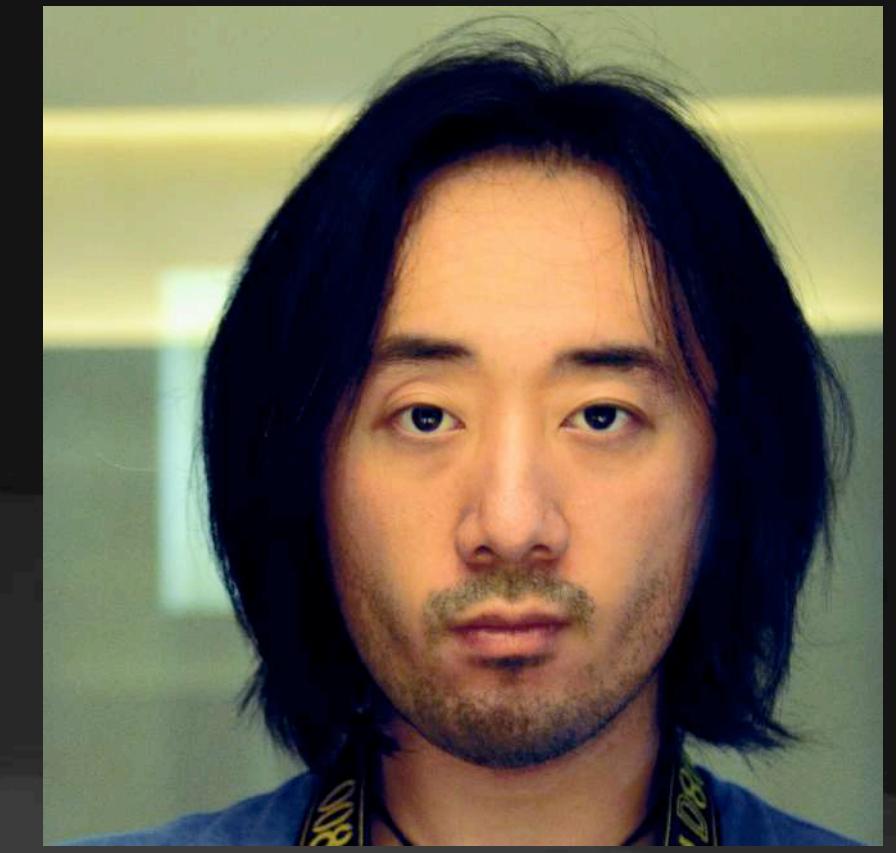
GE WANG

人 PRINCIPLE 2.1

DESIGN FOR PLAY AND DELIGHT

人 PRINCIPLE 2.2

DESIGN INSIDE-OUT



**ARTFUL
DESIGN**

TECHNOLOGY IN SEARCH OF THE SUBLIME



GE WANG

artful.design

Zwei mögliche Perspektiven

 INSIDE-OUT

„WELCHE KI-STÄRKE KÖNNEN WIR IM
MUSIKSCHULALLTAG NUTZEN?“

Anregungen & Infos:



tinyurl.com/upload-lvdm

OUTSIDE-IN 

„WO WÜNSCHEN WIR UNS IM
MUSIKSCHULALLTAG UNTERSTÜTZUNG?“

Fragen?

akademie für
TONKUNST

Matthias.Lang@darmstadt.de
github.com/langMatthias