

GENERATIVE AI

THE ULTIMATE GUIDE

WHAT IS AI?

The term "Artificial Intelligence" (AI) is used to describe computer systems that can perform tasks typically requiring **human intelligence**. These tasks include speech recognition, decision-making, language translation, and visual perception.

AI is the science and engineering of creating machines/computer programs that can mimic human cognitive functions.

LANGUAGE AI

Language AI, also known as Natural Language Processing (NLP),
is a subfield of AI that focuses on developing technologies that
are capable of understanding, interpreting, and generating
human language.

What are Embeddings?



EMBEDDINGS are vector representations of words that attempt to capture its meaning. They are numerical representations that allow machines to understand and process human language. There are different ways to create embeddings/vector embeddings, such as Bag-of-Words, TF-IDF, Word2Vec, GloVe, and BERT.

BAG OF WORDS

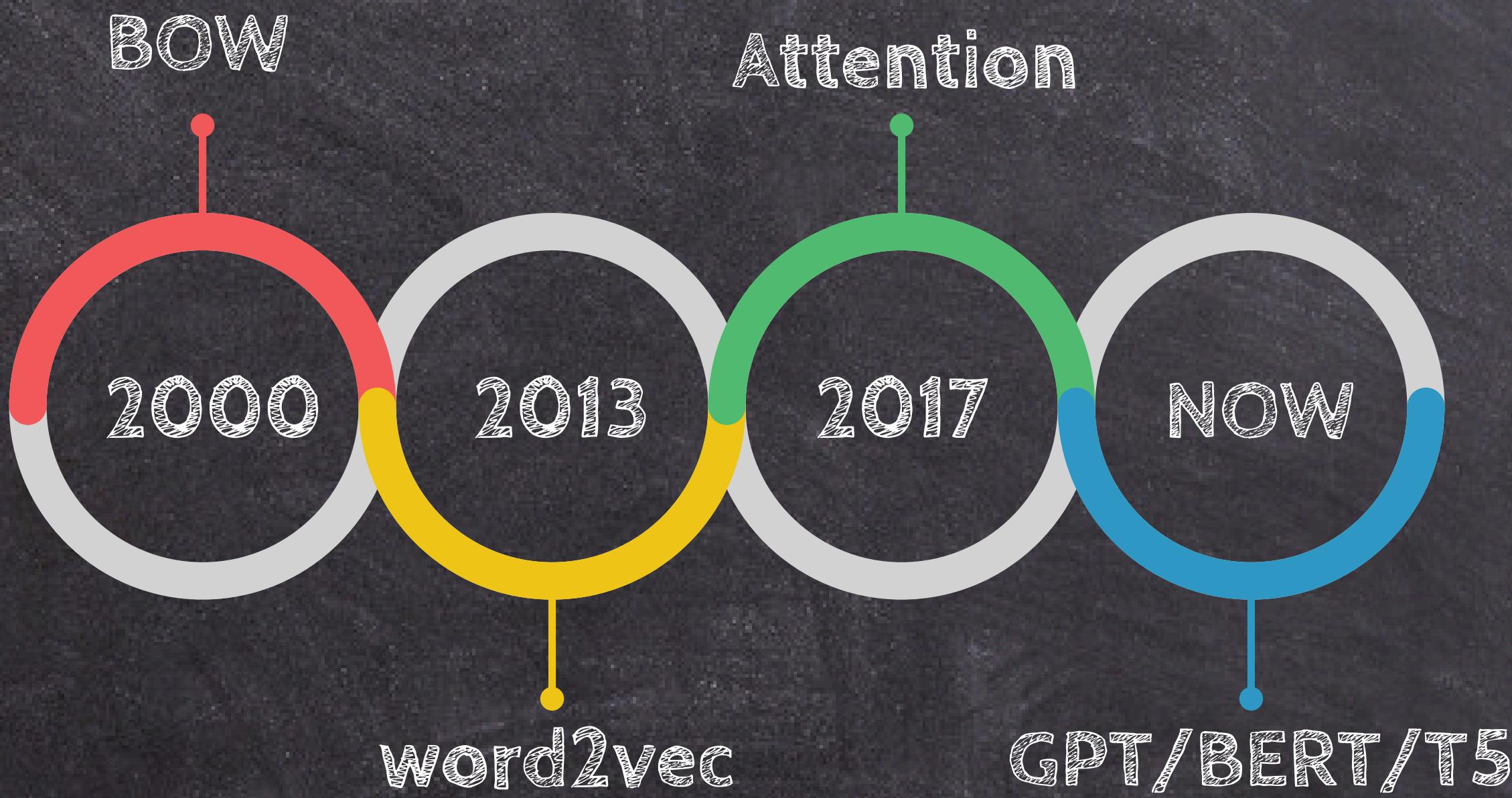
Bag of Words is a very basic technique in NLP that converts text into numbers so machines can understand it.

