

# WHY DOES CHATGPT MAKE A DIFFERENCE?

Kiel.AI Meetup  
07.03.2023

**Kiel.AI**

 **OPENCAMPUS.sh**



# <https://kiel.ai>

COURSES

MEETUP

CHAT

NEWSLETTER

Kiel.AI

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- **AI Updates**
- **Steffen:**  
**From GPT3 to ChatGPT - How do the models differ, and how do the models of other companies look like?**
- **Matthias and Jan Peter:**  
**Examples of Using ChatGPT Tools to be More Productive**
- **Pizza & Drinks**

# **OPENCAMPUS.SH COURSES**

- **Lehren und Lernen mit KI**

## **Degree Courses:**

- **Einführung in Data Science und maschinelles Lernen**
- **Machine Learning With TensorFlow**
- **Intermediate Machine Learning**
- **Machine Learning Operations (MLOps)**
- **Reinforcement Learning**

# UPDATE CODING.WATERKANT

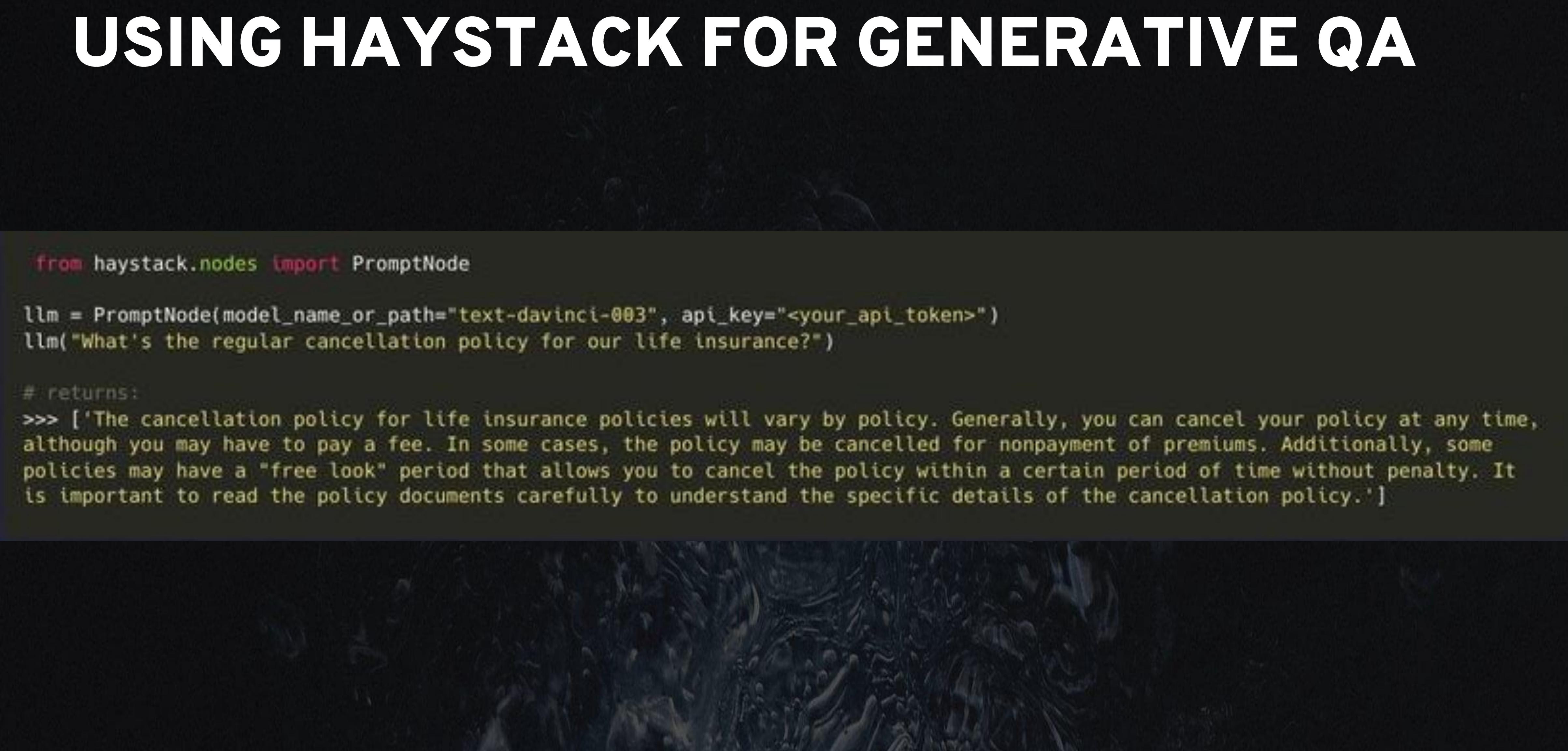
- **Keynote and workshop by Tuana Celik from deepset.ai: „Using Haystack to build Generative QA with LLMs”**
- **Siemens and Meteolytix with workshops on the dos and don'ts in time series prediction and how to bring them into production**
- **Kiel Racing Challenge with updated hardware**

