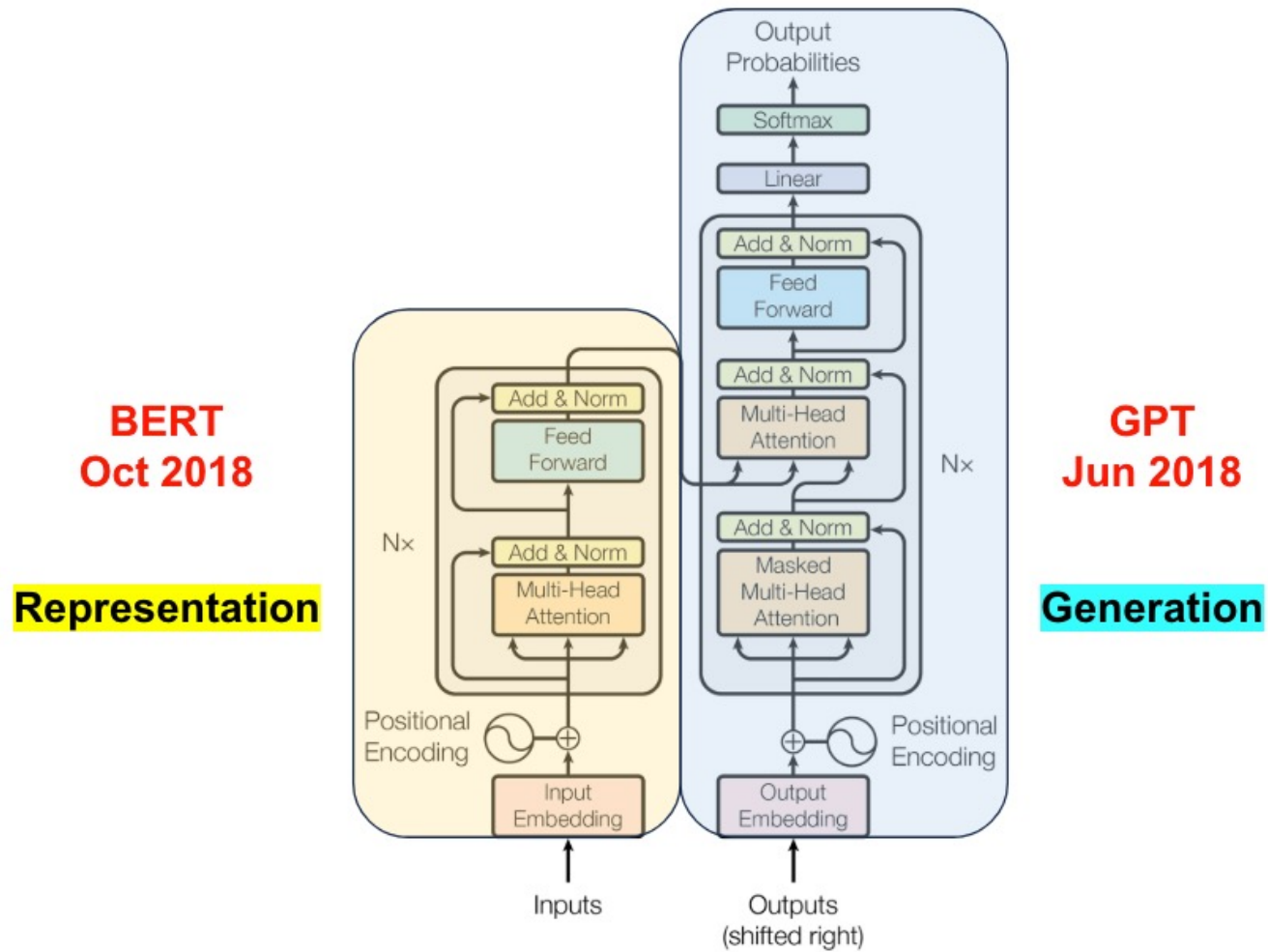


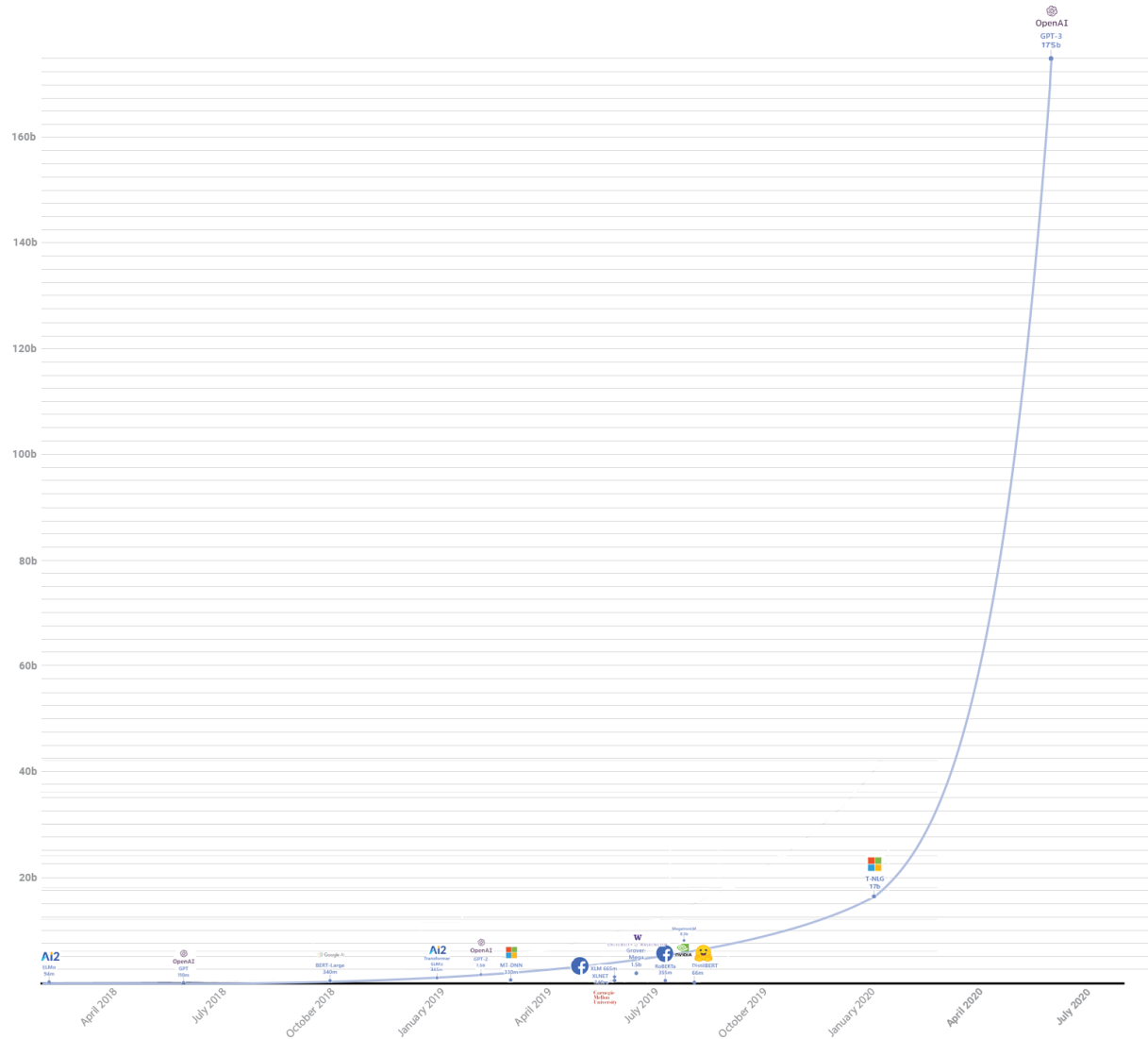
Large Language Models

Mohamed Afham

But what are LLMs?



