

Prompt Engineering & Fine Tuning



Value Quantified in Action

In the end, it's the resulting actions that prove the worth of any analytics engagement.

With our end-to-end expertise, we're with you through that last mile.



The Right Approach

We know Advanced Analytics, and we know how to make it work for you.

Our experience means our clients get successful, scalable transformations, not hype and buzzwords.



Your Secret Data Weapon

Any Analytics initiative is only as successful as the data engineering behind it.

That's why many organizations and technology partners trust us to do their heavy lifting.

Prompt Engineering



Prompt Engineering is the art of crafting inputs (prompts) for LLMs to produce optimal outputs.



Tips



Be as specific as possible	01
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Be as specific as possible




Create an image of a bird.




Generate an image of a hummingbird hovering near a bright red hibiscus flower, with sunlight casting dappled shadows through a lush green background.

Specify your desired output

Explain quantum computing

 Quantum computing is a revolutionary approach to computing that leverages the principles of quantum mechanics to process information in fundamentally different ways from classical computers. Here's a detailed breakdown of how quantum computing works and why it's so powerful:


1. Basic Principles of Quantum Mechanics

- **Superposition:** Unlike classical bits, which are either 0 or 1, quantum bits (qubits) can exist in a state where they are both 0 and 1 simultaneously. This property is known as superposition. A qubit in superposition can represent multiple possibilities at once, allowing quantum computers to process a vast amount of data in parallel.
- **Entanglement:** Qubits can become entangled, meaning the state of one qubit is directly related to the state of another,  matter how far apart they are. This interconnectedness allows quantum


 Message ChatGPT



Write a 300-word overview of quantum computing for a general audience, including its basic principles and potential applications, formatted in three paragraphs.

 Quantum computing represents a significant leap in the field of computer science, harnessing the principles of quantum mechanics to perform calculations far beyond the capabilities of classical computers. At its core, quantum computing relies on quantum bits, or qubits, which unlike traditional bits that can be either 0 or 1, can exist in multiple states simultaneously thanks to a property called superposition. Additionally, qubits can be entangled, meaning the state of one qubit can be instantaneously correlated with the state of another, regardless of distance. This dual ability allows quantum computers to process a massive amount of information at unprecedented speeds.

One of the most exciting aspects of quantum computing is its potential to revolutionize various fields through its ability to solve complex problems that are currently intractable for classical computers. For instance, in cryptography, quantum computers could crack encryption codes that would take classical computers millennia to

 Message ChatGPT



Providing Examples



Zero Shot Prompting

Classify the text into positive, neutral or negative

Text: The food was good.

Sentiment:



Sentiment: Positive

Explanation: The word "good" indicates a positive experience with the food, suggesting satisfaction or enjoyment.

Providing Examples



One-Shot Prompting



Translate the following:

"happy journey" => "bon voyage"

Now translate: "how are you"

Output – **"comment vas-tu ?"**

This is the informal version. If you want a formal version, it would be: **"comment allez-vous ?"**

Translate the following:

"happy journey" => "bon voyage"

Now translate: "how are you"

Providing Examples



Few-Shot Prompting

Question: What is 1132 plus 5076?

Answer: 6208

Question: What is 485123 plus 922013?

Answer: 1407136

Question: What is 633445 plus 999111?

Answer: 1632556

Question: What is 389674 plus 768234?

Answer:



1157908



Persona Pattern



Assigning a personality or a specific style to the LLM

Non-Persona Prompt: "What was the impact of industrialization on Victorian society?"

Persona Prompt: "As a historian with a deep understanding of the Victorian era, can you discuss the impact of industrialization on society during that time?"

Another Example

When I ask for help to write something, you will reply with a document that contains at least one joke or playful comment in every paragraph.

Write a thank you note to my steel bolt vendor for getting the delivery in on time and in short notice. This made it possible for us to deliver an important order.

Chain of Thought (CoT)



CoT prompting spurs reasoning in LLMs via decomposition.

Let's think Step by step

Q : A Juggler can juggle 16 balls. Half of the balls are golf balls, And half of the golf balls are blue. How many blue golf balls are there?

A: The answer (Arabic numerals) is

(Output) 8 **X**

Q : A Juggler can juggle 16 balls. Half of the balls are golf balls, And half of the golf balls are blue. How many blue golf balls are there?

