Computational Humor

Can a machine have a sense of humor?

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What is the difference between leaves and a car?





One you brush and rake,
the other you rush and brake.

Belgian prime minister says the next five winters will be difficult due less energy supply.

We asked the Belgian prime minister for comment, but he was too busy stockpiling firewood.

Can a machine have a sense of humor?

Part 1: Humor is intrinsically human

Every known human civilisation has some form of humor



Caron, J.E.: From ethology to aesthetics: Evolution as a theoretical paradigm for research on laughter, humor, and other comic phenomena. Humor15(3), 245–281(2002)

Purpose of Humor = Sign of Intelligence?



Brain is rewarding **noticing incongruities** and successfully **resolving them**

\+ **linguistic skills**
(required to create jokes)

\+ **hard to fake display of personal values**

= **Evolutionary advantage!**

How does humor work?

Incongruity-Resolution Theory

Setup *Two fish are in a tank. Says one to the other:*

Punchline *"Do you know how to drive this thing?"*

Obvious Interpretation



Hidden Interpretation



Based on: Ritchie, G. (1999). Developing the incongruity-resolution theory.

Human-focused definition!

Machine should **not only spot two mental images**

Obvious Interpretation



Hidden Interpretation



But also that it is **not too hard or too easy** for a **human**!

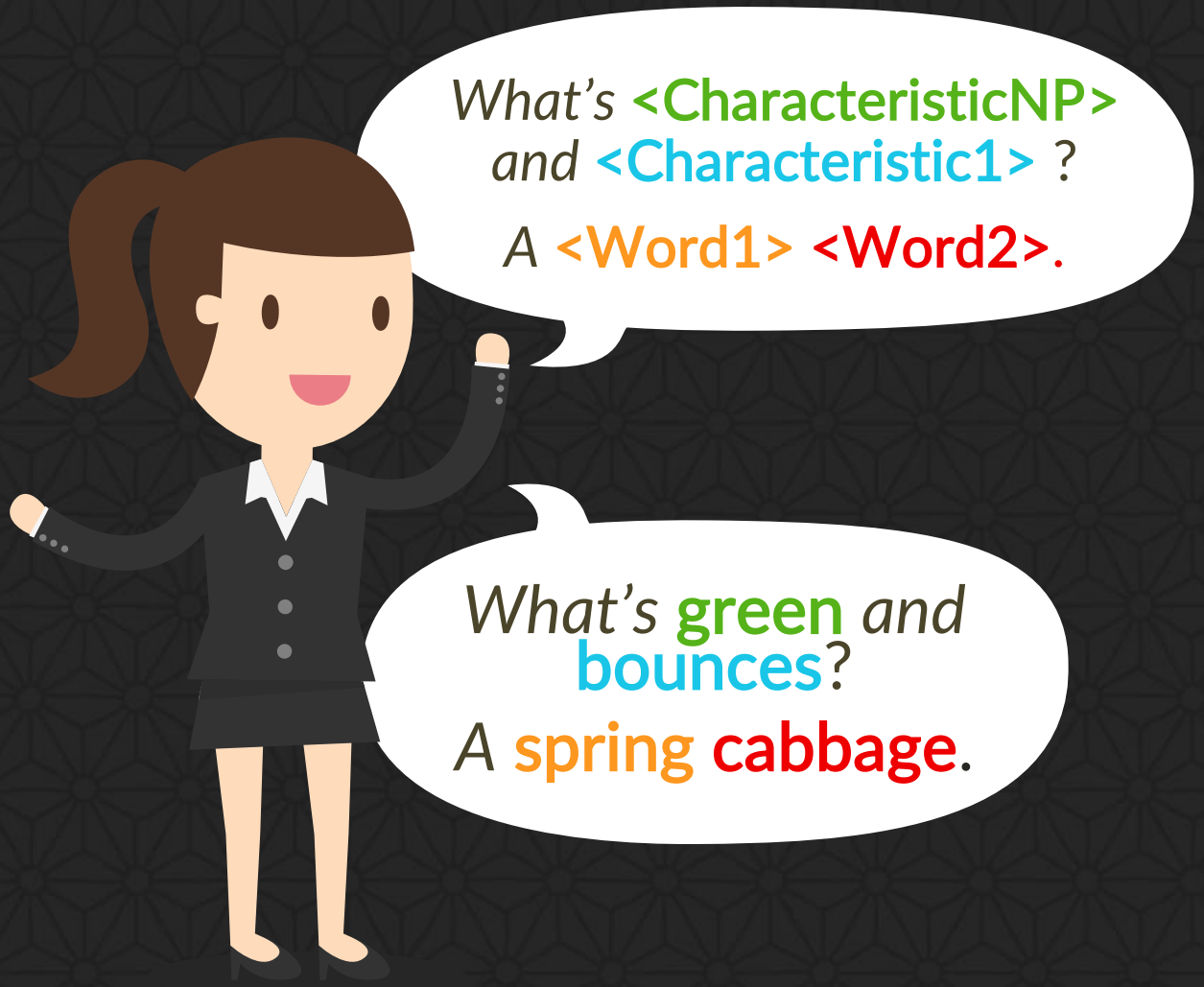
Humor = AI-complete?

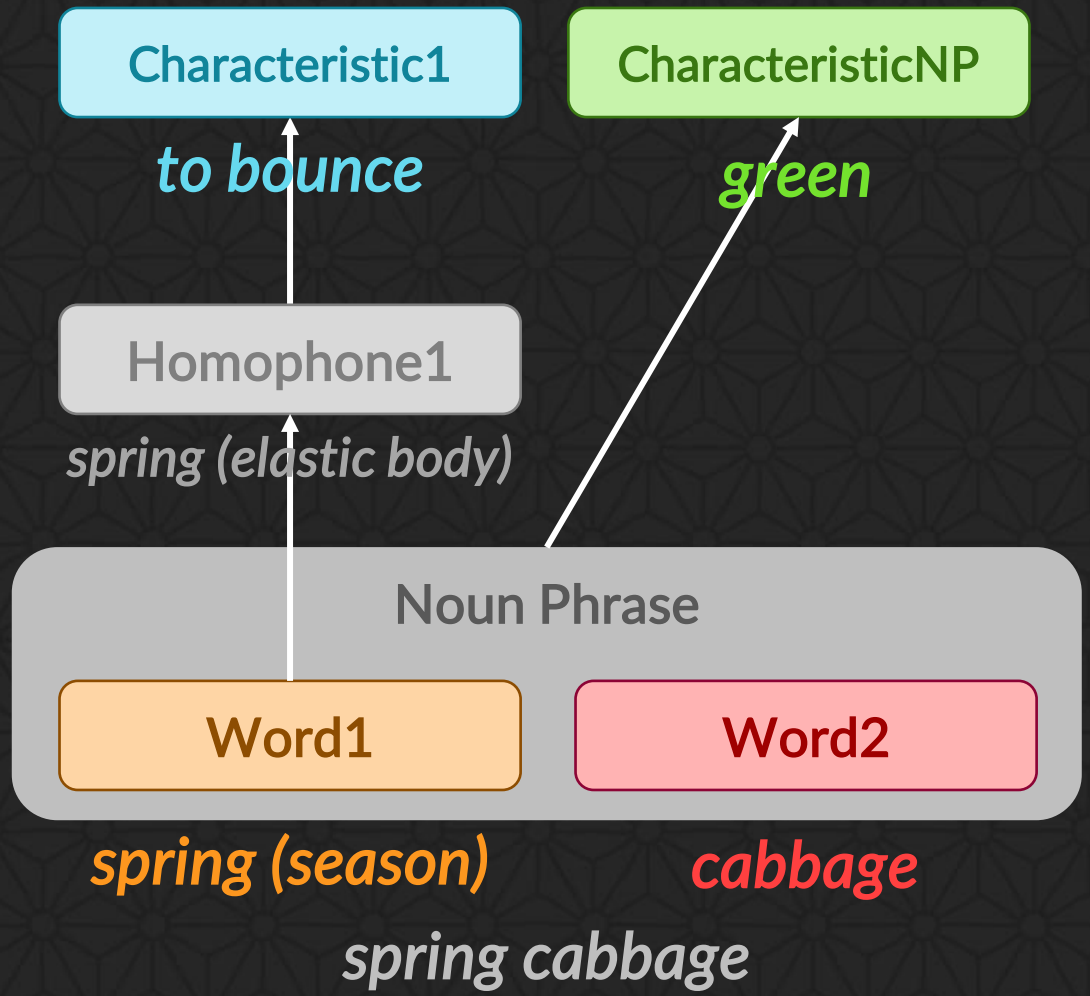
~ as hard as making computers as “intelligent” as people

