

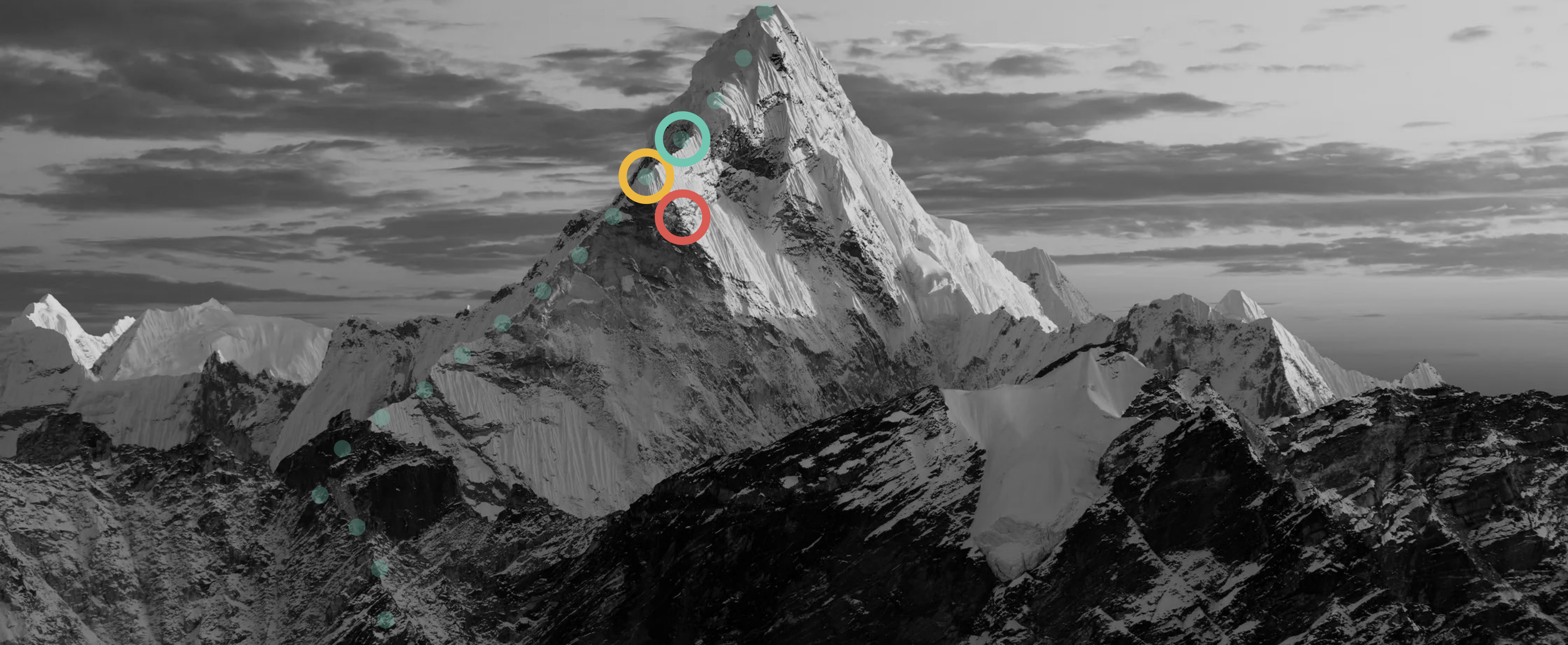
What is an LLM?







MARKOV CHAIN



LET'S CONSIDER A MARKOV CHAIN OF WORDS

The

MARKOV CHAIN OF WORDS

one

books

The only

world

greatest

MARKOV CHAIN OF WORDS

were

weren't

The books

she

description

I

MARKOV CHAIN OF WORDS

The books I was
can't
love
thought
don't

MARKOV CHAIN OF WORDS

The books I love would
with
you
to
this

MARKOV CHAIN OF WORDS

The books I love with a
her
the
his
Jasper

MARKOV CHAIN OF WORDS

The books I love with Jasper

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books weren't
were
description

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books description was

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books description was a

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books description vampire
 twig
 was a threat
 lot
 pretty

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books description was a pretty dress
name.

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

The books description was a pretty name.

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

```
def learn_word_frequencies(path: str, lookback: int = 2) -> dict:
    """Learn word frequencies from a text file. You can set the "state"
    of the markov model with lookback.
    """
    with open(path) as fo:
        words = fo.read().split(' ')
    words = [word for word in words if len(word) > 0]

    db = {}
    for i in range(len(words) - lookback):
        key = tuple(words[i:i + lookback])
        val = words[i + lookback]
        db[key] = db.get(key, []) + [val]

    return db
```


MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

```
def markov_chain(db: dict, lookback: int = 2) -> str:
    """Use a markov chain to generate new text from the dictionary.
    """
    paragraph = list(random.choice(list(db.keys())))

    for i in range(100):
        if random.random() < 0.01:
            last_words = random.choice(list(db.keys()))
        else:
            last_words = paragraph[-lookback:]

        next_word_options = db.get(tuple(last_words))
        if next_word_options:
            paragraph.append(random.choice(next_word_options))

    return ' '.join(paragraph)
```

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

You know what? Just leave him alone guys. Let him realize for himself how stupid he's being. I just couldn't resist. What did he think he would. I trip over my shoulder like Bella does in Twilight. Well not anymore apparently.