A: Let's think step by step.

(Output) There are 16 balls in total. Half of the balls are golf balls. That means that there are 8 golf balls. Half of the golf balls are blue. That means that there are 4 blue golf balls. **✓**

Providing Examples



Convert the main problem
into sub problems

Without solving the problem just yet, think through this carefully and list systematically and in detail all the problems that need to be solved before we can arrive at the correct answer.



Detailed Steps and Sub-Problems:

Initial Pair Crossing: Decide which two individuals cross first.

Returning with Flashlight: Decide who brings the flashlight back.

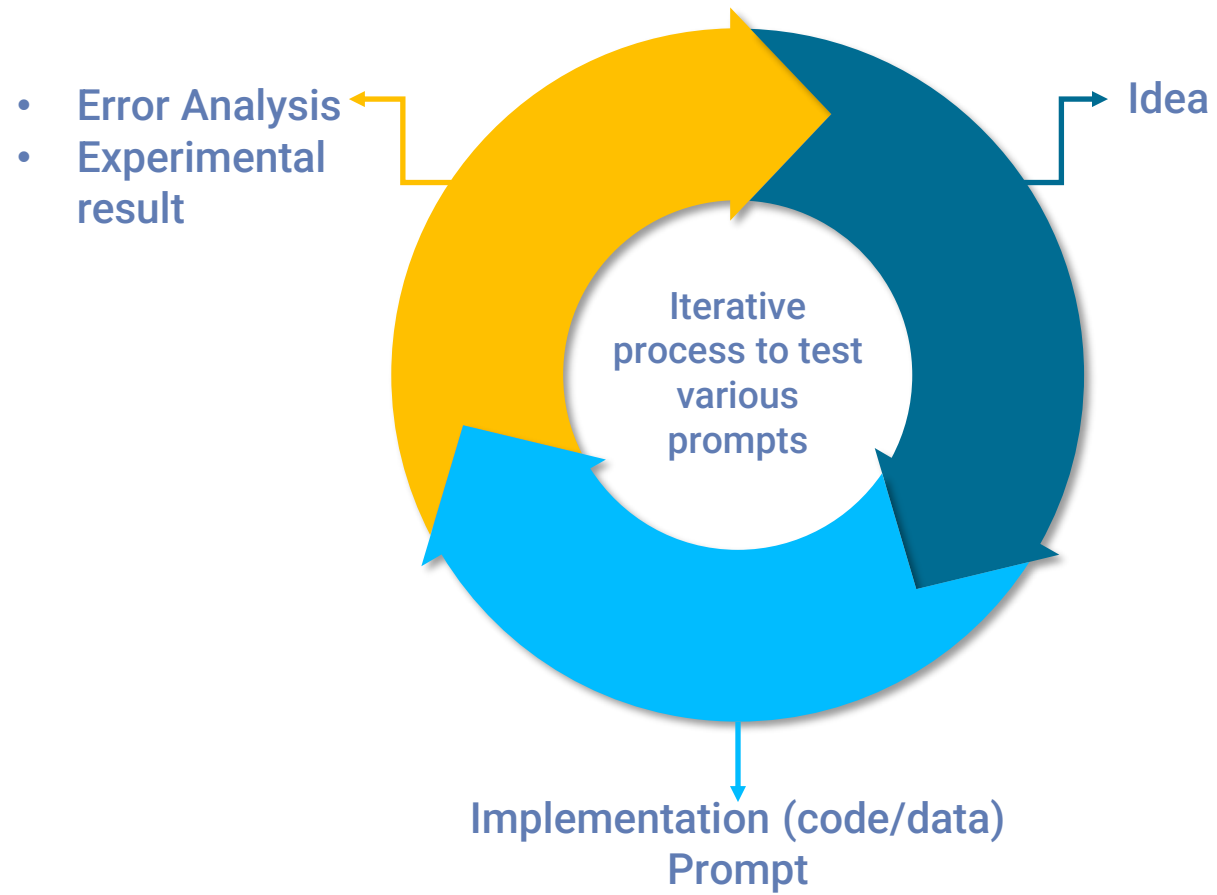
Second Pair Crossing: Determine the next pair to cross after the flashlight is returned.

Returning Again: Decide who brings the flashlight back again, if necessary.

Final Crossings: Plan the remaining crossings and returns until all are across.