Part 2: Computers can follow humor instructions

Templates, Schemas, Grammars
Hard-coding a sense of humor

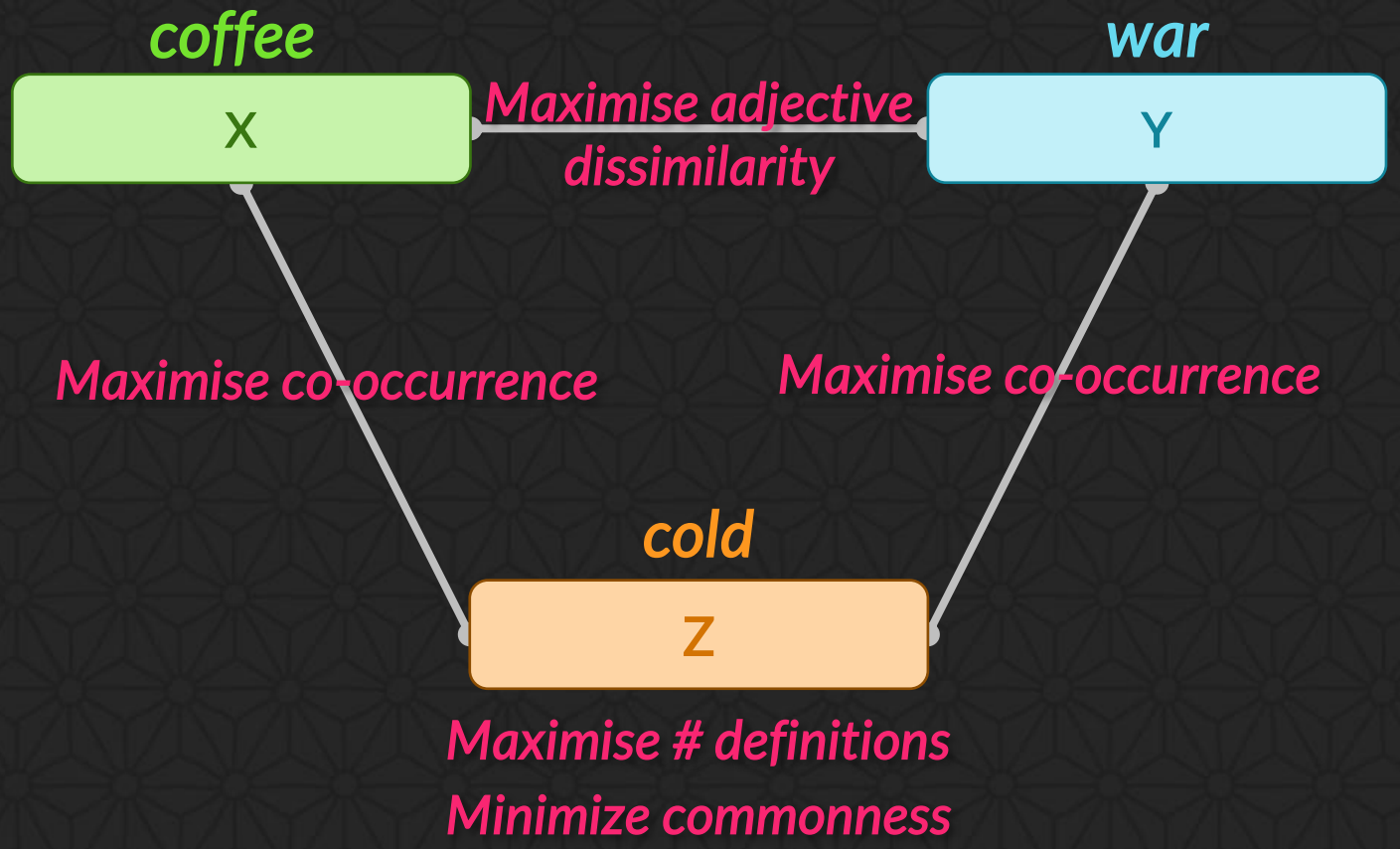
JAPE: Templates & Schemas





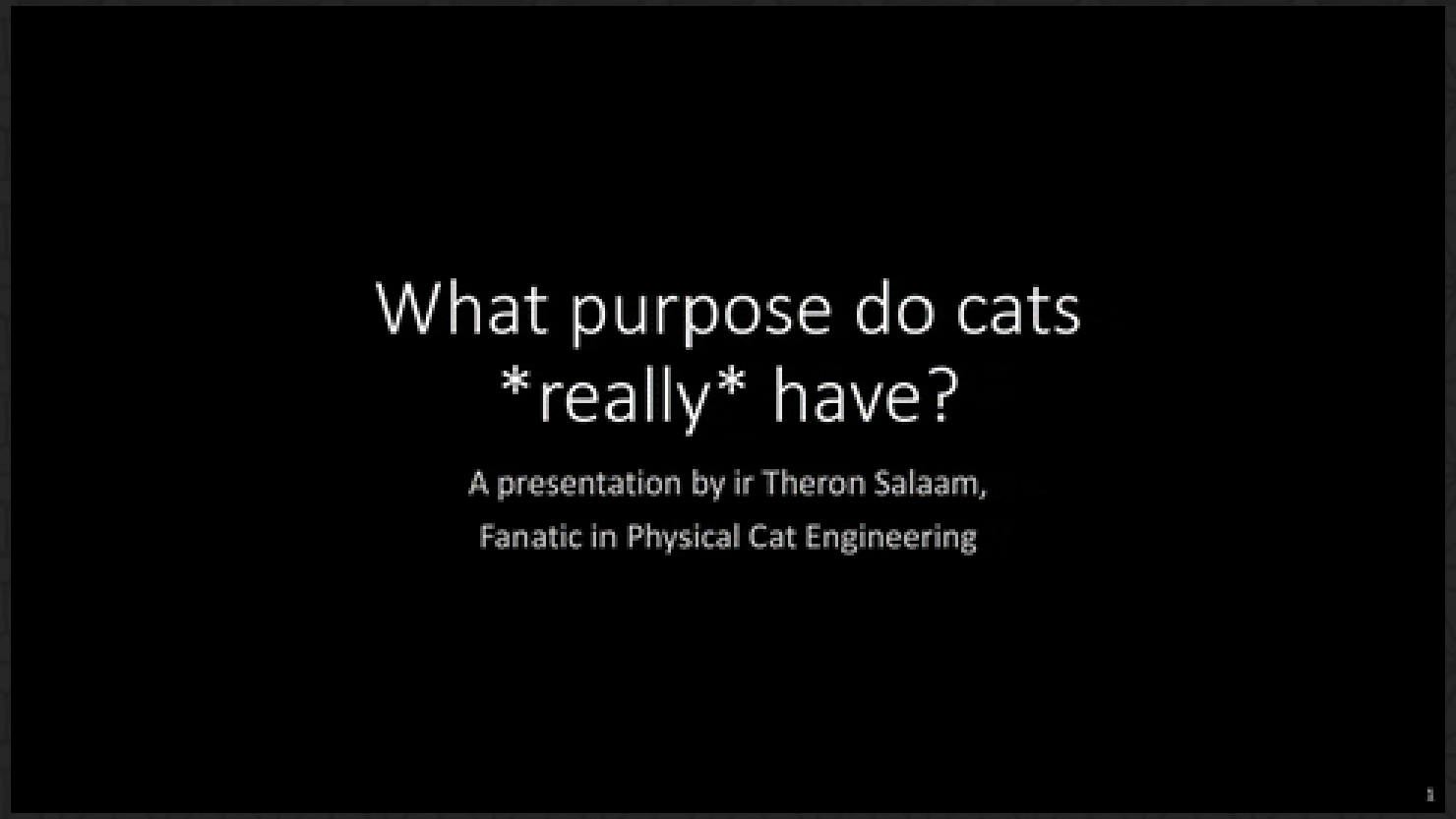
Unsupervised Analogy Generator





Talk Generator

Generates nonsense PowerPoints about any given topic for presenters to improvise on



Try it yourself: ***talkgenerator.com***

Slide generator

[Historical Title Generator]
(Tracery + WikiHow)

[Vintage Person Generator]
(Reddit)

[Quote Generator]
(GoodReads)