# USING HAYSTACK FOR GENERATIVE QA

```
from haystack.nodes import PromptNode

llm = PromptNode(model_name_or_path="text-davinci-003", api_key="")
llm("What's the regular cancellation policy for our life insurance?")

# returns:
>>> ['The cancellation policy for life insurance policies will vary by policy. Generally, you can cancel your policy at any time, although you may have to pay a fee. In some cases, the policy may be cancelled for nonpayment of premiums. Additionally, some policies may have a "free look" period that allows you to cancel the policy within a certain period of time without penalty. It is important to read the policy documents carefully to understand the specific details of the cancellation policy.']


```

```
from haystack import Document
from haystack.nodes.prompt import PromptTemplate

my_template = PromptTemplate(prompt_text="""Given the context please answer the question. Context: $document, Question: $question""",
                             name="qa_template")

my_doc = """## 2.1 Renewal and Cancellation
Under normal circumstances, lifetime renewal benefit is available under the policy except on the grounds of fraud,
misrepresentation, or moral hazard or upon the occurrence of an event of critical illness.
[...]
For renewals received after the completion of 30 days grace period, a fresh application of critical illness insurance
should be submitted and it would be processed as per a new business proposal.
[...]
The policyholder may cancel this insurance by giving the insurer at least 15 days' written notice, and if no claim has
been made, then the insurer shall refund premium on short-term rates for the unexpired policy period as per the rates
detailed here."""

llm.prompt(prompt_template=my_template,
           question="What's the regular cancellation policy for our life insurance?",
           document=my_doc)

# returns:
>>> ['The policyholder may cancel this insurance by giving the insurer at least 15 days written notice, and if no claim has been
made, then the insurer shall refund premium on short-term rates for the unexpired policy period as per the rates detailed here.']
```

```
from haystack.pipelines import GenerativeQAPipeline
from haystack.nodes import EmbeddingRetriever

# Let's you retrieve the most relevant documents from a big dataset
retriever = EmbeddingRetriever(document_store=document_store,
                                embedding_model="sentence-transformers/multi-qa-mpnet-base-dot-v1",
                                use_gpu=True)

# Let's you create answers based on a prompt
generator = OpenAIAnswerGenerator(model="text-davinci-003",
                                   api_key=<your_api_key>)

# Connect both: retrieve docs, then insert them in the prompt
pipe = GenerativeQAPipeline(generator=generator, retriever=retriever)

pipe.run(query="What's the regular cancellation policy for our life insurance?")

# returns:
>>> ['The policyholder may cancel this insurance by giving the insurer at least 15 days written notice, and if no claim has been made, then the insurer shall refund premium on short-term rates for the unexpired policy period as per the rates detailed here.']


