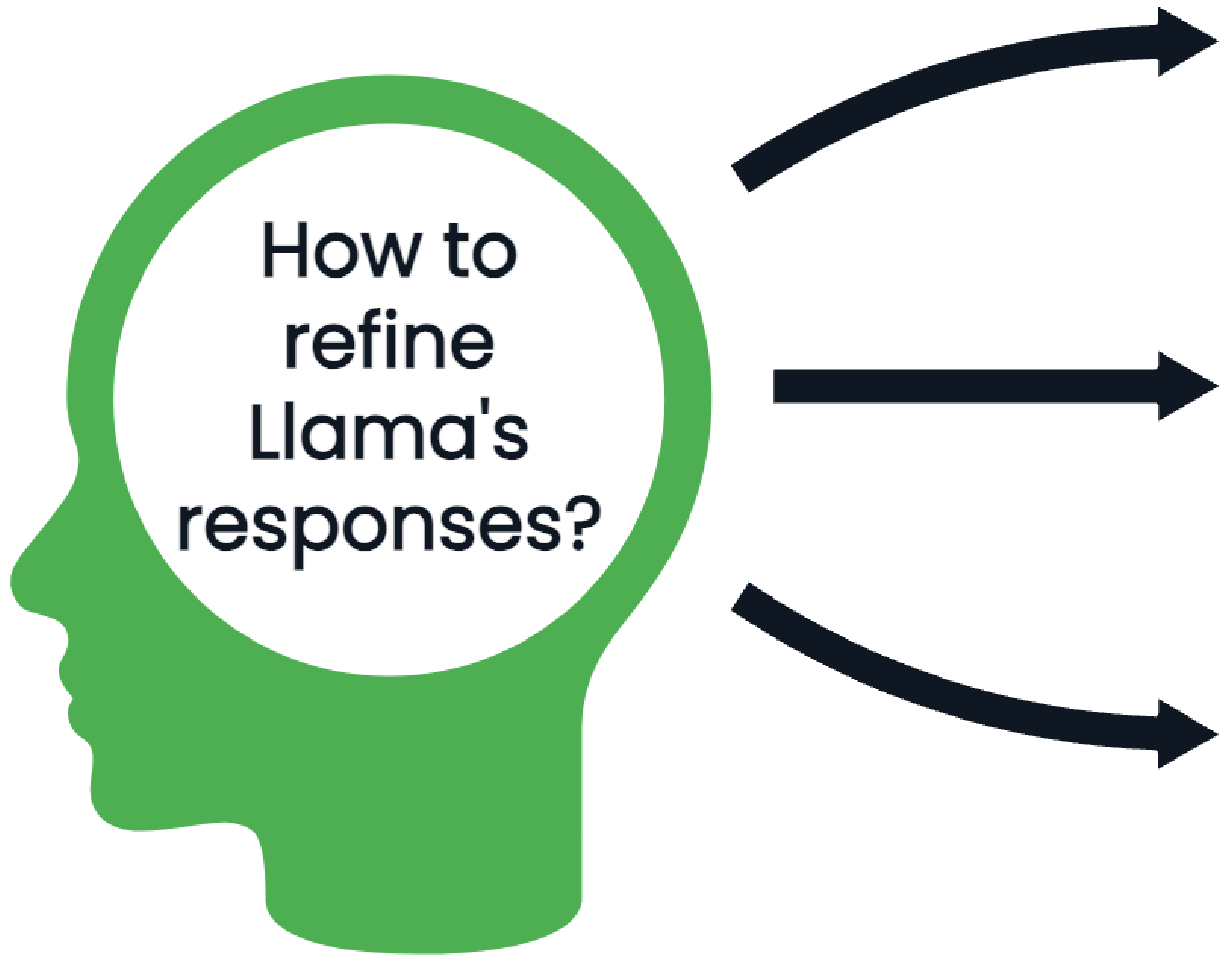
Guiding unstructured responses

WORKING WITH LLAMA 3

Imtihan Ahmed
Machine Learning Engineer

Controlling model output