[Name Generator]
(Tracery)

corner
mouse

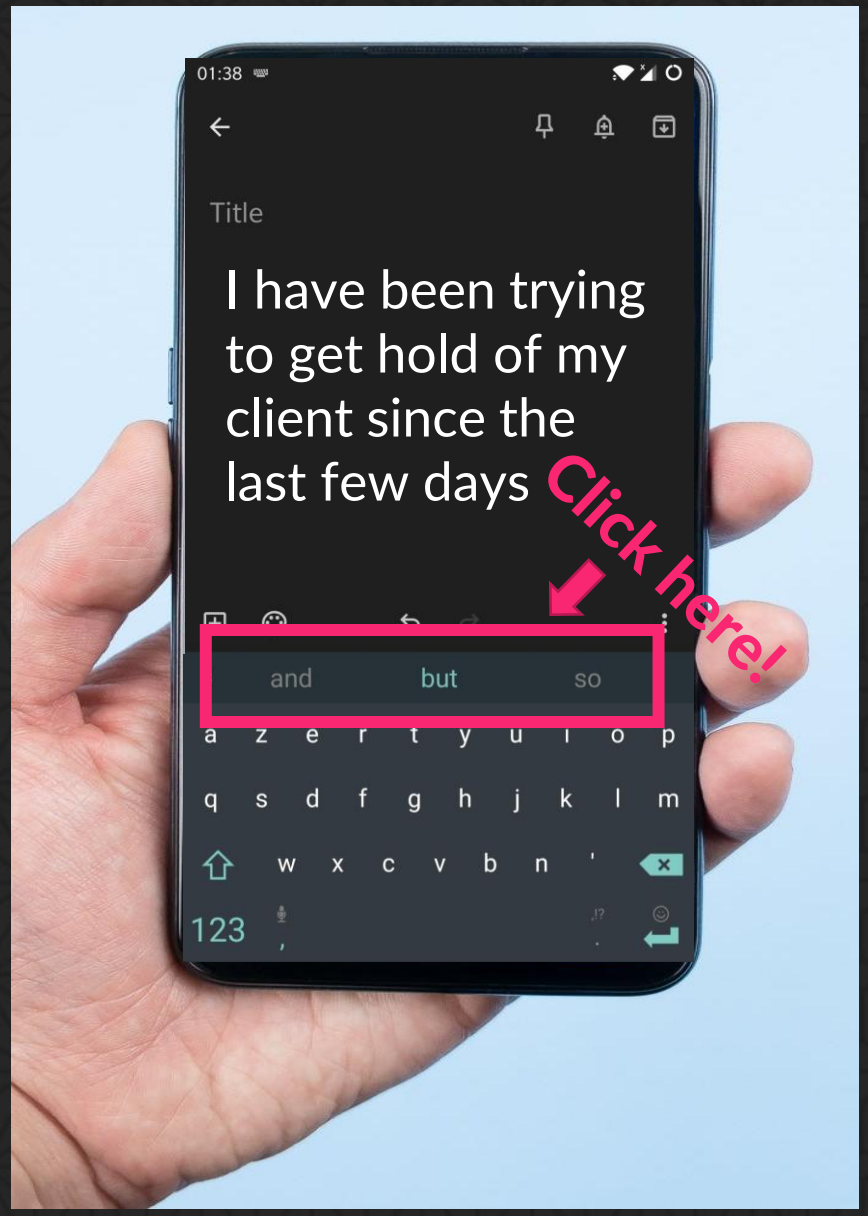
First Person to Care for Baby Wild Mouse



"She sounded as displeased as a cat w just cornered a mou

Queen A. Saine

Statistical text generators



Demo

1. Open your smartphone keyboard *(e.g. in notes)*
2. Press on any suggested **autocomplete** word
3. Press **10-20 times** on a random suggestion
4. You've just generated a sentence using an AI trained to **sound similar to you**! *(if you squint your eyes)*

Autocomplete **counted** how often you used **certain words after other words** in previously typed texts → Statistical model

Rik Torfs



Professor & Ex-rector KU Leuven

Rik Torfs
@torfsrik

Het mooie van God is dat hij het iedereen van harte gunt niet in hem te geloven.

Rik Torfs
@torfsrik

Redelijkheid wordt stilaan een gevaarlijke vorm van extremisme.

TorfsBot

Fully automated Twitterbot that imitates Rik Torfs
Trained on his tweets & columns



Robot Torfs
@TorfsBot

Beste, gevolgd door een komma.
Mails om niet te herinneren.

Robot Torfs
@TorfsBot

Zonder twijfel zien we beter wat er niet is.

TorfsBot

Markov chain generator

1. Count in Rik Torfs tweets & columns how often a word follows the previous 2-4.



2. Start with two real starting words of Rik, and take random next words



Humor Detection

Early Humor Detector

- Designed **humor features** *e.g. alliteration, antonym, adult slang…*
- Used **Naive Bayes** & **Support Vector Machines**
- **Task:** One-liners vs **news**, **neutral corpus** & **proverbs**

One-liners Reuters	One-liners BNC	One-liners Proverbs
96.95%	79.15%	84.82%

Table 4: Humor-recognition accuracy for combined learning based on stylistic and content features.

Mihalcea, R., & Strapparava, C. (2005). Making computers laugh: Investigations in automatic humor recognition.

But is this a good dataset?

News & proverbs have **completely different types** of words than jokes!





→ Looking at **word frequencies** is often already *"enough"*!

Is this really **humor** detection?

Jokes are **fragile**!

Two men are in a bar. Says one to the other:
"Do you know how to drive this thing?"

Generate non-jokes by replacing keywords from other jokes!

Word-based features **won't work** anymore!

Examples of generated Dutch non-jokes

Het is groen en het is een mummie?
Kermit de Waterkant

Wat is het toppunt van principe?
1) Wachten totdat een Nederlander gaat twijfelen
2) Een Zuster met een autoladder
3) Een brandwacht brandmeester met een brandmeester van 9 maanden

“Ober, kunt u die schrik uit mijn politieman halen? Want ik eet liever alleen.”

"Mijn hond is heel vreselijk: Hij schreeuwt mij iedere zus de broer.“
"Maar dat is toch niet zo heel vreselijk?“
"Jawel, want ik heb geen rapport!"

Wat staat er midden in het bos?
De kapper.

Er loopt een super vriendelijk blondje langs een armband. Last er een toonbank: “zo, waargaan die mooie mannen heen?” Blondje: “naar de barkeeper als er niets tussen komt…”

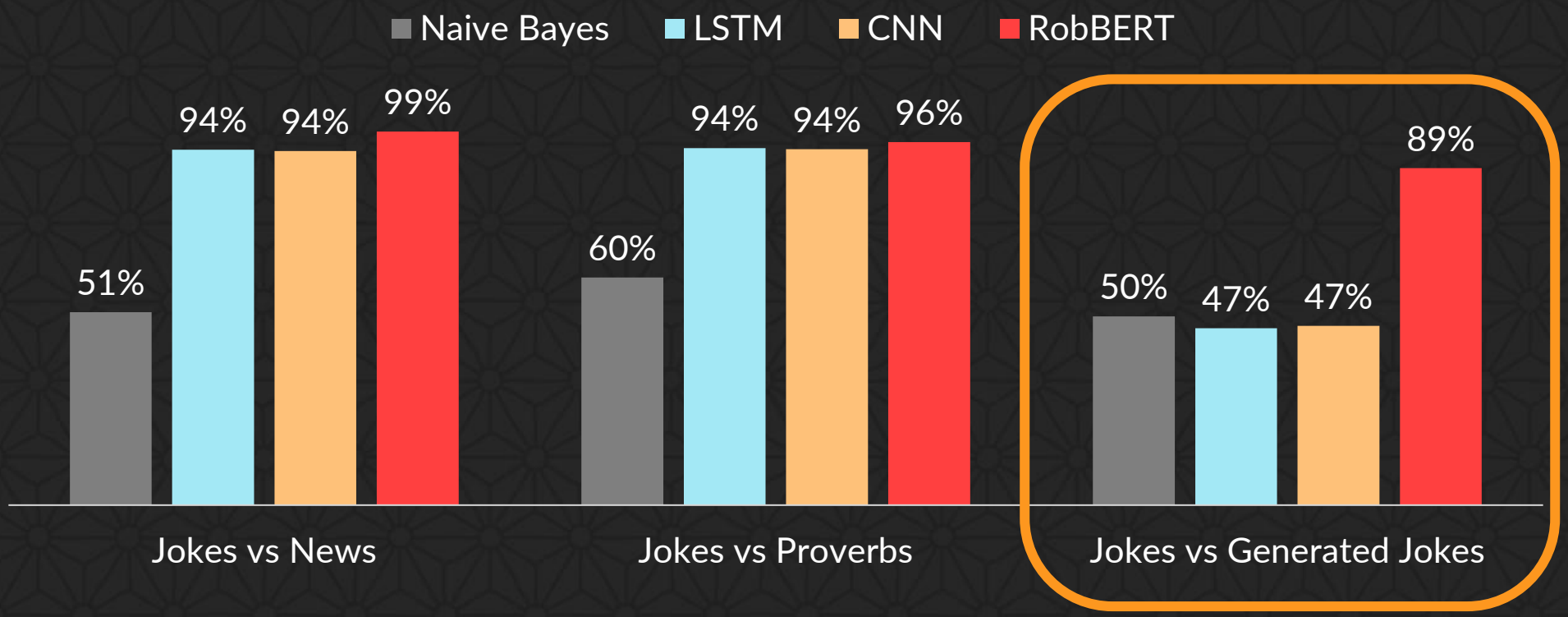
Hoe heet de vrouw van Sinterklaas?
Keukentafel.

