



Automatisierung wissenschaftlicher Kommunikation

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OeAD, 13.12.2021



„Die Grenzen meiner Sprache sind die Grenzen meiner Welt.“ (L. Wittgenstein)

→ Doch wer ist “meiner”?

Vom singulären «Ich» zu sprachlichen «Korpora»

Korpora benutzt für

- Linguistische Forschung
- Philologie
- Maschinelle Übersetzungen
- Computerlinguistik / NLP

Corpus	Language	Domain	Size (Hour)
LibriSpeech [17]	English	novels	960
TED-LIUM3 [18]	English	TED talks	452
Switchboard [19]	English	Telephone	260
THCHS30 [20]	Chinese	newspapers	30
AISHELL-V1 [21]	Chinese	multidomain	500
AISHELL-V2 [22]	Chinese	multidomain	1000
ATCSpeech [23]	Chinese/English	real ATC	59
ATCOSIM [24]	English	simulated ATC	11
LDC94S14 [25]	English	airport	70
Airbus [26]	English	pilot	40

... zu KI-Sprachmodellen !

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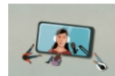
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TECH • ARTIFICIAL INTELLIGENCE

DeepMind debuts massive language A.I. that approaches human-level reading comprehension

BY JEREMY KAHN

December 8, 2021 5:00 PM GMT+1

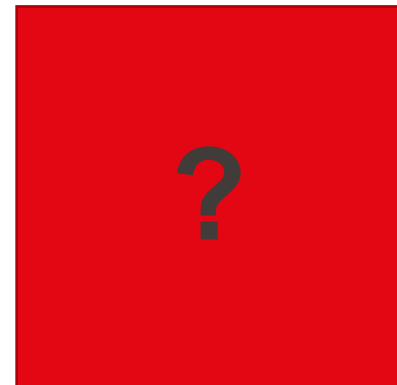
<https://deepmind.com/research/publications/2021/improving-language-models-by-retrieving-from-trillions-of-tokens>



AlphaZero



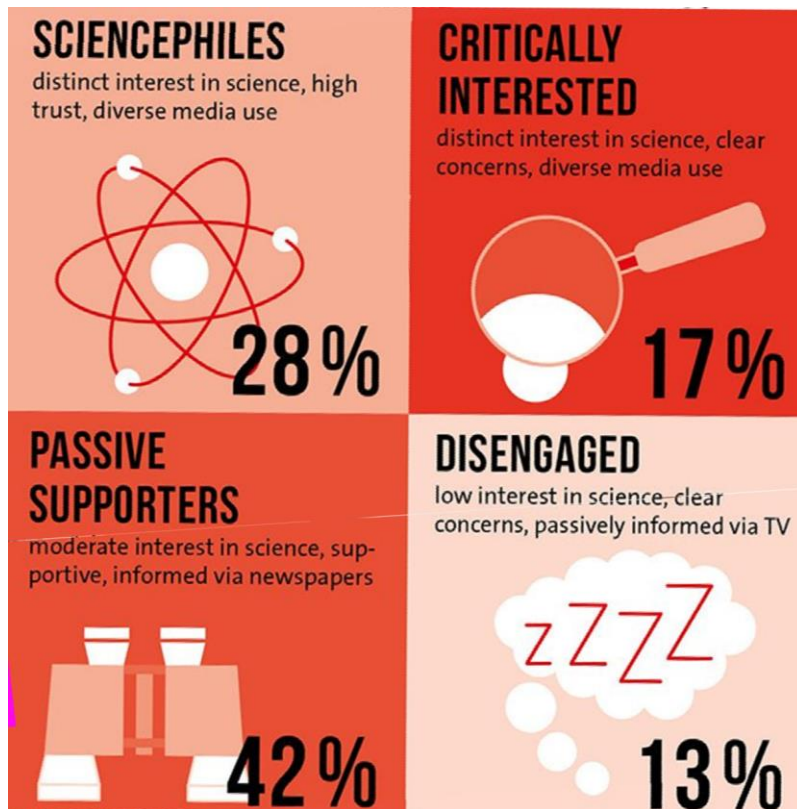
AlphaGo



Alpha...?

Warum sollte man so etwas tun?

Wissenschaftsferne Publika erreichen



#Covid19

<https://wissenschaftsbarometer.ch/>

Schweizer Corona-App-Code erobert die Welt

Carmela Troncoso arbeitete jüngst bis 16 Stunden täglich in ihrer Lausanner Wohnung. Das Resultat zusammen mit einem Team ist überwältigend. Eine Erfolgsgeschichte in fünf Akten



+ Das Magazin, NZZ, Le Matin, 24h, Le Temps, SRF, RTS, etc.