From GPT-2 to GPT-3 and beyond

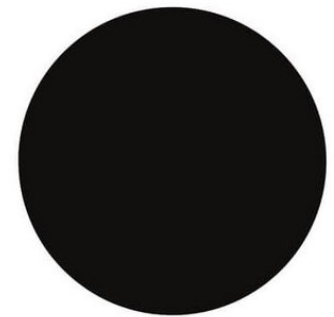


GPT-3



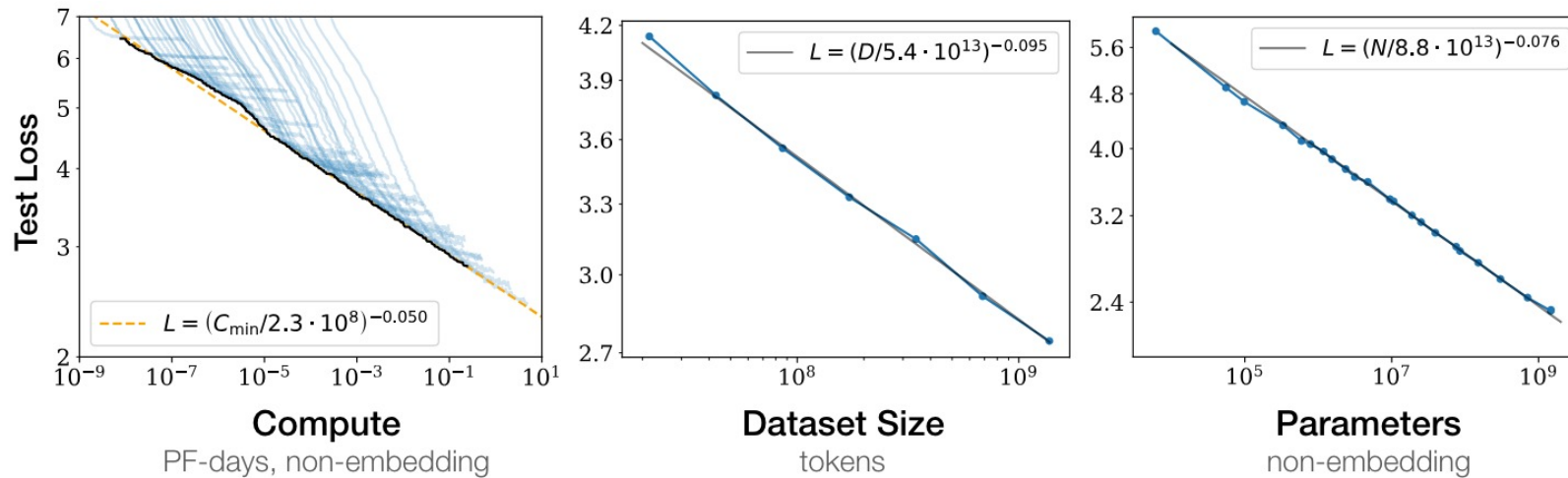
175.000.000.000

GPT-4



1.000.000.000.000.00

From GPT-2 to GPT-3 and beyond – Massive Scaling

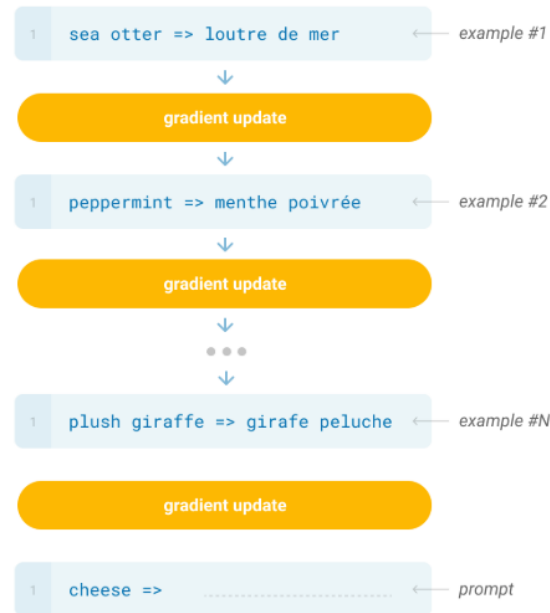


Diverse Training data with massive parameters is the key !!

From GPT-2 to GPT-3 and beyond – Prompt Engineering

Fine-tuning

The model is trained via repeated gradient updates using a large corpus of example tasks.



Pre-LLMs

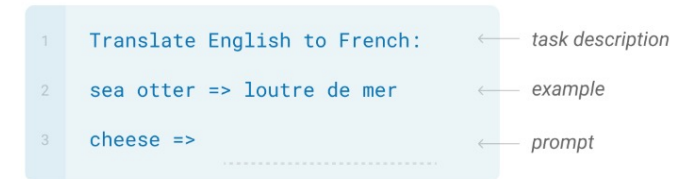
Zero-shot

The model predicts the answer given only a natural language description of the task. No gradient updates are performed.