MARKOV CHAIN OF WORDS STARTING WITH TWO WORDS

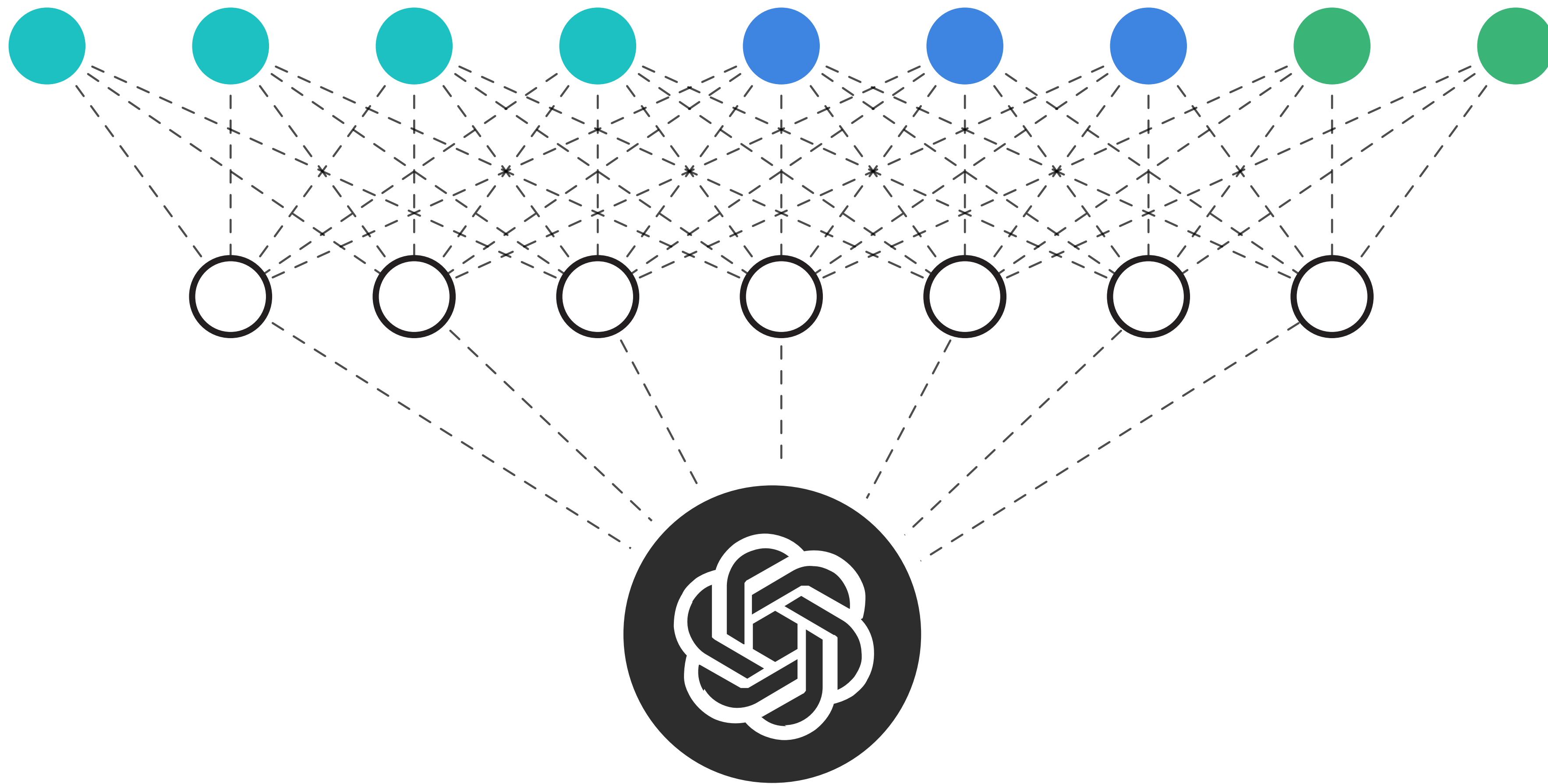
I **get** out of my hand. I blushed at having Edward as my eyes flew open in shock, Why would she be jealous?

I shrug, Because she thinks I'm a vegetarian.

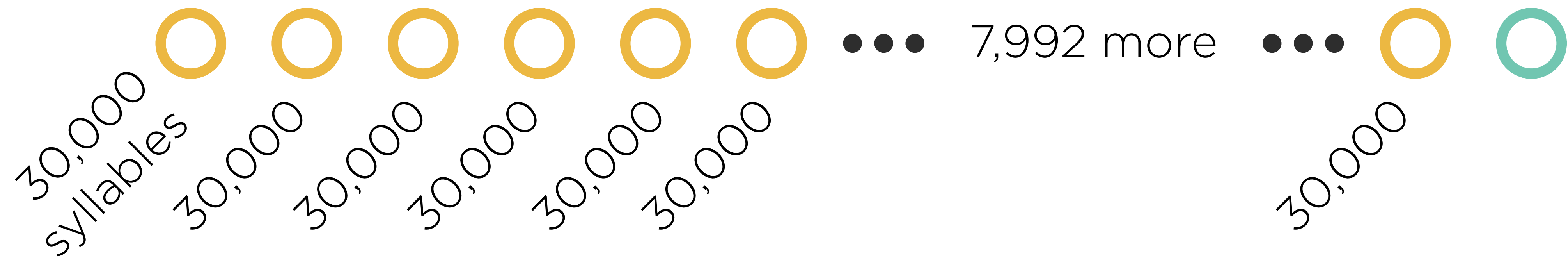
**Look at what we can produce
with looking back only 2 words**

Now imagine what one can do
looking back 8000 syllables

CHATGPT (AND LLMS) ARE BUILT AS NEURAL NETWORKS



CHATGPT MUST APPROXIMATE ALL OPTIONS



A one followed by 36,000 zeros

CHATGPT MUST APPROXIMATE ALL OPTIONS



A one followed by 36,000 zeros

Replaced by 1.76 trillion parameters/500GB - 5TB