NEWS

Technology

Coronavirus: First Google/Apple-based contact-tracing app launched

How a handful of Apple and Google employees came together to help health officials trace coronavirus

CHRISTINA FARR @CHRISFYFARR

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CHF 2...
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S20 series

+ Reuters, Economist, NYTimes, Tech Crunch, El Pais, etc.

Years 2013-2018

- 3300-4200 articles/year
- 6-8% diffused
- cited about 2850 times/year
- 75% of citations in Western CH (despite being a national school)

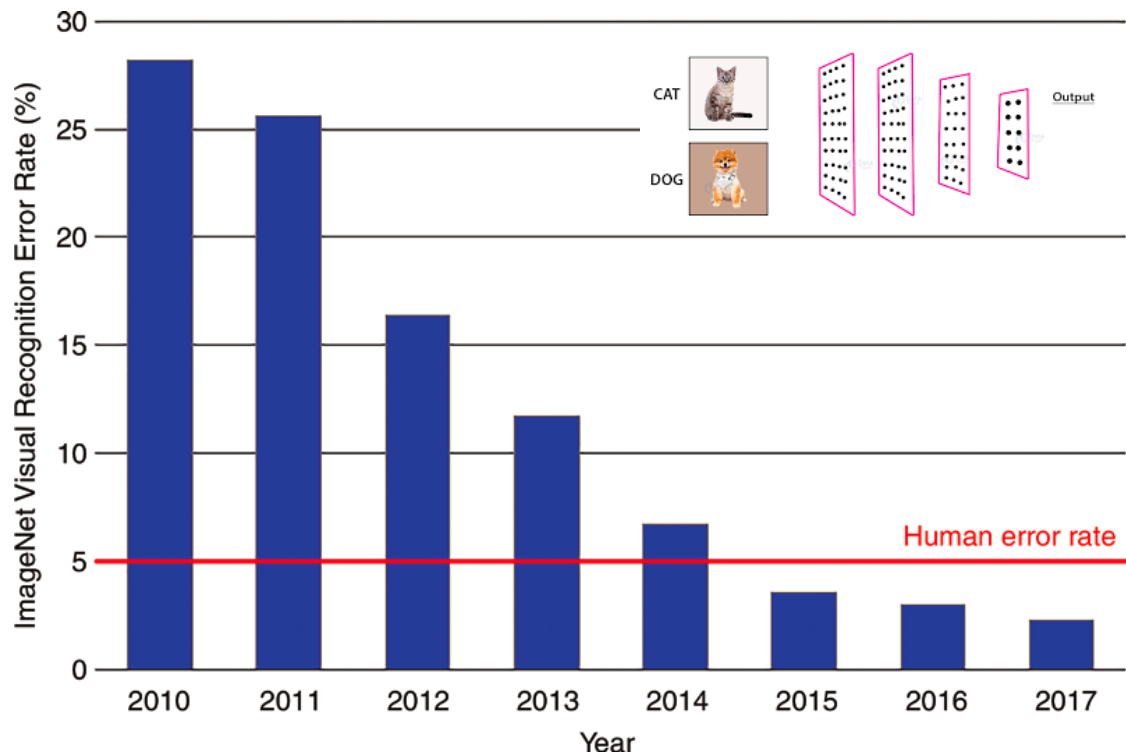


**Besser und
ausführlicher
erklären
(PUoS)**

vs.