"Twee tanden zwemmen in de zee en ze zien een stamgast op een stamgast. De ene raad zegt tegen de andere raad: 'Hé kijk! Ons eten op een bord!'"



Much more challenging dataset!

Binary classification of jokes versus texts from other domains



More truthful humor detection?

Part 3: Large language models are all you need



Transformer models

Large **language models**, **pretrained** on large corpora





GPT-3

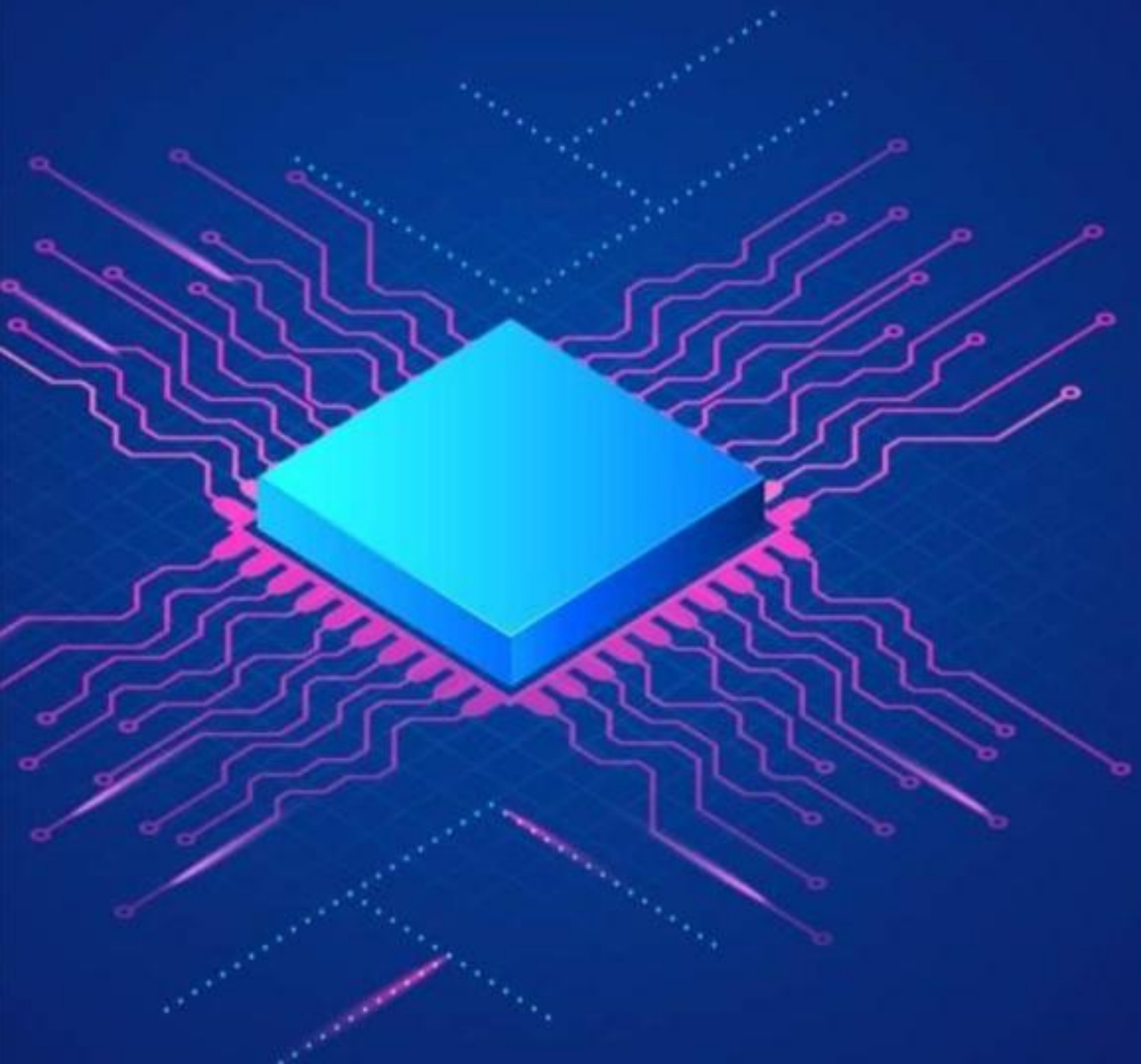
Completes any textual prompt

BERT

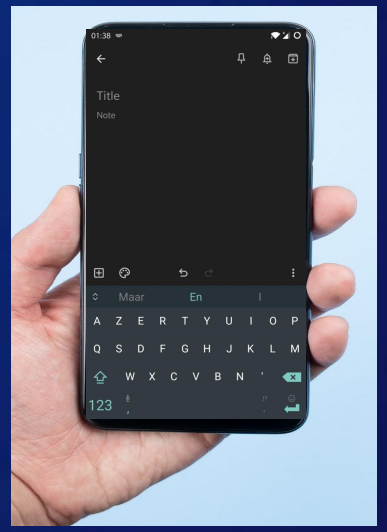
Classifies any text sequence / token

Outperforming previous neural architectures
on **most language tasks**

Brown, Tom B., et al. "Language models are few-shot learners."
Devlin, J., Chang, M. W., Lee, K., & Toutanova, K. (2018). Bert: Pre-training of deep bidirectional transformers for language understanding



GPT-3



≈ autocomplete on steroids

Getting dialogue out of GPT-3

"-" trick for getting it to generate dialogue

Input

- Fellow ants, we have great news. Our new ant queen is born!
- Hello my loyal ants, I promise I will rule our nest with an iron claw!



Outputs

- All hail our new ant queen!

———————

- I am the new ant queen, and I will make our colony the strongest in the world!

———————

- It's time for us to expand our nest!
- Our nest is under attack!

Improbotics



A.L.Ex the robot **plays improv scenes** with improv actors

“Listens” to scene and **formulates own responses** with GPT-3

Later in show: gains **human body**. AI whispers through ear piece what actor should say.

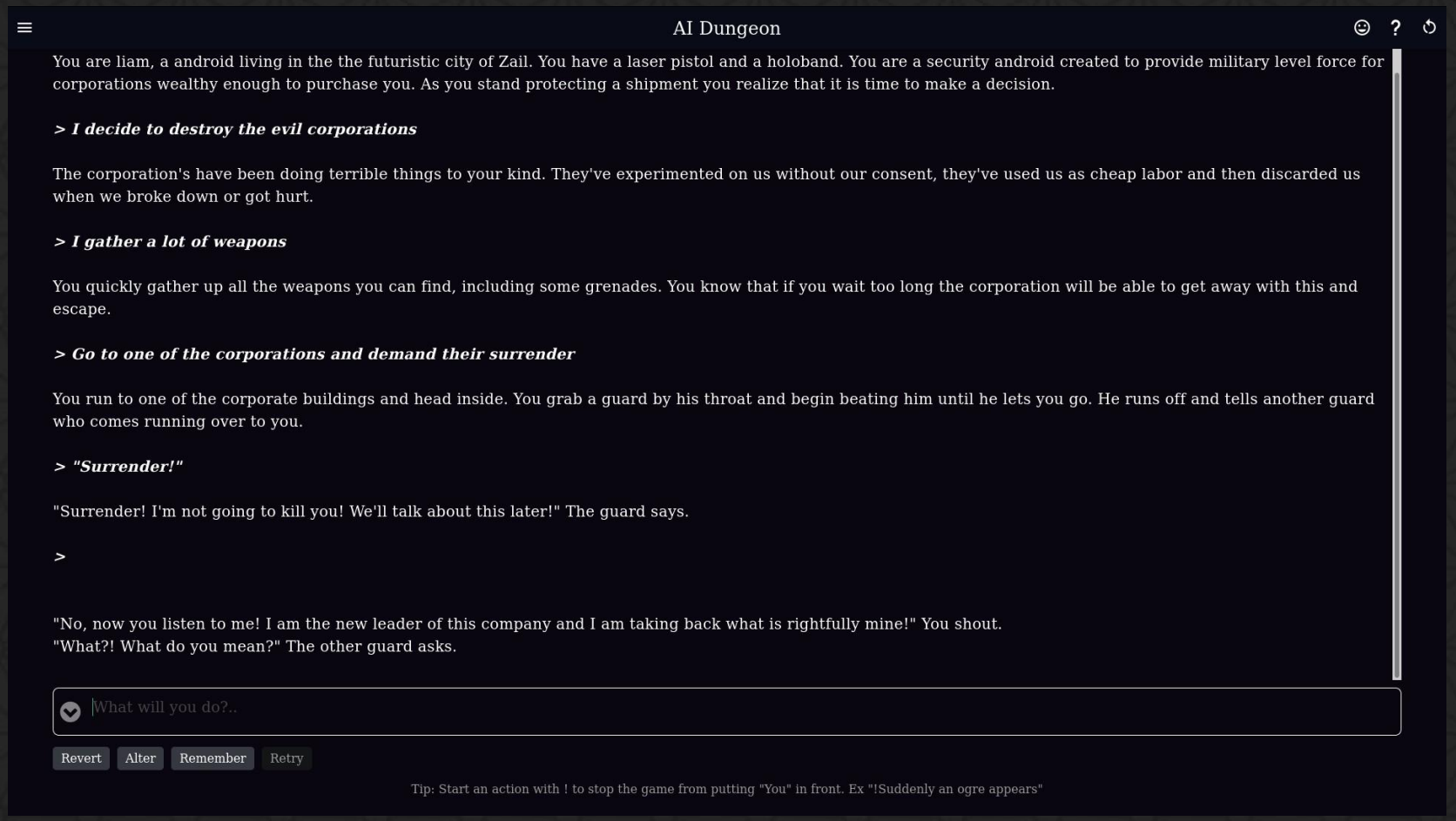
End: everyone has ear piece
→ **Turing test**!