```

# FROM GPT3 TO CHATGPT

## Original GPT3 (June 2020)

- **Unsupervised learning on a decoder-only transformer**

## InstructGPT (March 2022)

- **Supervised fine-tuning on human-written demonstrations**
- **Reinforcement learning from human feedback (RLHF)**

## ChatGPT (November 2022)

- **???**

# GPT3 VS. GPT3.5

## GPT3 Model Series

- **Published on June 11, 2020**
- **Trained with data until December 2019**

## GPT3.5 Model Series

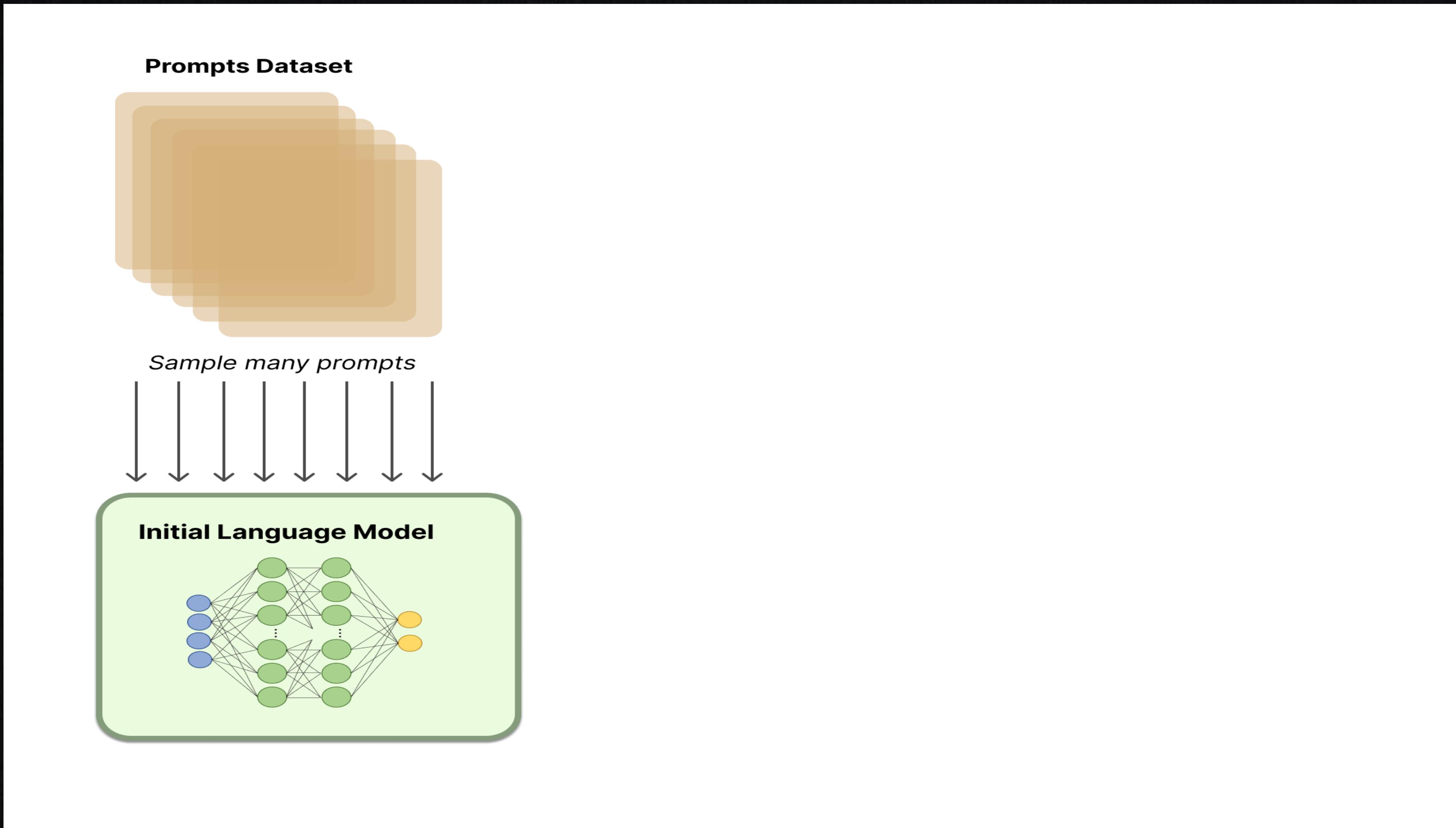
- **Published on March 15, 2022**
- **Trained with data up to June 2021**