- Parameters
- Roles



Controlling model output

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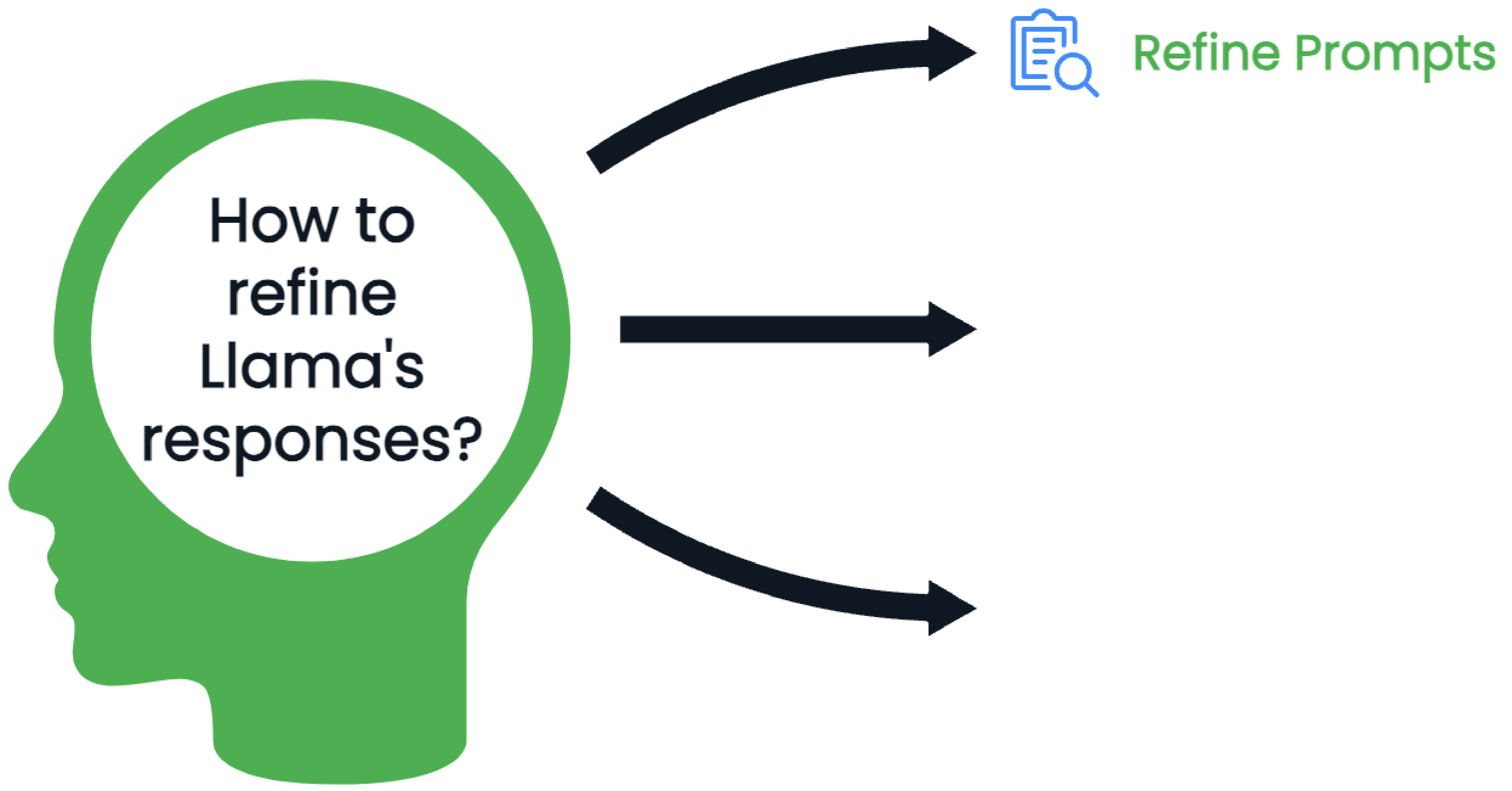