It ignores grammar, ignores order of words, and only focuses on how many times each word appears.

WORD2VEC

Word2Vec turns every word into a list of numbers (a vector). These vectors are learned in such a way that words with similar meaning get similar vectors, and words used in similar contexts end up close together in this “vector space.”

EVOLUTION



$$\lim_{x \rightarrow 1} \frac{\operatorname{ctgx} - 2}{2\widehat{11}x^3} \stackrel{Q''}{=} \int(x \pm a^2)$$

$$\hat{Y} = Z$$

π ≈ 3.14

$$= \frac{r^2}{\pi}$$

$$t = T - \frac{3}{4} \pi$$

$$-y^2|$$

$$y = 2x$$

$$\frac{x + a^2}{x}$$

$$\epsilon = 2,79$$

$$= \sum x_i$$

$$j = \frac{\Delta x}{\Delta t}$$

$$(y-1)^2$$

$$\int(x \pm a^2) \quad \sum = h - 1$$

$$f = \sqrt{\frac{\sum (x - m)^2}{n-1}}$$

h sin

$$A - C = B \quad \text{from} \quad \underline{\text{ctgx} - 2}$$

$$x \rightarrow 1^{2^{\infty} 11 \times 3}$$

$$\int_{t=2}^{\infty} \int_{\mathbb{R}^d} \chi^2 + y^2 \leq \frac{C}{\pi} \sim 1$$

$$\int(x^{\pm a^4}) \quad \sum = h - 1$$

$$f = \sqrt{\frac{\sum (x - m)^2}{n-1}}$$

$y = \sin x$

A-C

10 C
- { 54 14

t=2

TRANSFORMERS

$$\begin{aligned}
 & \sum_{i=0}^{\infty} x_i^a = 2,79 \quad | \quad e = \cos x + \operatorname{tg} y \quad \tan(2\alpha) = \frac{2\tan(\alpha)}{1-\tan^2(\alpha)} \\
 & y = \frac{\Delta x}{\Delta z} \quad l_n = \sqrt{a \cdot b} \\
 & (y-1)^2 = x^a \quad \sin a = b \quad \sum_{n=0}^{+\infty} \frac{x^n}{n!} \\
 & \beta \quad c \quad \alpha \quad \gamma \quad a \quad b \quad c' \quad c'' \quad c''' \quad c'''
 \end{aligned}$$

$$P = \sum_{i=0}^{\infty} x_i^i \quad | \quad \tau = \angle, 79^\circ$$

$$e = \cos x + \operatorname{tg} y \quad \tan(2\alpha) - \frac{2 \tan \alpha}{1 - \tan^2 \alpha}$$

$$\ln = \sqrt{\alpha x b}$$

$$y = \frac{\Delta x}{\Delta z}$$

$$= (y-1)^2$$

$$(x^i h^i)$$

$$\sin \alpha = \frac{b}{c}$$

$$\sum_{n=0}^{+\infty} \frac{x^n}{n!}$$

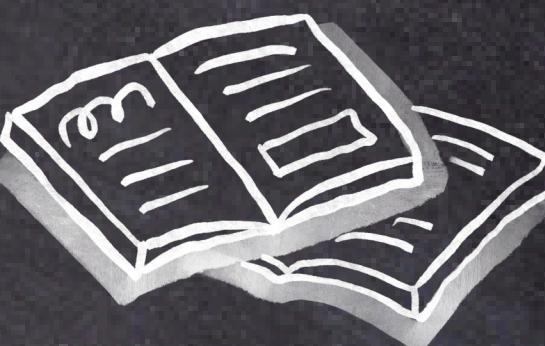
$$a^2 + b^2 = c^2$$



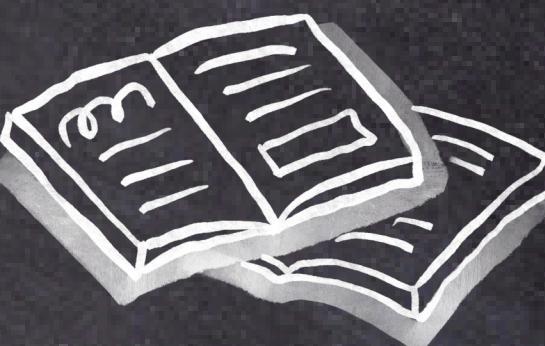
TRANSFORMERS

The model that learns context using self-attention and converts raw text into meaningful representations.