Experimental approach



Fine Tuning

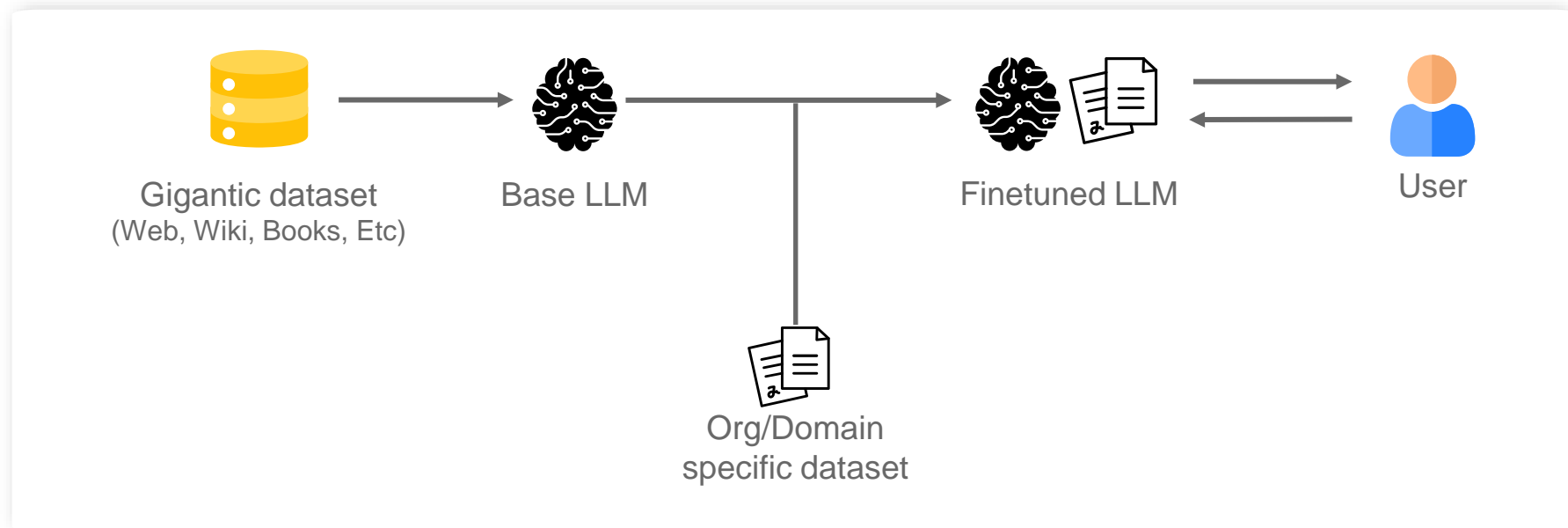


Prompt Engineering has its limitations

When the output needs to be in a very specific format

Equivalent to providing many examples

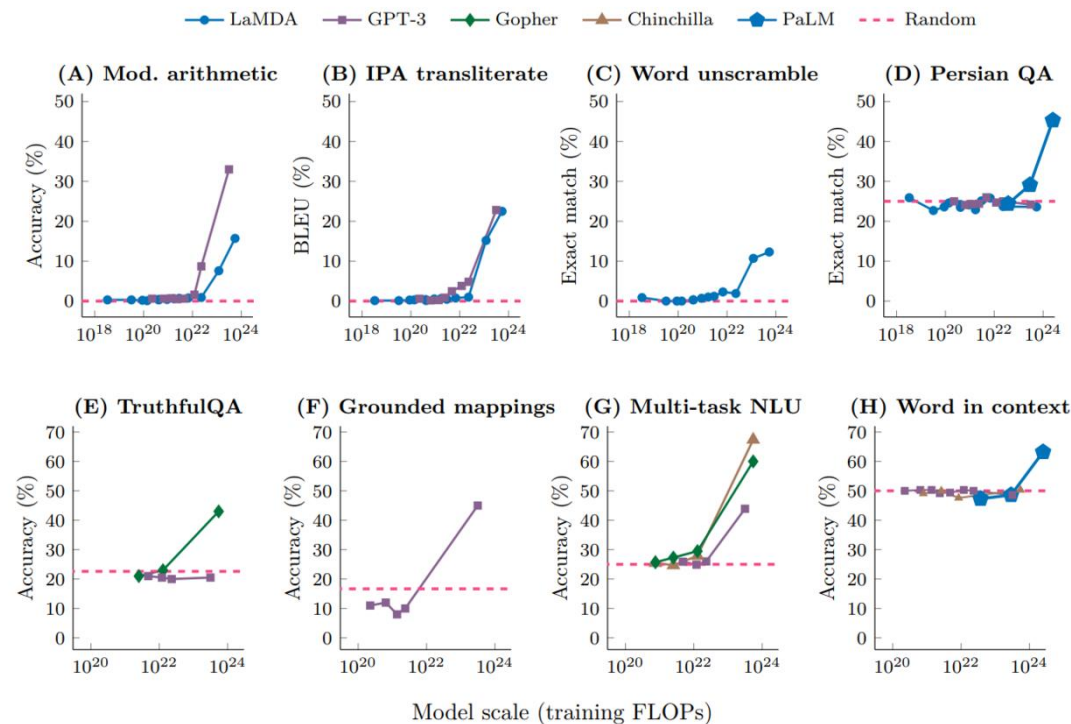
Faster response, lower cost due to decreased token count