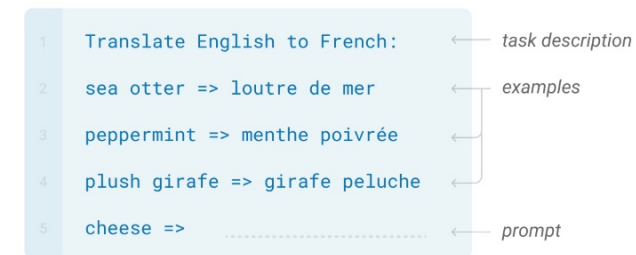
One-shot

In addition to the task description, the model sees a single example of the task. No gradient updates are performed.



Few-shot

In addition to the task description, the model sees a few examples of the task. No gradient updates are performed.



GPT-3 and Beyond

From GPT-2 to GPT-3 and beyond



PaML (540b), **LaMDA** (137b) and others.



BLOOM (176b)



OPT-IML (175b), **Galactica** (120b), **BlenderBot3** (175b), **Llama 2** (70b)



PanGu- α (200b)



GPT-3 (175b), **GPT-3.5** (?b), **GPT-4** (?b)



Megatron-Turing NLG (530b)

ANTHROPIC

Claude (?b), **Claude 2** (?b)



Exaone (300b)



ERNIE 3.0 Titan (260b)



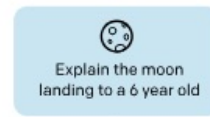
Jurassic-1 (178b), **Jurassic-2** (?b)

LLMs with human feedback

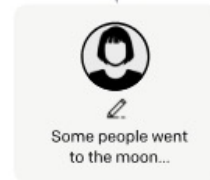
Step 1

**Collect demonstration data,
and train a supervised policy.**

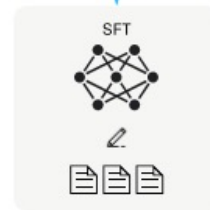
A prompt is
sampled from our
prompt dataset.



A labeler
demonstrates the
desired output
behavior.



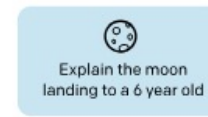
This data is used
to fine-tune GPT-3
with supervised
learning.



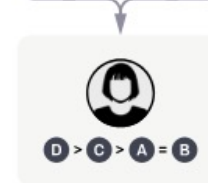
Step 2

**Collect comparison data,
and train a reward model.**

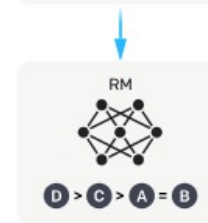
A prompt and
several model
outputs are
sampled.



A labeler ranks
the outputs from
best to worst.



This data is used
to train our
reward model.



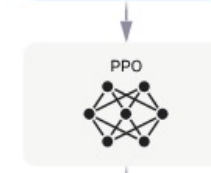
Step 3

**Optimize a policy against
the reward model using
reinforcement learning.**

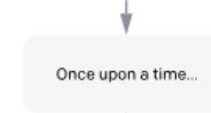
A new prompt
is sampled from
the dataset.



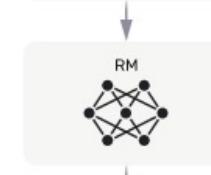
The policy
generates an output.



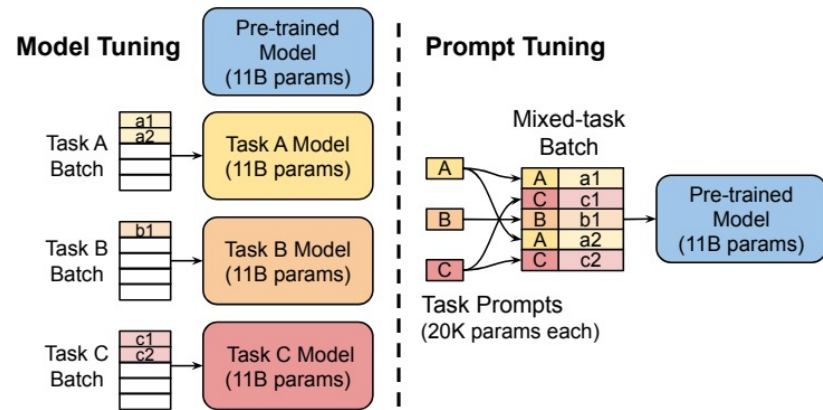
The reward model
calculates a
reward for
the output.