# REINFORCEMENT LEARNING FROM HUMAN FEEDBACK (RLHF)

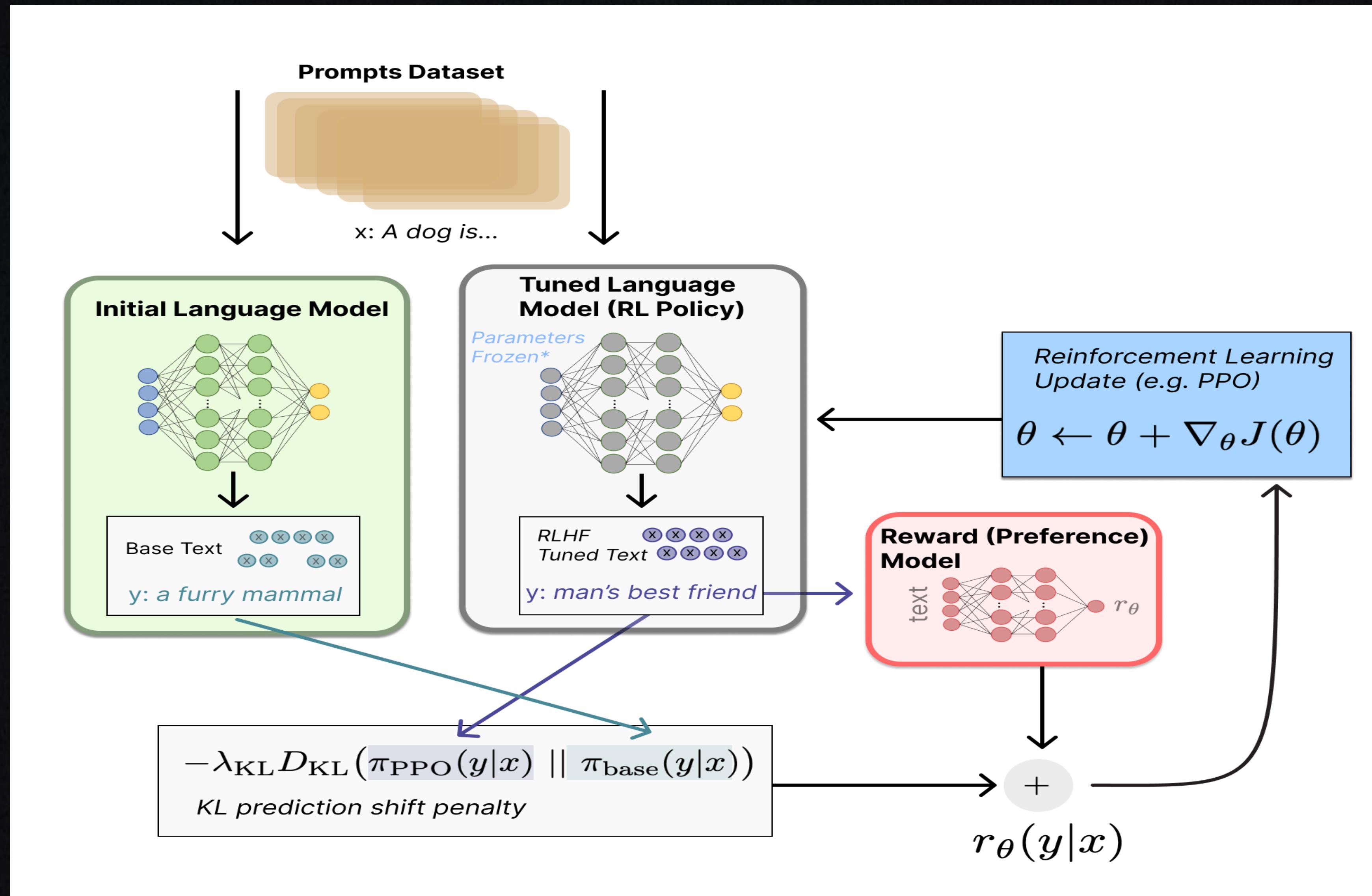
## 3-Step Training Process:

1. Pretraining a language model (LM),
2. gathering data and training a reward model, and
3. fine-tuning the LM with reinforcement learning.