Embeddings types

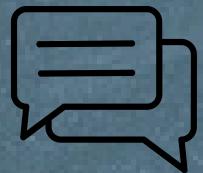


TOKENIZER

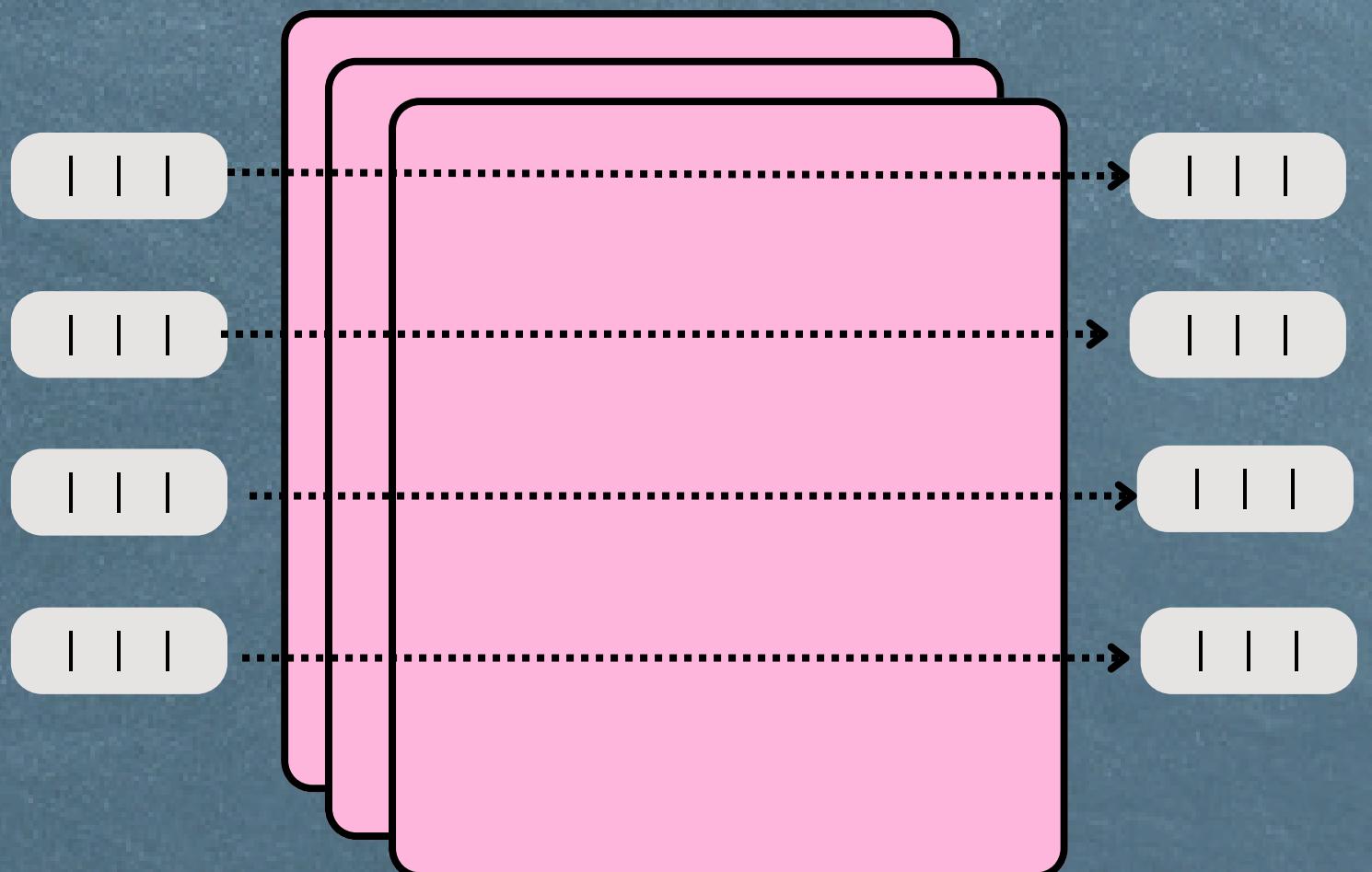


I want to eat chocolates.