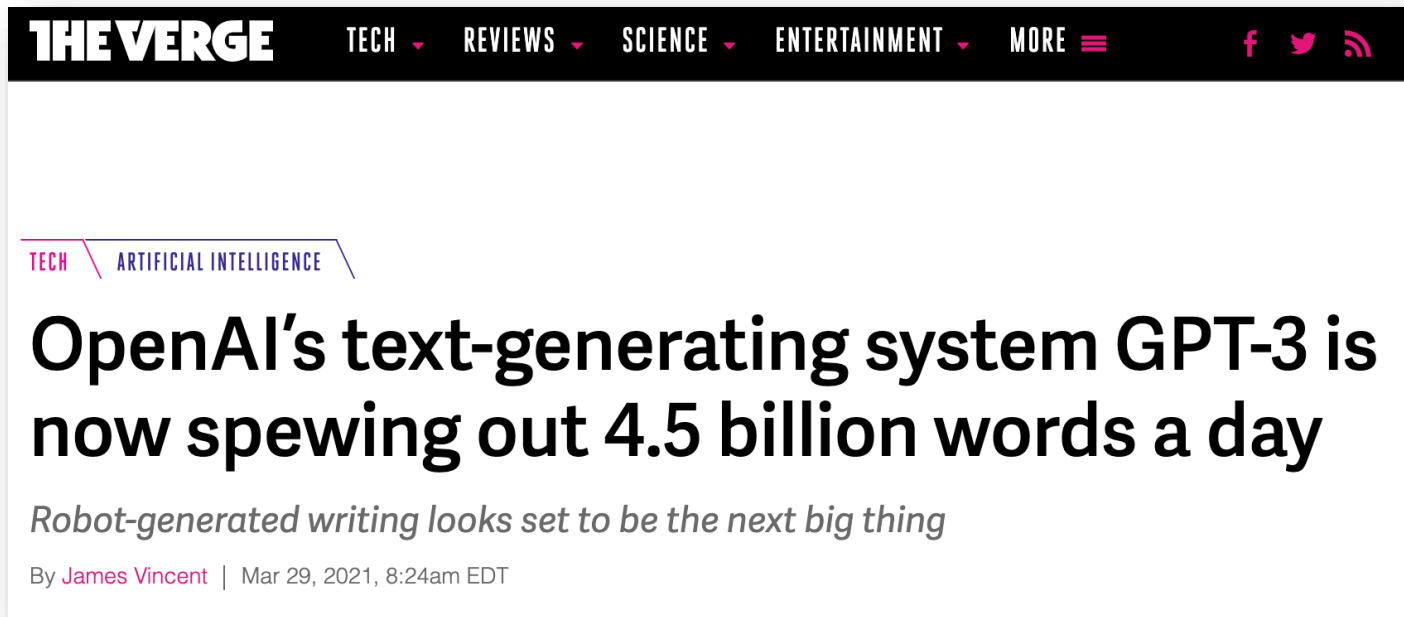
Neue
Modelle
finden?

Back to ML/KI - ein möglicher Lösungsansatz?



from Researchgate.net

Automatisch generierte Texte



→ <https://deepai.org/machine-learning-model/text-generator>

Unser Projekt



- **Ziel:** wissenschaftliche Texte zu vereinfachen und besser zugänglich zu machen
- **Methode:** eine KI mit öffentlichen Texten trainieren und Milliarden von Parametern auf die bisher von der EPFL verfassten Nachrichtentexte abstimmen (GPT-3 Modell)

collaboration with Prof. Jaggi, EPFL

Vereinfachung:

Verschiedene
Lesestufen für
www.epfl.ch

Zusammenfassungen:

z.B. Blick Romandie

1) Zusammenfassungen

Robots are usually expected to be rigid, fast and efficient. But researchers at EPFL's Reconfigurable Robotics Lab (RRL) have turned that notion on its head with their soft robots.

Soft robots, powered by muscle-like actuators, are designed to be used on the human body in order to help people move. They are made of elastomers, including silicon and rubber, and so they are inherently safe. They are controlled by changing the air pressure in specially designed 'soft balloons', which also serve as the robot's body. A predictive model that can be used to carefully control the mechanical behavior of the robots' various modules has just been published in Nature – Scientific Reports.

Potential applications for these robots include patient rehabilitation, handling fragile objects, biomimetic systems and home care. "Our robot designs focus largely on safety," said Jamie Paik, the director of the RRL. "There's very little risk of getting hurt if you're wearing an exoskeleton made up of soft materials, for example" she added.

A model for controlling the actuators

In their article, the researchers showed that their model could accurately predict how a series of modules – composed of compartments and sandwiched chambers – moves. The cucumber-shaped actuators can stretch up to around five or six times their normal length and bend in two directions, depending on the model.

"We conducted numerous simulations and developed a model for predicting how the actuators deform as a function of their shape, thickness and the materials they're made of," said Gunjan Agarwal, the article's lead author.

One of the variants consists of covering the actuator in a thick paper shell made by origami. This test showed that different materials could be used. "Elastomer structures are highly resilient but difficult to control. We need to be able to predict how, and in which direction, they deform. And because these soft robots are easy to produce but difficult to model, our step-by-step design tools are now available online for roboticists and students."

In addition to these simulations, other RRL researchers have developed soft robots for medical purposes. This work is described in Soft Robotics. One of their designs is a belt made of several inflatable components, which holds patients upright during rehabilitation exercises and guides their movements.

"We are working with physical therapists from the University Hospital of Lausanne (CHUV) who are treating stroke victims," said Matthew Robertson, the researcher in charge of the project. "The belt is designed to support the patient's torso and restore some of the person's motor sensitivity."

The belt's soft actuators are made of pink rubber and transparent fishing line. The placement of the fishing line guides the modules' deformation very precisely when air is injected. "For now, the belt is hooked up to a system of external pumps. The next step will be to miniaturize this system and put it directly on the belt," said Robertson.

Adaptable and reconfigurable robots

Potential applications for soft actuators don't stop there. The researchers are also using them to develop adaptable robots that are capable of navigating around in cramped, hostile environments. And because they are completely soft, they should also be able to withstand squeezing and crushing.