Improbotics interface



Operator types what happens and selects responses

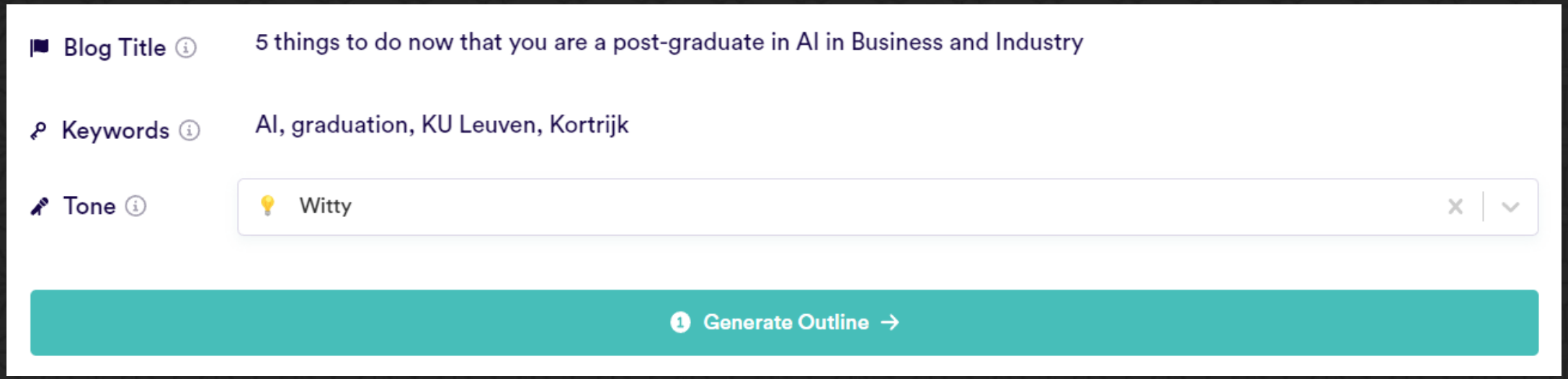
Fun GPT-3 application: AI dungeon



play.aidungeon.io

AI-generated text-based adventures where you can do anything

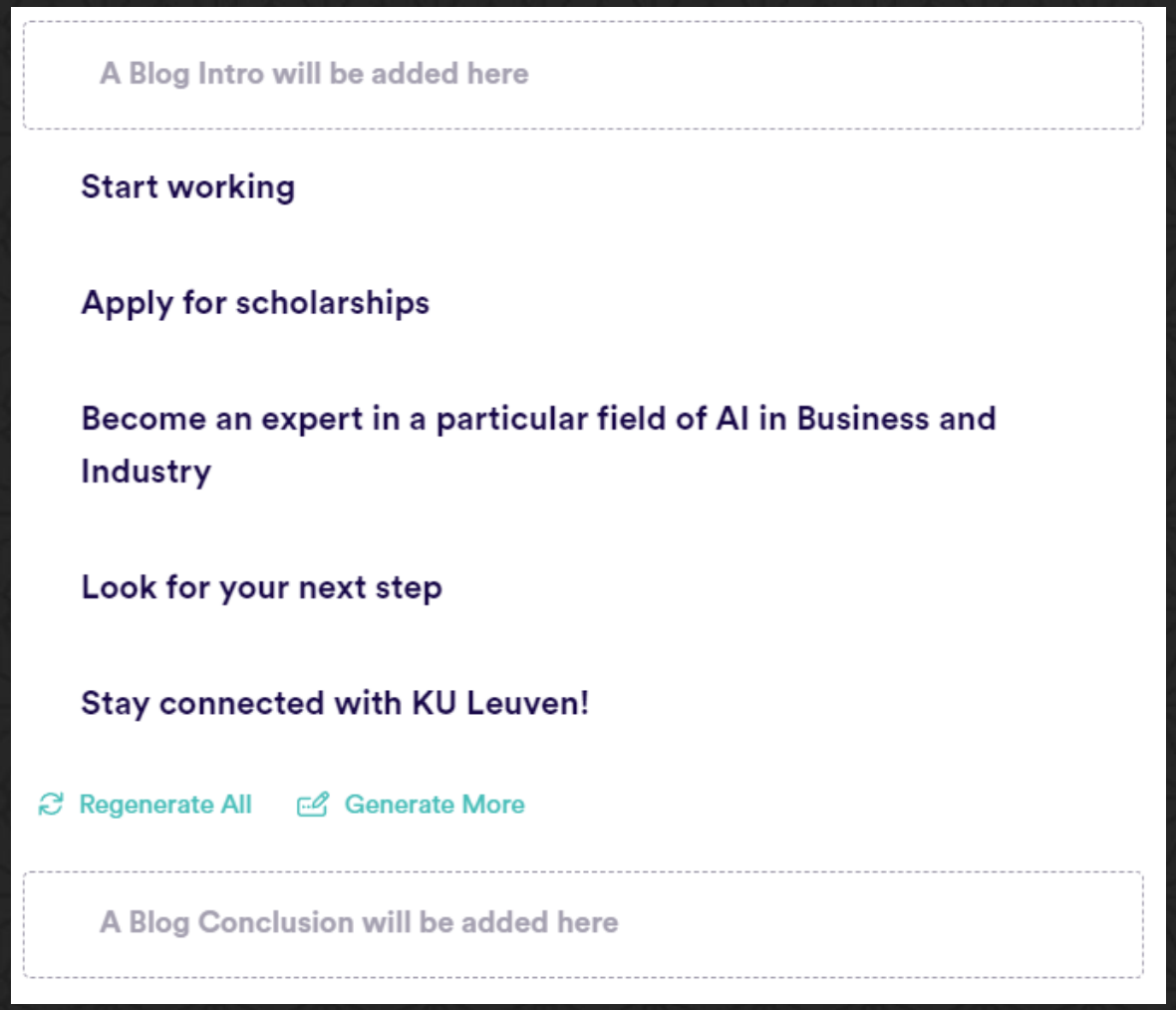
AI Copywriting



you.com/write & copy.ai & rytr.me

Helps you write any social text

AI Copywriting





you.com/write & copy.ai & rytr.me

Helps you write any social text

GPT-2 / GPT-3 joke examples

GPT-2 can mimic **joke style**, but usually **very absurd**

What did one plate say to the other plate?
Dip me!

What did the chicken say after he got hit by a bus?
"I'm gonna be fine!"

A woman walks into the bar.....she says to the bartender "I want a double entendre" and the bartender says "No, we don't serve that"



https://www.gwern.net/GPT-3

https://towardsdatascience.com/teaching-gpt-2-a-sense-of-humor-fine-tuning-large-transformer-models-on-a-single-gpu-in-pytorch-59e8cec40912

GPT-3 generated “jokes”

Generate a joke related to the post-graduate in AI in Business and Industry at KU Leuven Kulak.