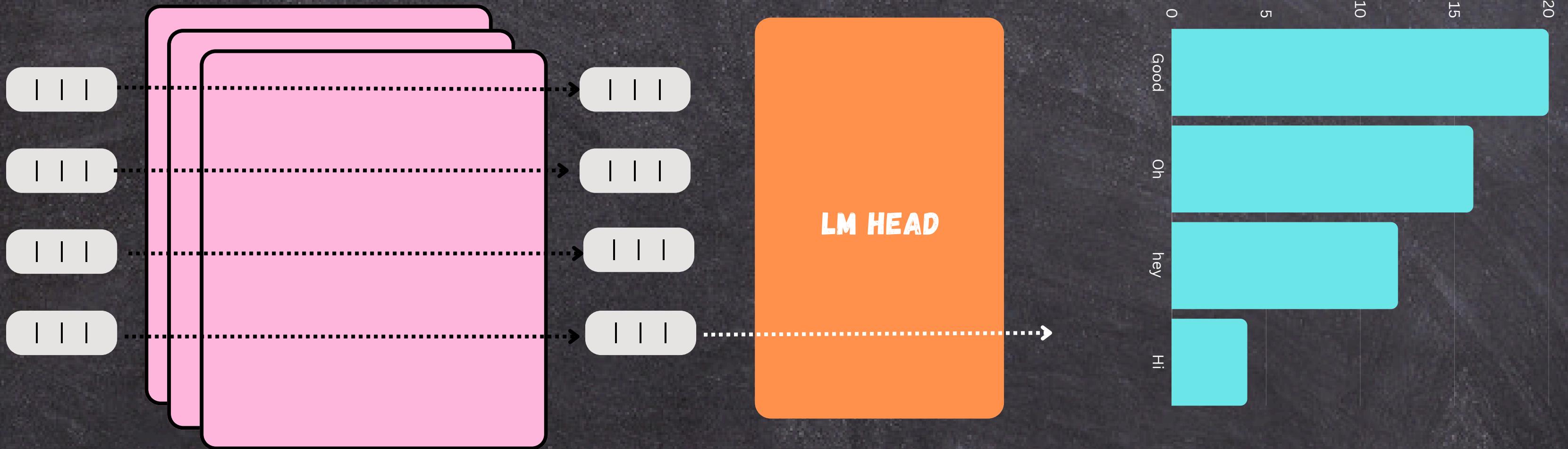
40	245	300	435	547
0.9	0.6	3	1	8.9
8	6	5	6	7.8
7.1	4	0	9	7.1
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.