"Using soft actuators, we can come up with robots of various shapes that can move around in diverse environments," said Paik. "They are made of inexpensive materials, and so they could easily be produced on a large scale. This will open new doors in the field of robotics."

Original news

EPFL researchers have developed **soft** robots that are made of **soft** materials that can be controlled by air pressure. The research has also been used to develop a **soft** robotic belt for patients' rehabilitation. The work has just been published in Nature Scientific Reports.

AI generated summary

2) Vereinfachung

Input

EPFL researchers have developed soft robots that are made of soft materials that can be controlled by air pressure. The research has also been used to develop a soft robotic belt for patients' rehabilitation. The work has just been published in Nature Scientific Reports.



Easy level 0.4

EPFL researchers have developed **soft robots that are capable of moving in the body and can be controlled by changing the air pressure in their actuators**. Their work has been published in Nature Scientific Reports. The research could open new doors in the field of robotics.



Easy level 0.1

Soft robots are made of **soft elastomers, made of elastomer elastomas**, and can be controlled by changing the air pressure in specially designed 'soft balloons' that also serve as the robot's body. A predictive model that can be used to control the mechanical behavior of the robots' modules has just been published in Nature Scientific Reports.

Coming soon: verschiedene Lesestufen für epfl.ch

Des virus pour imiter les protéines antigel



Des chercheurs de l'EPFL et de l'Université de Warwick ont identifié un peptide aux propriétés similaires à celles des protéines antigel, grâce à un virus, le phage. En limitant la formation de glace, ces protéines pourraient jouer un rôle central dans la conservation des organes et des cellules, ou dans l'industrie alimentaire.

Texte original Simplifié

Ceci est une version simplifiée. [Lien vers le texte original](#)

Pour résister au froid, certains organismes ont développé des protéines leur permettant de survivre dans des environnements extrêmes. Ces protéines antigel, dont le fonctionnement est encore mal compris, permet cette survie car elle limite la formation de glace, en se liant aux cristaux dès leur apparition. «La formation de glace est mortelle pour les organismes», indique Corey Stevens, collaborateur scientifique au Laboratoire des Polymères de l'EPFL. Cela détruit les cellules et les tue.»

Un rôle clé pour la conservation des cellules et des organes

Plusieurs domaines, comme la conservation du sang, des cellules, voire des organes destinés à être transplantés, sont confrontés à cette limitation. Au froid, les organes ne peuvent en effet être conservés que quelques heures avant de devenir inutilisables. La cryoconservation (conservation à très basse température) assure une conservation beaucoup plus longue des cellules, mais seule une petite partie peut ensuite être récupérée et utilisée, justement en raison de la formation de gel. Une meilleure compréhension des protéines antigel permettrait de résoudre des problèmes que les virus ont permis de découvrir.

24.06.21

LINKS

• [Laboratoire des Polymères](#)

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Polymers Laboratory (LP) [STI](#) [virus](#)

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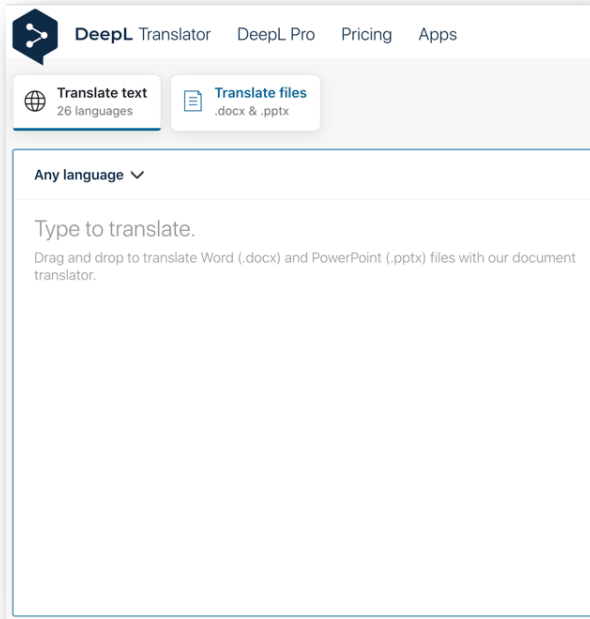
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Wir stehen erst ganz am Anfang...

- Mehr Wissenschaft in die Gesellschaft bringen (ETH-Gesetz)
- Unterschiedlicher Grad an Komplexität für verschiedene Zielgruppen
- Rolle der Medien?
- Polarisierung der Gesellschaft (Prof. M. Schäfer, University of Zurich)

→ ML/KI als mögliche Hilfe/Werkzeug?





Merci!