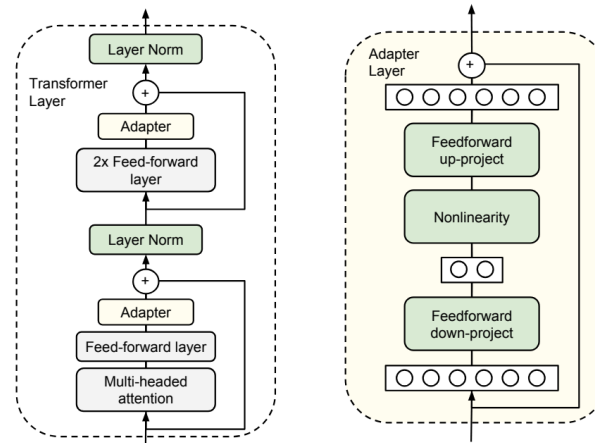
The reward is
used to update
the policy
using PPO.



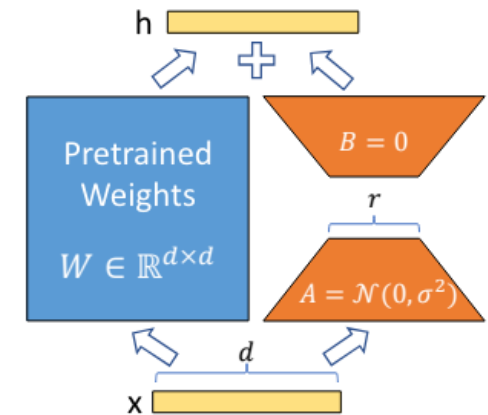
Parameter Efficient Fine-tuning



Prompt Tuning



Adapters

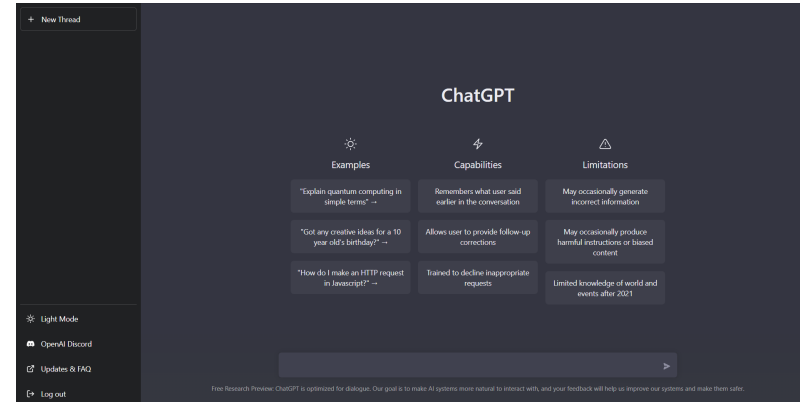


LoRA

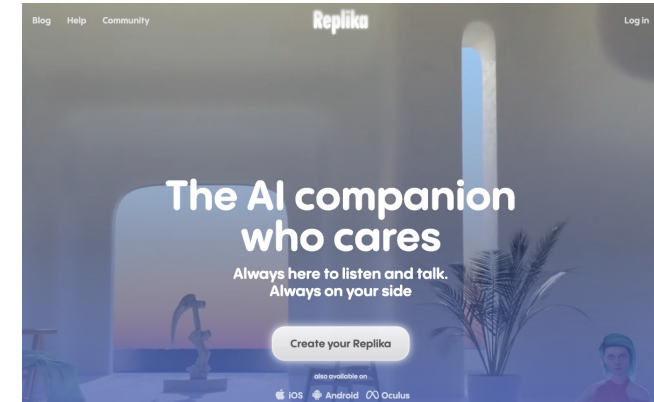
LLMs - Applications



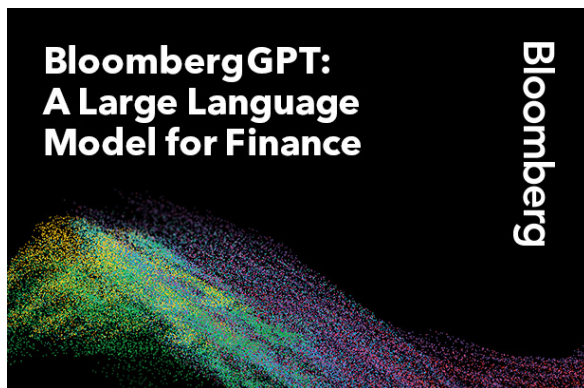
Grammarly



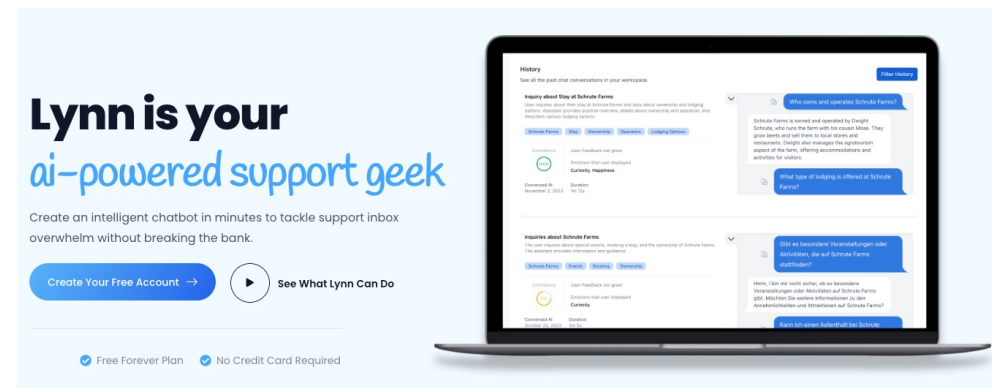
ChatGPT



Replika



BloombergGPT



Lynn

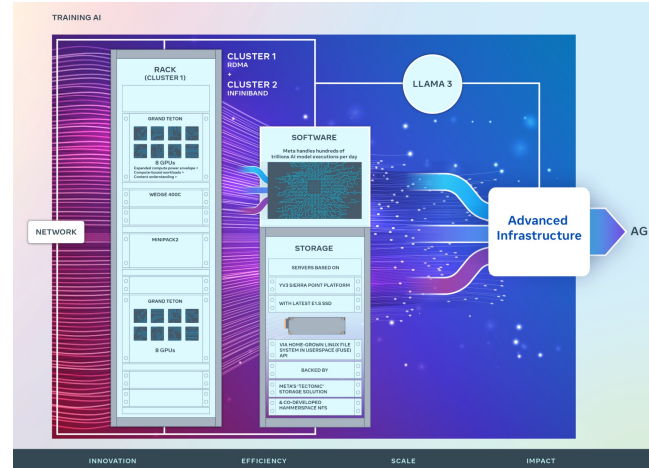
LLMs - Challenges and Ethical Considerations

- Bias