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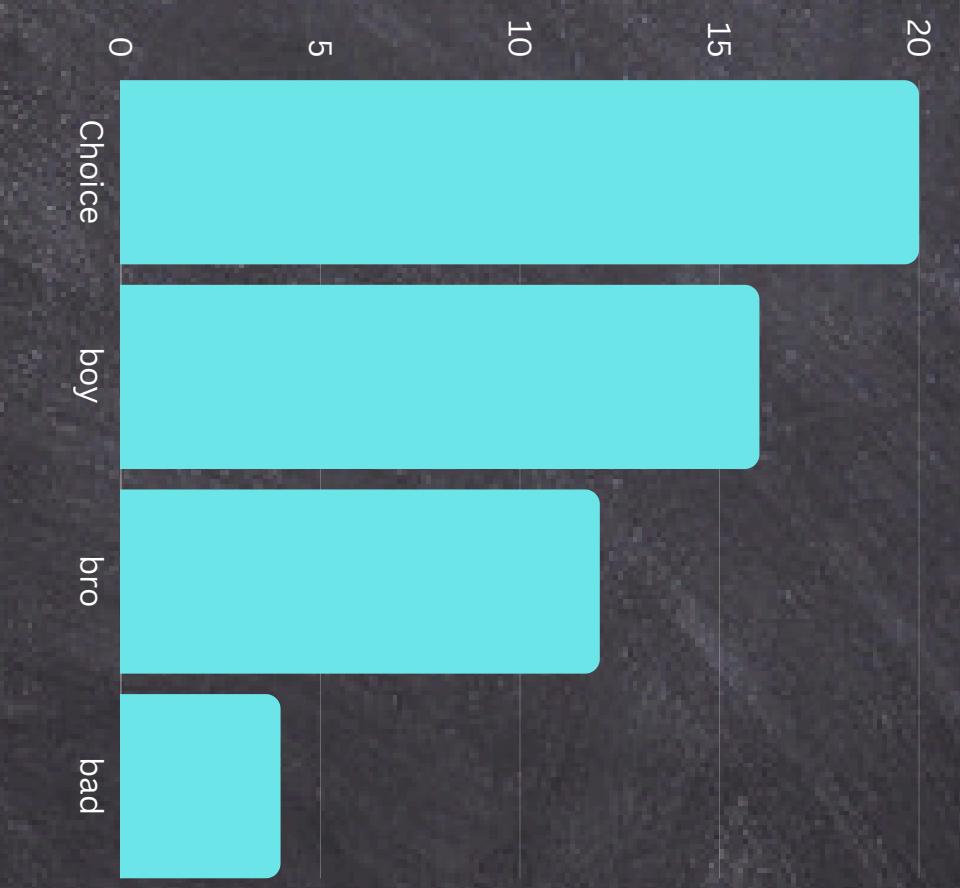
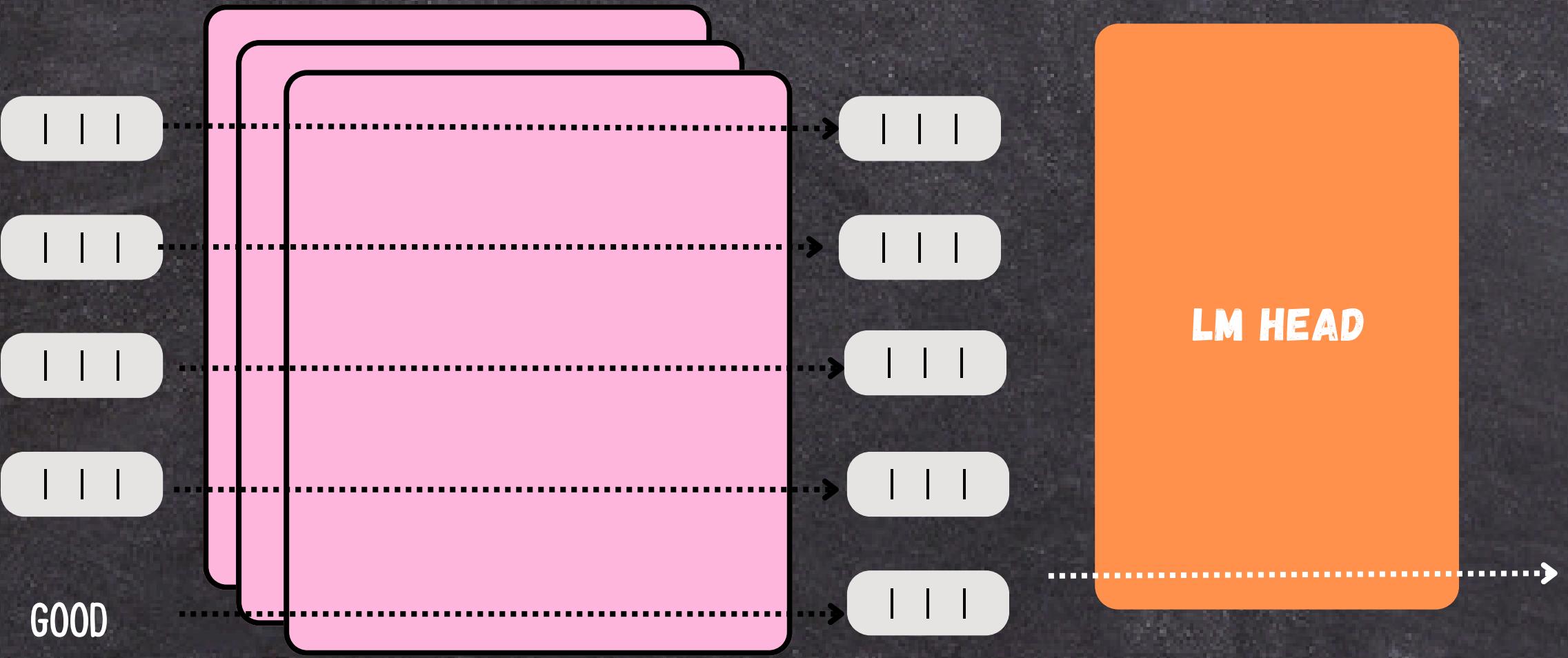