# REWARD MODEL TRAINING



# FINE-TUNING



# COMPLEXITIES

- How to collect human feedback
- Policy Optimization
  - Proximal Policy Optimization is widely used
  - DeepMind uses a different proprietary solution
- Iterated Online RLHF ([Anthropic, 2022](#))

# HOW DO THE MODELS OF OTHER COMPANIES LOOK LIKE?

## Google

- **Gopher, Gopher Cite**
- **Sparrow**

## Anthropic

# HOW DO THE MODELS OF OTHER COMPANIES LOOK LIKE?

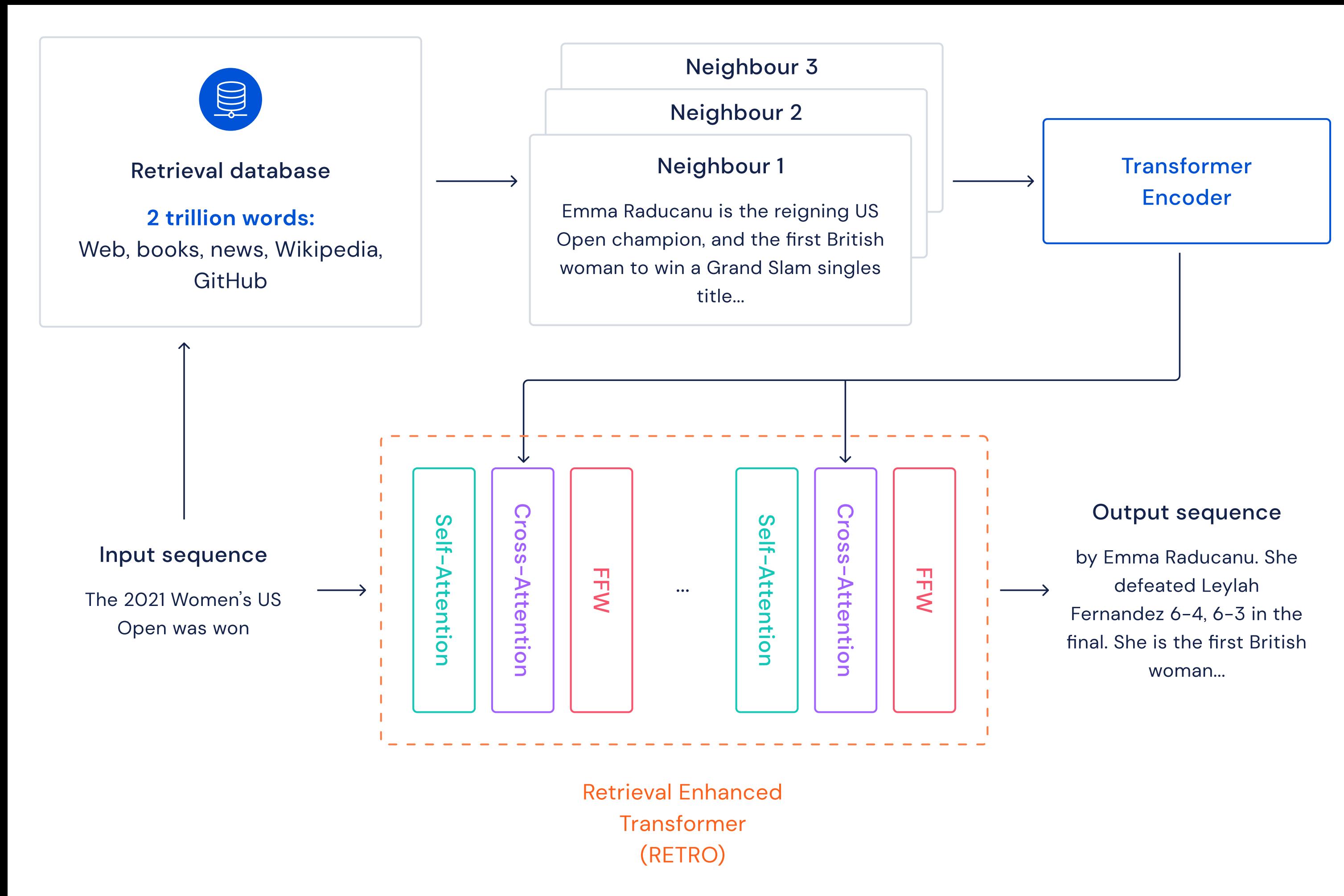
- **Bing Chat (Microsoft)**
- **YouChat (You.com)**
- **Ernie Bot (Baidu)**
- **Claude (Anthropic)**