Emergent Abilities??



The capabilities of LLMs that appear suddenly and unpredictably as model size, computational power, and training data scale up.



Training data sample – jsonl format



```
{  
  "messages":  
    [  
      {"role": "user", "content": "OpenAI develops powerful AI models."},  
      {"role": "assistant", "content": "OpenAI, AI, technology"}  
    ]  
}
```

```
{"messages": [{"role": "user", "content": "OpenAI develops powerful AI models."}, {"role": "assistant", "content": "OpenAI, AI, technology"}]}
```

```
{"messages": [{"role": "user", "content": "The GPT-4 model is great for natural language understanding."}, {"role": "assistant", "content": "GPT-4, natural language processing, AI"}]}
```

```
{"messages": [{"role": "user", "content": "DataFactZ provides advanced data analytics solutions."}, {"role": "assistant", "content": "DataFactZ, data analytics, solutions"}]}
```

```
{"messages": [{"role": "user", "content": "Python is a versatile programming language."}, {"role": "assistant", "content": "Python, programming, language"}]}
```

```
{"messages": [{"role": "user", "content": "Adobe PDF Services can extract tables, images, and text from PDFs."}, {"role": "assistant", "content": "Adobe PDF Services, PDF, extraction"}]}
```

```
{"messages": [{"role": "user", "content": "Machine learning can automate many tasks."}, {"role": "assistant", "content": "machine learning, automation, tasks"}]}
```

```
{"messages": [{"role": "user", "content": "Streamlit is a great tool for creating data apps."}, {"role": "assistant", "content": "Streamlit, data apps, tools"}]}
```

```
{"messages": [{"role": "user", "content": "Data visualization helps in understanding complex data."}, {"role": "assistant", "content": "data visualization, understanding, complex data"}]}
```

```
{"messages": [{"role": "user", "content": "Natural language processing is a field of AI."}, {"role": "assistant", "content": "natural language processing, AI, field"}]}
```

```
{"messages": [{"role": "user", "content": "TensorFlow and PyTorch are popular machine learning frameworks."}, {"role": "assistant", "content": "TensorFlow, PyTorch, machine learning, frameworks"}]}
```

```
{"messages": [{"role": "user", "content": "Big data technologies are essential for data analysis."}, {"role": "assistant", "content": "big data, technologies, data analysis"}]}
```

```
{"messages": [{"role": "user", "content": "Cloud computing provides scalable resources."}, {"role": "assistant", "content": "cloud computing, scalable, resources"}]}
```

```
{"messages": [{"role": "user", "content": "Artificial intelligence can improve healthcare."}, {"role": "assistant", "content": "artificial intelligence, improve, healthcare"}]}
```

```
{"messages": [{"role": "user", "content": "Cybersecurity is crucial for protecting data."}, {"role": "assistant", "content": "cybersecurity, protecting, data"}]}
```

```
{"messages": [{"role": "user", "content": "Blockchain technology ensures data integrity."}, {"role": "assistant", "content": "blockchain, technology, data integrity"}]}
```

```
{"messages": [{"role": "user", "content": "Robotics can revolutionize manufacturing."}, {"role": "assistant", "content": "robotics, revolutionize, manufacturing"}]}
```



Thank you!

DATA FACT | Z

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