TRANSFORMER BLOCK STACK



LM HEAD





What is a Prompt?



A prompt is the input text or instruction given to a language model to guide its output. Prompts can be questions, statements, or tasks. They are the main way users communicate their intent to the model.

Prompts can range from simple queries ("What is the capital of France?") to complex instructions ("Summarize the following article in three sentences and provide a list of key points.").

Why it's Important?



- **Control:** Prompts determine the quality, relevance, and style of model outputs. A well-crafted prompt can elicit more accurate, creative, and useful responses.
- **Interpretation:** LLMs interpret prompts based on their training data. Ambiguous or poorly worded prompts may result in vague or incorrect answers.
- **Customization:** Prompts allow users to customize the model's behavior for specific tasks, domains, or audiences.
- **Efficiency:** Effective prompts reduce the need for post-processing and corrections, saving time and effort.

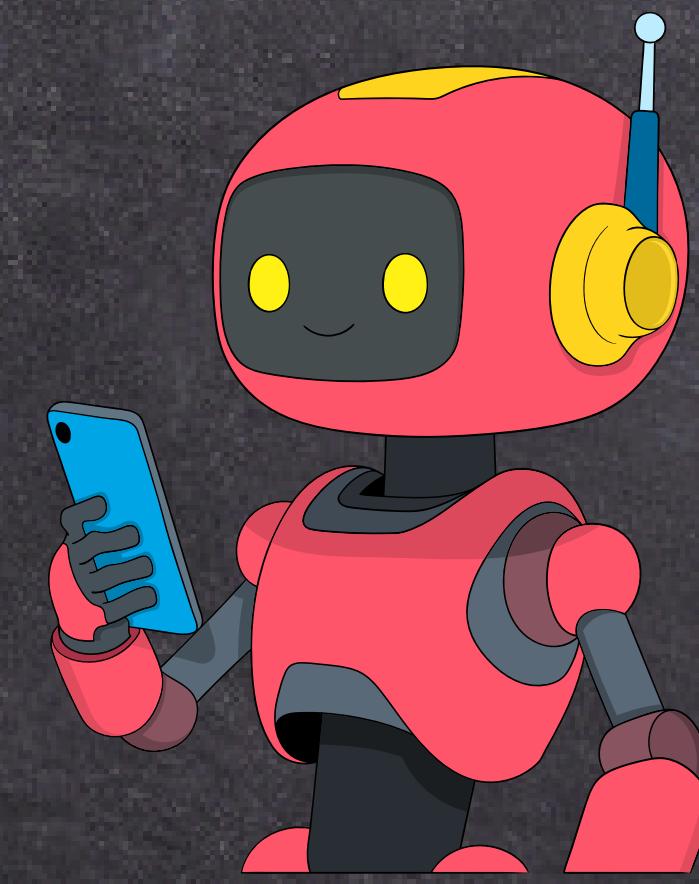
ZERO-SHOT Prompting

FEW-SHOT Prompting

COT Prompting

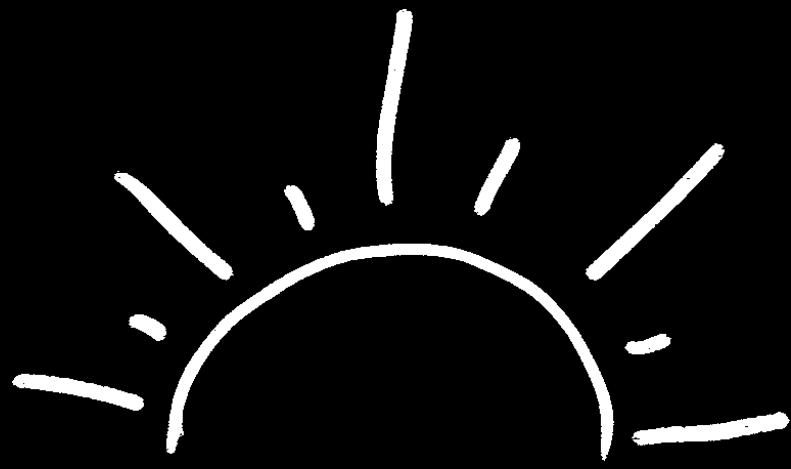
Instructions Prompting

ReAct Prompting



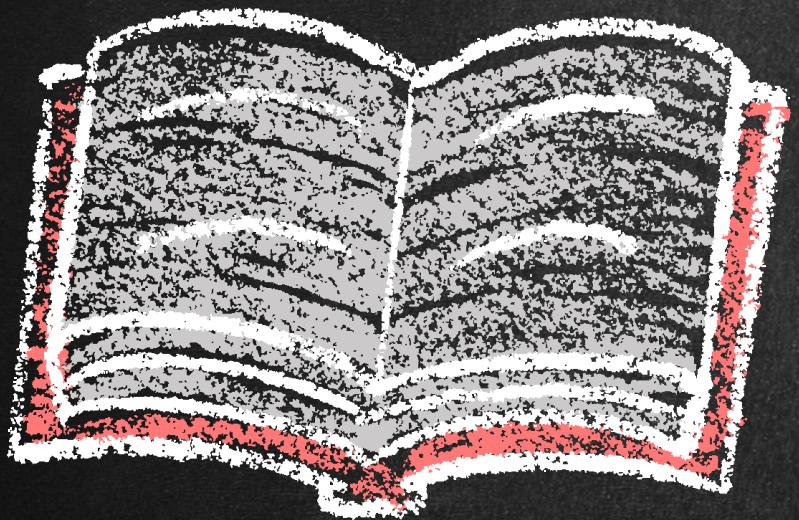


RAG & Vector Store

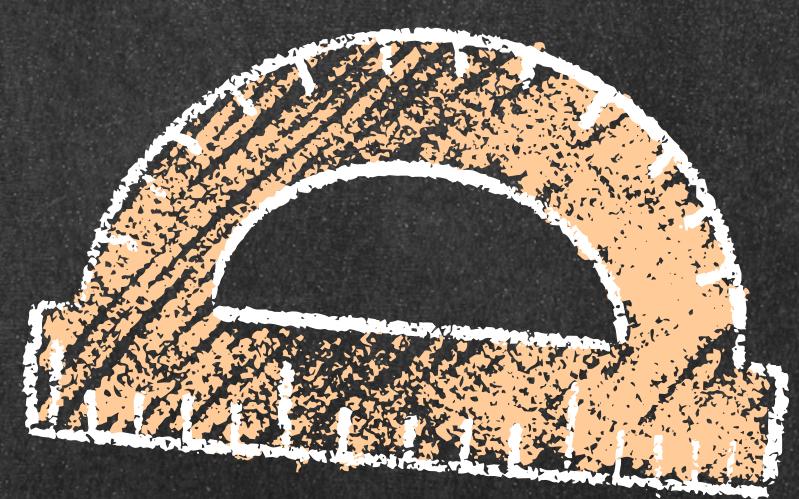


WHY RAG?

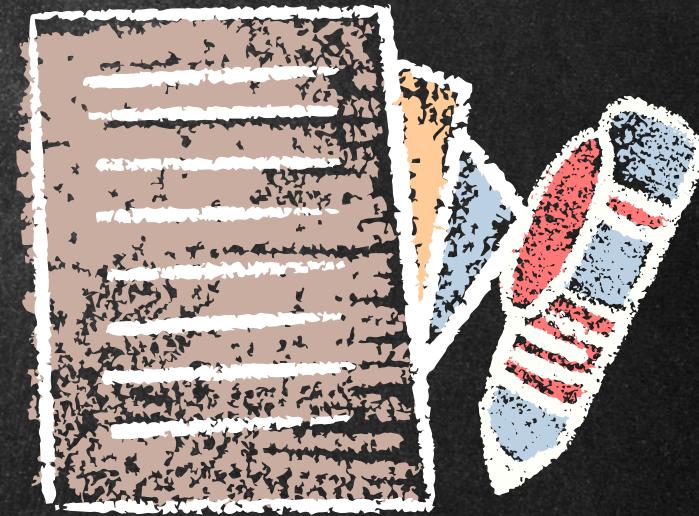
RAG



RETRIEVAL



AUGMENTED



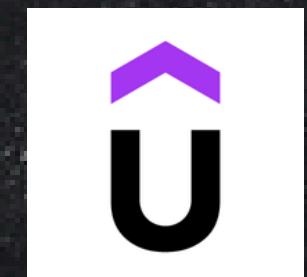
GENERATION



HANDLES



ANSH LAMBA



ANSH LAMBA JSR