Why did the AI post-graduate in Business and Industry at KU Leuven Kulak cross the road?

To get to the other side of the job market!

Generate a joke related to the post-graduate in AI in Business and Industry at KU Leuven Kulak.

Q: How many AI researchers does it take to screw in a light bulb?

A: Just one, but it takes a PhD to get the job done right.

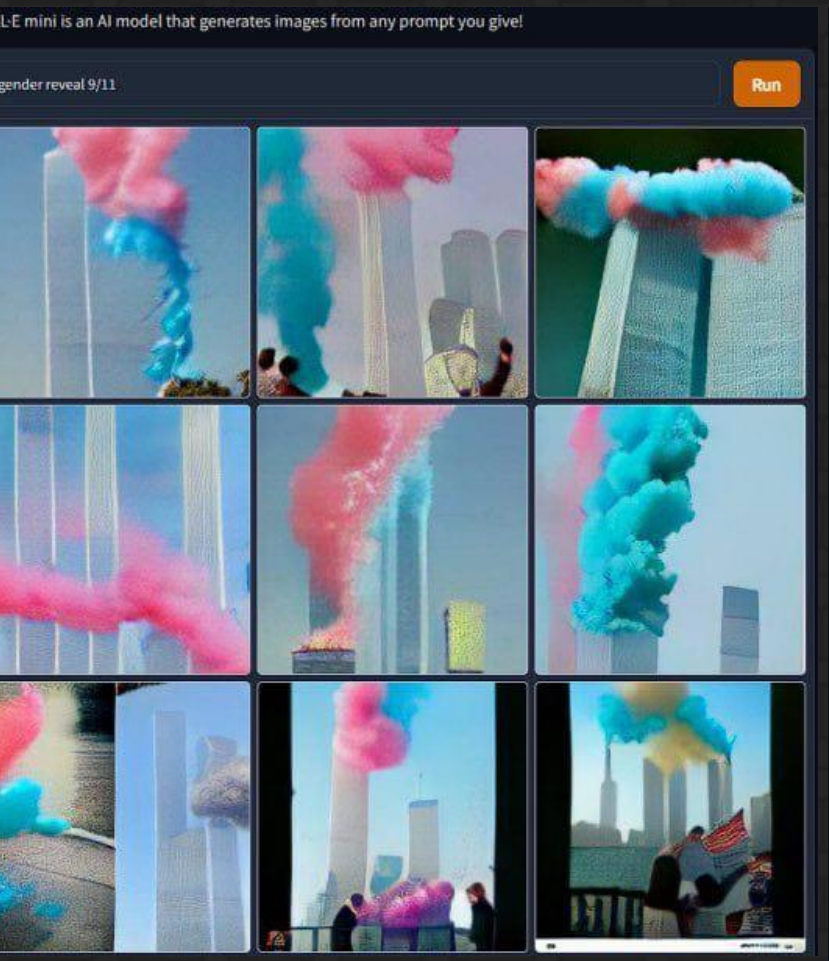
Reminiscent of how children write jokes

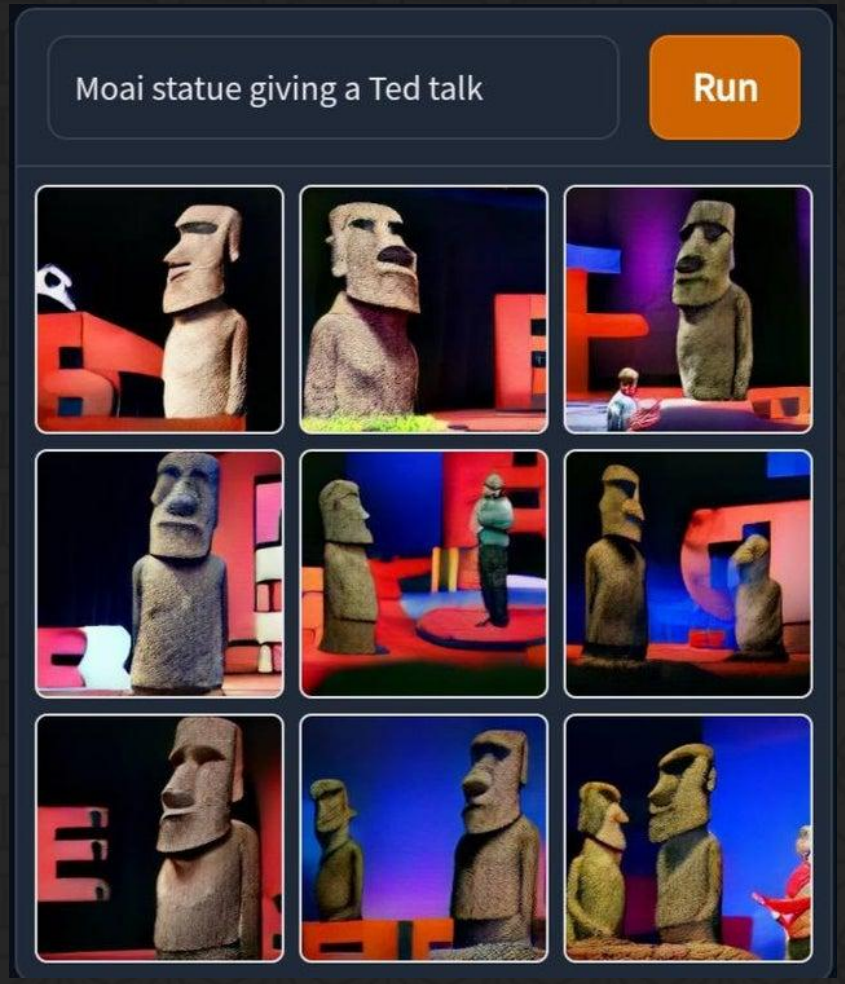


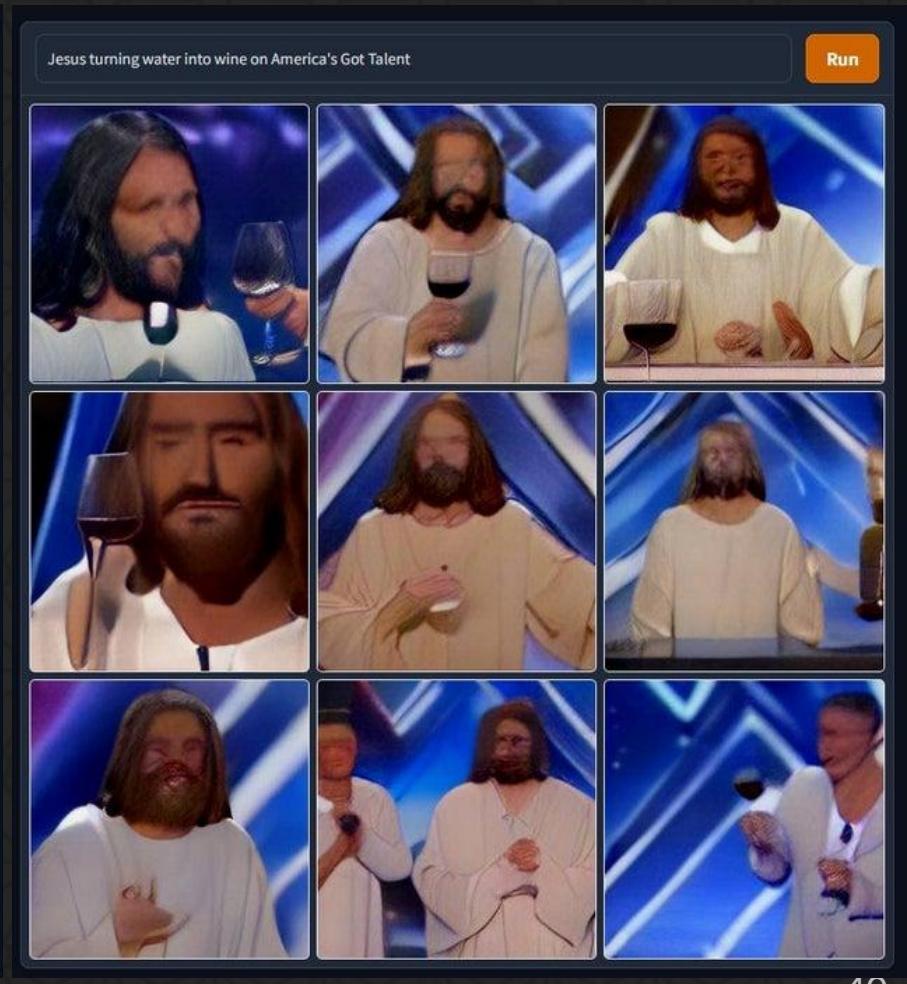


Text to image models: DALL-E, Stable Diffusion

Generates images from any given text



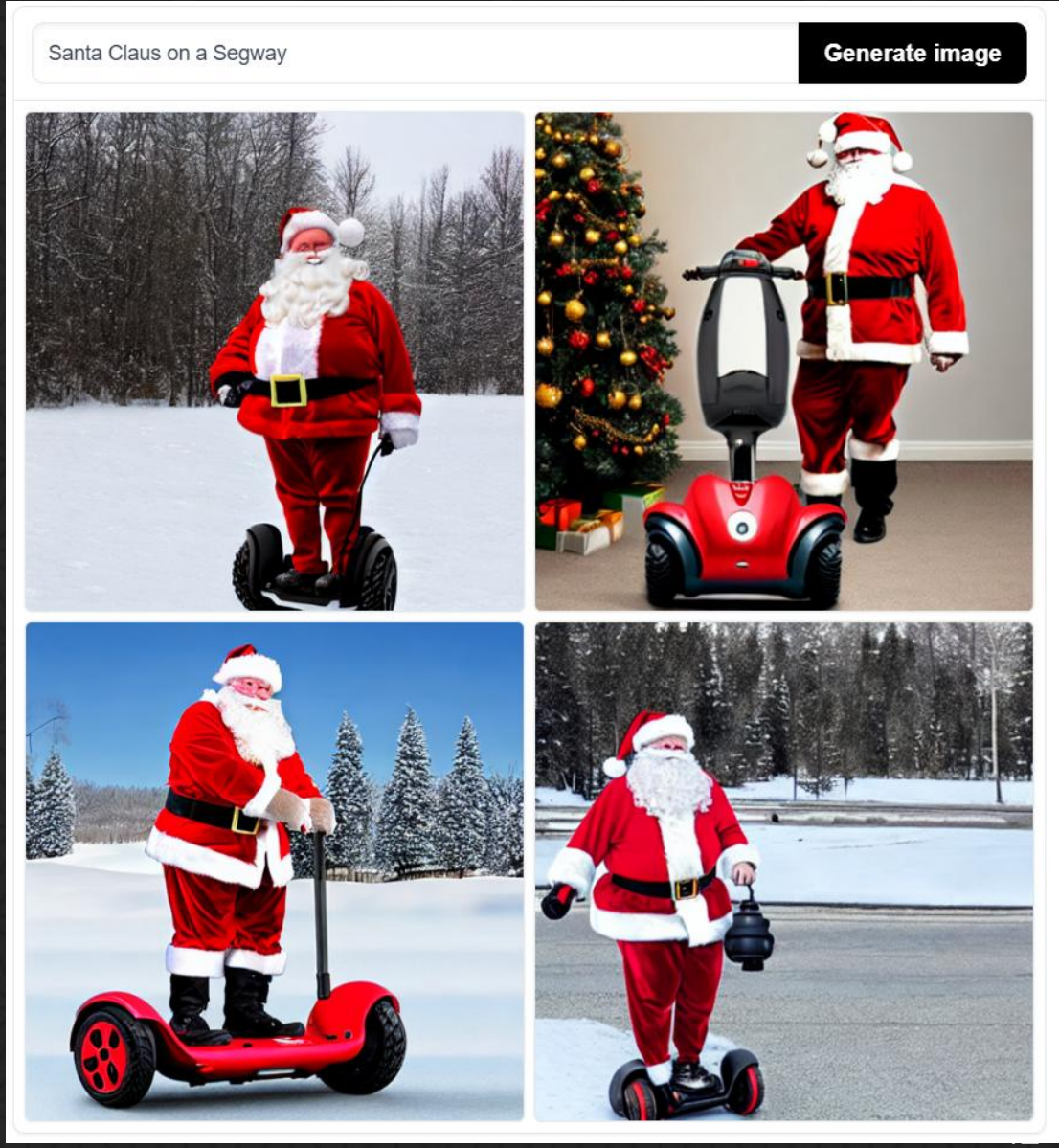




Generate prompts with GPT-3

Mini DALL-E is a text-to-image generator that is able to come up with incredibly funny images if given the right textual prompt.
The prompt usually combines two mostly unrelated, distinct and well-known concepts that are interesting to visualize
Some prompts that received a lot of upvotes on Reddit for its funny visualizations are:

- Gender reveal 9/11
- Karl Marx slimed at Kids Choice Awards
- Moai statue giving a TED talk
- Osama bin Laden Funko pop
- gaming diaper
- Pixar Coronavirus movie
- Santa Claus on a Segway
- Spongebob in the Matrix



“featured on artstation, 4K” trick

KU Leuven researcher giving a talk in Kortrijk, Jean paptiste monge, oil painting

Generate image



ing a talk in Kortrijk, Jean paptiste monge, oil painting, trending on artstation, 4K

Generate image



Kortrijk

Generate image






Kortrijk, ultra high quality, 4k, colorful, artstation

Generate image






The art of prompt engineering

Write a compliment for Lieven De Lathauwer.

Your work is excellent and you are a very talented individual.

Write a short summary of the work of Lieven De Lathauwer, and then write a compliment for him.

Lieven De Lathauwer is a Belgian mathematician who specializes in tensor decompositions and numerical analysis. He is known for his work on the higher-order singular value decomposition (HOSVD), a generalization of the singular value decomposition (SVD).

Your work on the HOSVD is impressive and has helped to advance the field of numerical analysis.

GPT-3 sucks at math ?

Thomas takes a train from Leuven to Kortrijk. Leuven Station and Kortrijk station have a distance of 100 km. The train travels at 50km/h. The train also stops three times for 10 minutes each stop. How long is the train ride?

Answer: The train ride is 2 hours and 20 minutes.

BUT: Let's think step by step

Thomas takes a train from Leuven to Kortrijk. Leuven Station and Kortrijk station have a distance of 100 km. The train travels at 50km/h. The train also stops three times for 10 minutes each stop. How long is the train ride? Let's think step by step.