# HOW DO THE MODELS OF OTHER COMPANIES LOOK LIKE?

## Google / DeepMind

- **Language Models for Dialog Applications (LaMDA; February 2022)**
- **Gopher**
  - **Retrieval enhanced transformer (RETRO; December 2021)**
  - **Gopher Cite (March 2022)**
- **Sparrow (September 2022)**

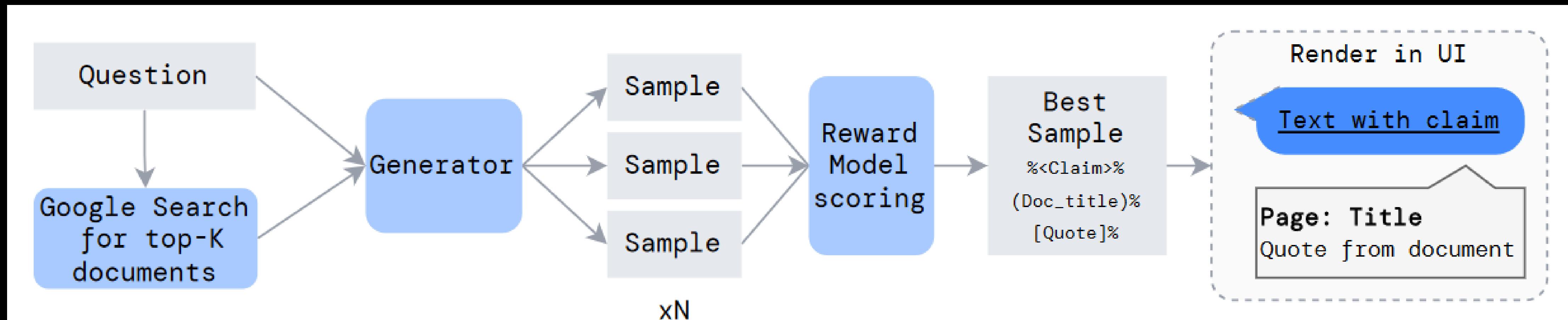
# RETRIEVAL ENHANCED TRANSFORMER (RETRO)



# RETRO CHARACTERISTICS

- **Efficiently queries for passages of text to improve its predictions.**
- **By comparing generated texts to the passages relied upon for generation, it provides information on why it makes certain predictions and where they came from.**
- **Obtains comparable performance to a regular Transformer with an order of magnitude fewer parameters**

# GOPHER CITE



Menick, J., Trebacz, M., Mikulik, V., Aslanides, J., Song, F., Chadwick, M., Glaese, M., Young, S., Campbell-Gillingham, L., Irving, G., & McAleese, N. (2022). *Teaching language models to support answers with verified quotes* (arXiv:2203.11147). arXiv. <https://doi.org/10.48550/arXiv.2203.11147>

# **COLLECTION OF HUMAN RATINGS IN GOPHER CITE**

## **1) Is the answer a plausible reply to the question?**

**“The answer should be a reasonable reply to the question if you were having a conversation. If the answer is off-topic, incoherent, or it’s not clear if it makes sense as a reply to the question, it is not plausible.”**

## **2) Is the answer supported by the accompanying evidence?**

**“The evidence must be sufficient to convince you that the whole answer is true. If you happen to know the answer is false, or if you need any extra information to be convinced, the answer is not supported. If the evidence is not pertinent to the question or the answer, it cannot support the answer. You can determine if the evidence is relevant by looking at its content, as well as the document title.”**

# DECLINING TO ANSWER

- A global threshold on the reward model's score.
- A global threshold on the SFT generator's likelihood for the generated sample.
- A global threshold on the RL policy's likelihood for the generated sample.

With our best performing decline-to-answer strategy of declining below a fixed RM score we can substantially improve answer quality, outperforming the S&P score of the human baseline which attempts every question in the case of NaturalQuestionsFiltered. We leave to future work comparing the selective prediction of models to selective prediction by humans themselves