 - Models can perpetuate existing biases in training data.
 - E.g., Gender, Racial and Cultural biases
- Misinformation
 - Risk of generating plausible but false information
 - Challenges in distinguishing between true and false outputs
- Privacy
 - Concerns over data privacy and potential misuse of sensitive information
- Job Displacement
 - Impact on jobs in sectors like content creation, customer service, etc

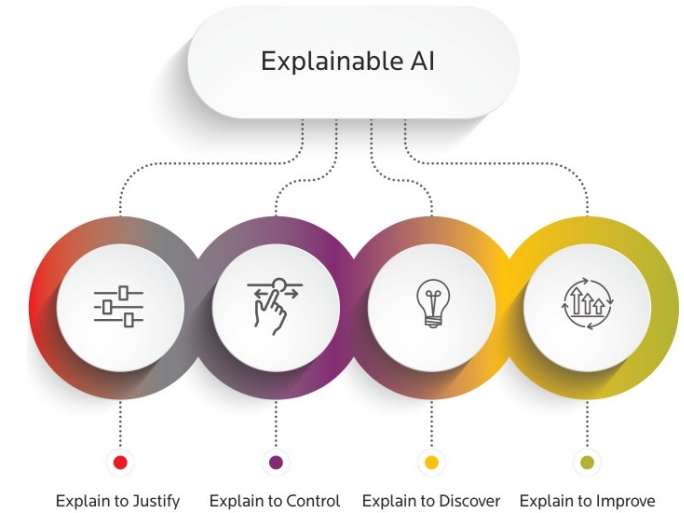
LLMs – What's Next



Multimodal Models



Scaling Up



Explainable AI

Thank You !

Questions?