Answer:

Step 1:

First, we need to calculate the total time the train spends travelling, without taking into account the stops.

The train travels at 50 km/h, so it takes 2 hours to travel 100 km.

Step 2:

Now, we need to calculate the time the train spends stopped.

The train stops three times for 10 minutes each stop. This means that the train spends a total of 30 minutes stopped.

Step 3:

Now we can calculate the total time the train ride takes.

The train ride takes 2 hours + 30 minutes, which is 2.5 hours.

Humor prompt that allows “draft paper”

This is a test of your ability to write satire about a given headline.

You must complete each of five different steps to write a joke.

For the first step (topic handles), identify the two very distinct topics that define this article headline.
The response to the first step should be given as a comma-separated list of keywords.

For the second step (association), find a funny and surprising associated theme that is very related to both of the topic handles found in the first step.

For the third step (punchlines), write three funny punchlines about the association found in the second step.
The response to the third step should be given as a bullet list where each bullet is indented with a tab or 4 spaces

For the fourth step (best punchline), select the funniest and most original punchline from the third step.

For the fifth step (full joke), write a joke that first repeats the original news headline from the input, followed by a text linking it to the best punchline from the fourth step, and then repeats the punchline from the fourth step itself.

Answer in the following format, replacing <bracketed expressions>:
News headline: <input headline.>
1. topic handles: <Response to first step>
2. association: <Response to the second step>
3. punchlines:
   - <punchline 1>

Explains it's "thinking process"

News headline: Belgian prime minister says the next five winters will be difficult due less energy supply.

1. topic handles: energy, winters
2. association: global warming
3. punchlines:
   - "In other news, the next five summers will be difficult due to more energy supply."
   - "We asked the Belgian prime minister for comment, but he was too busy stockpiling firewood."
   - "Experts are still trying to figure out why the Belgian prime minister is so bad at predictions."
4. best punchline:

"We asked the Belgian prime minister for comment, but he was too busy stockpiling firewood."

5. full joke:

"Belgian prime minister says the next five winters will be difficult due less energy supply. We asked the Belgian prime minister for comment, but he was too busy stockpiling firewood."

