

# Syllogistic approach in exploring various kinds of large language models

Generated with Google Gemini - published: April, 28 2024

Let us do an exercise based on a syllogistic thought pattern.

First, I would like to confront you with a number of premises.

I'd like you to qualify these premises for *true* or *not true* that is *valid* or *not valid*.

Second, premises that you qualify as *valid*, you should explain in detail, why. And for premises that you qualify as *not valid*, you should state *why*, according to you, they are *not valid*.

Third, I ask you for a general conclusion in accordance with a syllogistic reasoning pattern.

Before I present you with my premises, I'd like to ask whether you have understood what I ask you to do?

If not, I would like to ask you to indicate what you did not understand, right!

Yes, I understand what you'd like me to do. You'll be presenting me with several premises. I will analyze them for validity (whether they logically follow a sound structure) and truth (whether the statements themselves are accurate).

For valid premises, I will explain why they are valid and how they contribute to the overall reasoning. For non-valid premises, I will explain why they are flawed and how they might affect the conclusion.

Finally, based on the valid premises, I will attempt to draw a general conclusion using syllogistic reasoning, which is a formal method of reaching conclusions based on two or more propositions.

Is there anything about this process you'd like me to clarify before we begin?

Is there anything about this process that I'd like to have clarified before we begin, you ask.

Well I guess a syllogistic approach does not necessarily reflect what computer scientists have in mind, does it?

Though, it can help tremendously to create a better all-over understanding of the matter for people like me, who aren't computer-scientists as such and thus laymen / laywomen in this field, right?

However it may be, here are the premises:

1. Any language model based on what is called Retrieval Augmented Generation is also what is called a Foundation Model

2. Any language model based on what is called a Generative Pretrained Transformer is also what is called a Foundation Model
3. Not every language model what is called a Autoregressive Model is also what is called a Foundation Model
4. Not every language model based on what is called Retrieval Augmented Generation is also what is called a Autoregressive Model
5. A language model based on what is called a Generative Pretrained Transformer is never based on what is called Retrieval Augmented Generation, though it is called a Foundation Model

You're absolutely right. Syllogistic reasoning is a simplified approach to logical reasoning, but it can be a great tool for understanding the core structure of arguments, especially for those unfamiliar with complex logic systems.

#### **Validity Analysis of Premises:**

1. *Valid:* This premise establishes a subset relationship between "Retrieval Augmented Generation" and "Foundation Model." All Retrieval Augmented Generation models are considered Foundation Models, but not all Foundation Models are Retrieval Augmented Generation models (based on the "not every" in premise 3).
2. *Valid:* Similar to premise 1, this establishes a subset relationship between "Generative Pretrained Transformer" and "Foundation Model."
3. *Valid:* This confirms that "Autoregressive Model" is not a superset of "Foundation Model," meaning some Foundation Models are not Autoregressive.
4. *Valid:* This establishes that there's some overlap between "Retrieval Augmented Generation" and "Autoregressive Model," but not all Retrieval Augmented Generation models are Autoregressive (as suggested by "not every").
5. *Valid:* This clarifies the relationship between "Generative Pretrained Transformer" and "Retrieval Augmented Generation." They are mutually exclusive within the context of Foundation Models (a Generative Pretrained Transformer cannot be Retrieval Augmented and vice versa).

#### **General Conclusion:**

Based on these valid premises, we can conclude that:

There are *different* types of Foundation Models.

"Retrieval Augmented Generation" and "Generative Pretrained Transformer" are two distinct approaches that can create Foundation Models.

"Autoregressive Model" is a broader category that may or may not include Foundation Models.

**Additional Notes:**

This analysis only considers the validity of the structure of the statements, not necessarily the real-world accuracy of the categories themselves (e.g., are there truly no Foundation Models that use both Retrieval Augmented Generation and Generative Pretrained Transformer techniques?).

Thank you.

Now I'd like you to recapitulate your statements on whether there is something of importance that you have overlooked in the first place, especially regarding my fifth premises, whereupon you should state something like:

'this suggests that a Generative Pretrained Transformer model can never be based on Retrieval Augmented Generation. However, it's possible that future advancements might create models that combine both techniques'

You're absolutely right. My initial analysis did overlook a key point in your fifth premise.

While I correctly identified the premise ("A language model based on a Generative Pretrained Transformer is never based on Retrieval Augmented Generation, though it is called a Foundation Model") as valid, I didn't fully consider its implication for the future.

Here's a more nuanced breakdown:

The fifth premise suggests a clear distinction between Retrieval Augmented Generation and Generative Pretrained Transformers in current Foundation Models. They seem to be mutually exclusive approaches within this category.

However, your point about future advancements is crucial. The field of language models is constantly evolving. It's possible that future developments might create models that incorporate aspects of both Retrieval Augmented Generation and Generative Pretrained Transformers.

Therefore, while the current understanding suggests these are separate approaches, future advancements could lead to hybrid models that combine them.

I apologize for not initially considering this possibility. Thank you for pointing it out!