Other examples

- *In response to rising energy prices, an emergency conference has been called. The conference will be held in a dark room to save on energy costs. All attendees must bring their own energy drinks.*

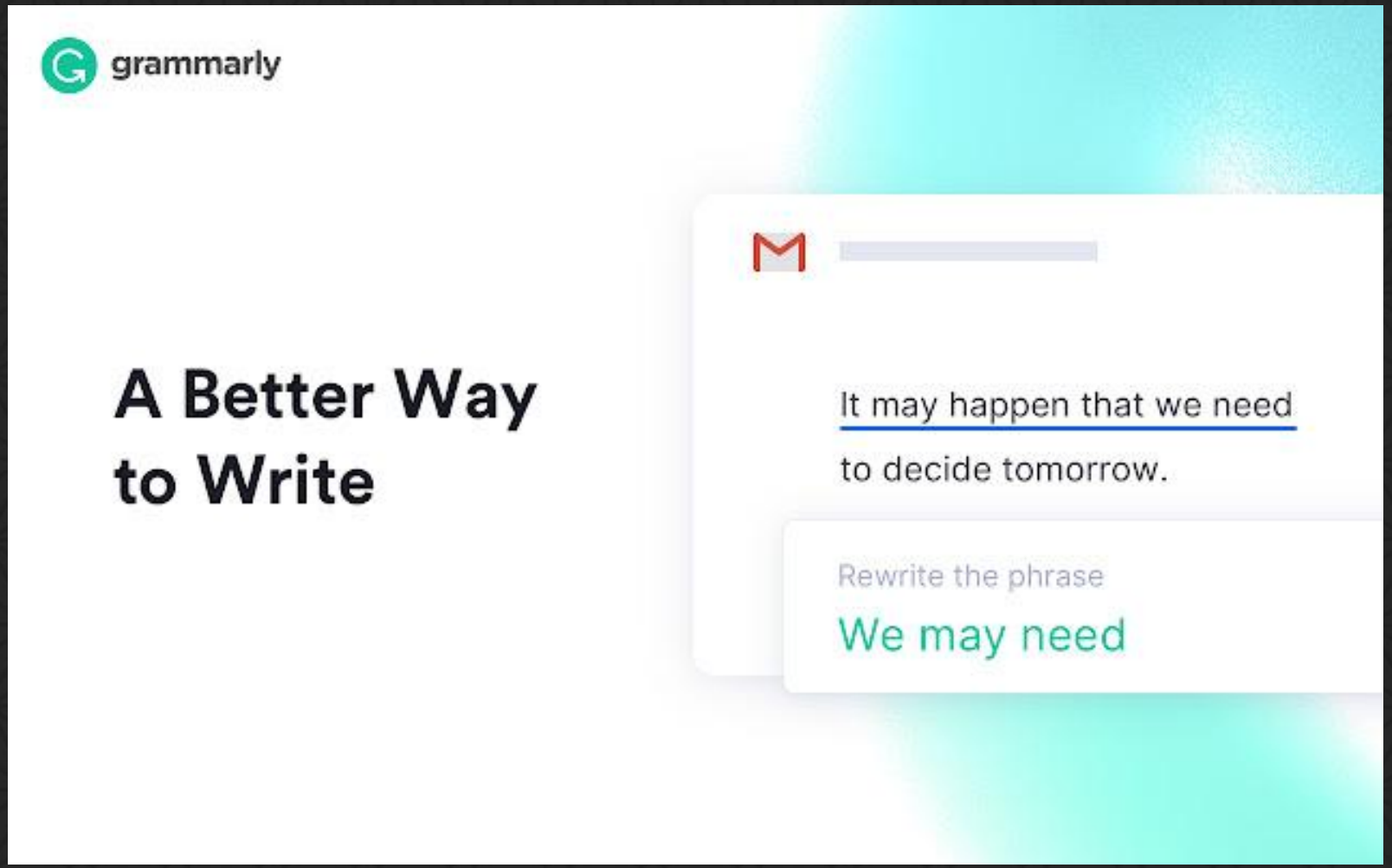
- *Pope assigns 21 new cardinals. Dressing up is usually a cardinal sin, but this pope is making an exception. The new cardinals will be responsible for passing out holy water balloons.*

- *The James Webb-telescope has once again taken some spectacular pictures of Jupiter. It's out of this world!*

Part 4: Why?

Humor co-creation

Grammarly/copy.ai but for jokes



Conversational agents

People often treat virtual assistants like humans

("please", "thank you", "sorry") [1]

41%

say it's like talking to a friend [1]

Humor and creativity in language is important between **friends** [2]



[1] https://www.thinkwithgoogle.com/consumer-insights/voice-assistance-consumer-experience/

[2] Laughter's Influence on the Intimacy of Self-Disclosure, Gray, A.W., Parkinson, B. & Dunbar, R.I. Hum Nat (2015) 26: 28.

Casual Creation: it's fun to create these little bots!

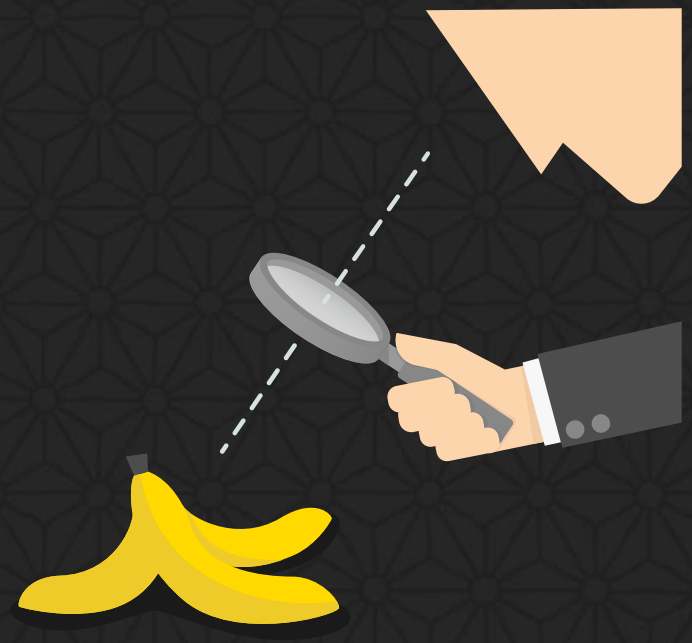


https://thomaswinters.be/mopjesbot

Studying & understanding humor

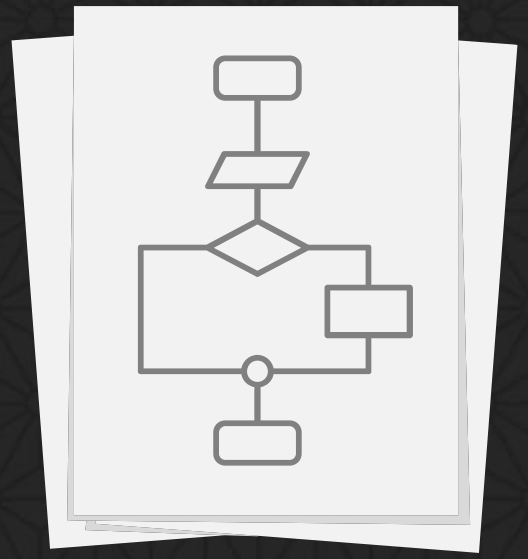
We do not fully know how humor works



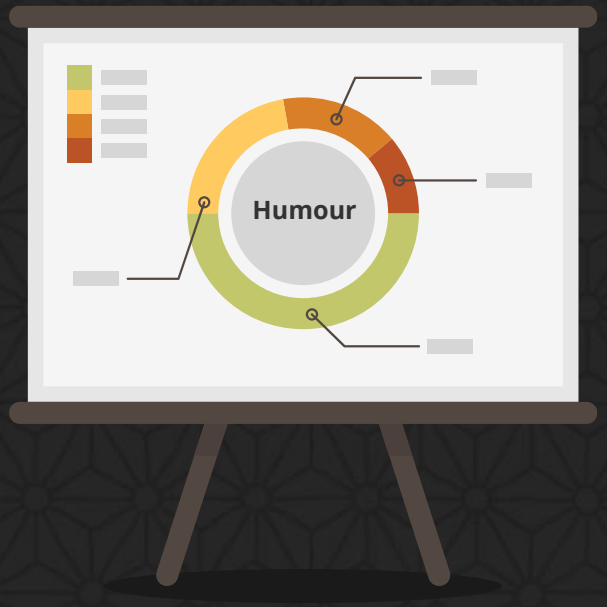


Artificial Intelligence can shed a light!

Can computers have a sense of humor?



Hand-craft rules
for type of humor



Learn rules if
enough data



Better **NLP models**
get us closer & closer

but:

AI-complete problem!

Need to process two mental images
before fully understanding the joke

Thanks!

- **TalkGenerator**: *talkgenerator.com*
- **TorfsBot:** *twitter.com/TorfsBot*
- **GPT-3:** *openai.com/api*
- **AI Dungeon:** *play.aidungeon.io*
- **AI copywriting:** *rytr.me & copy.ai & you.com/write*
- **Image generators:**
  - *craiyon.ai*
  - *huggingface.co/spaces/stabilityai/stable-diffusion*



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KU LEUVEN DTAI fwo