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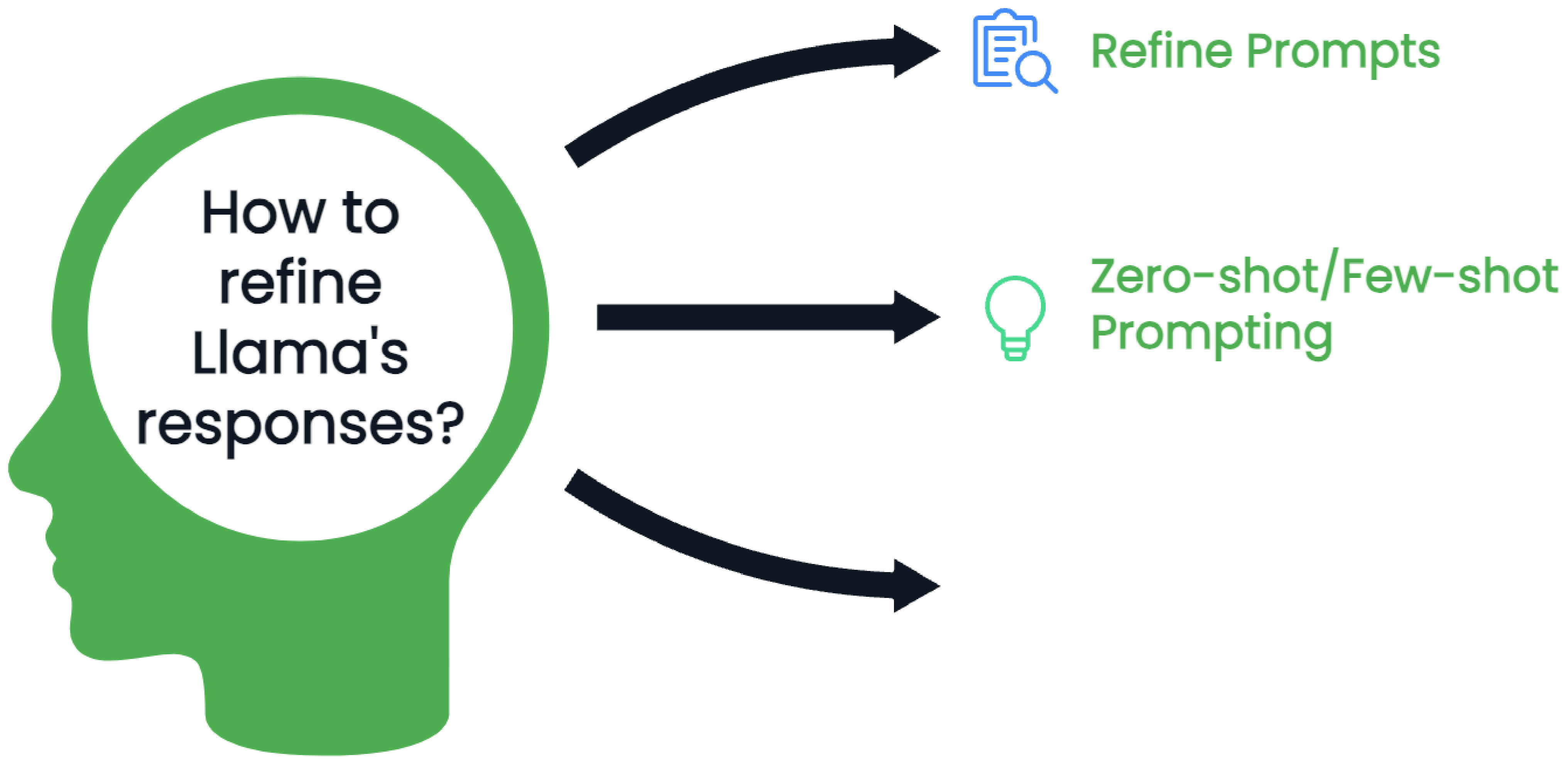
How to refine Llama's responses?
Refine Prompts
Zero-shot/Few-shot Prompting

Controlling model output

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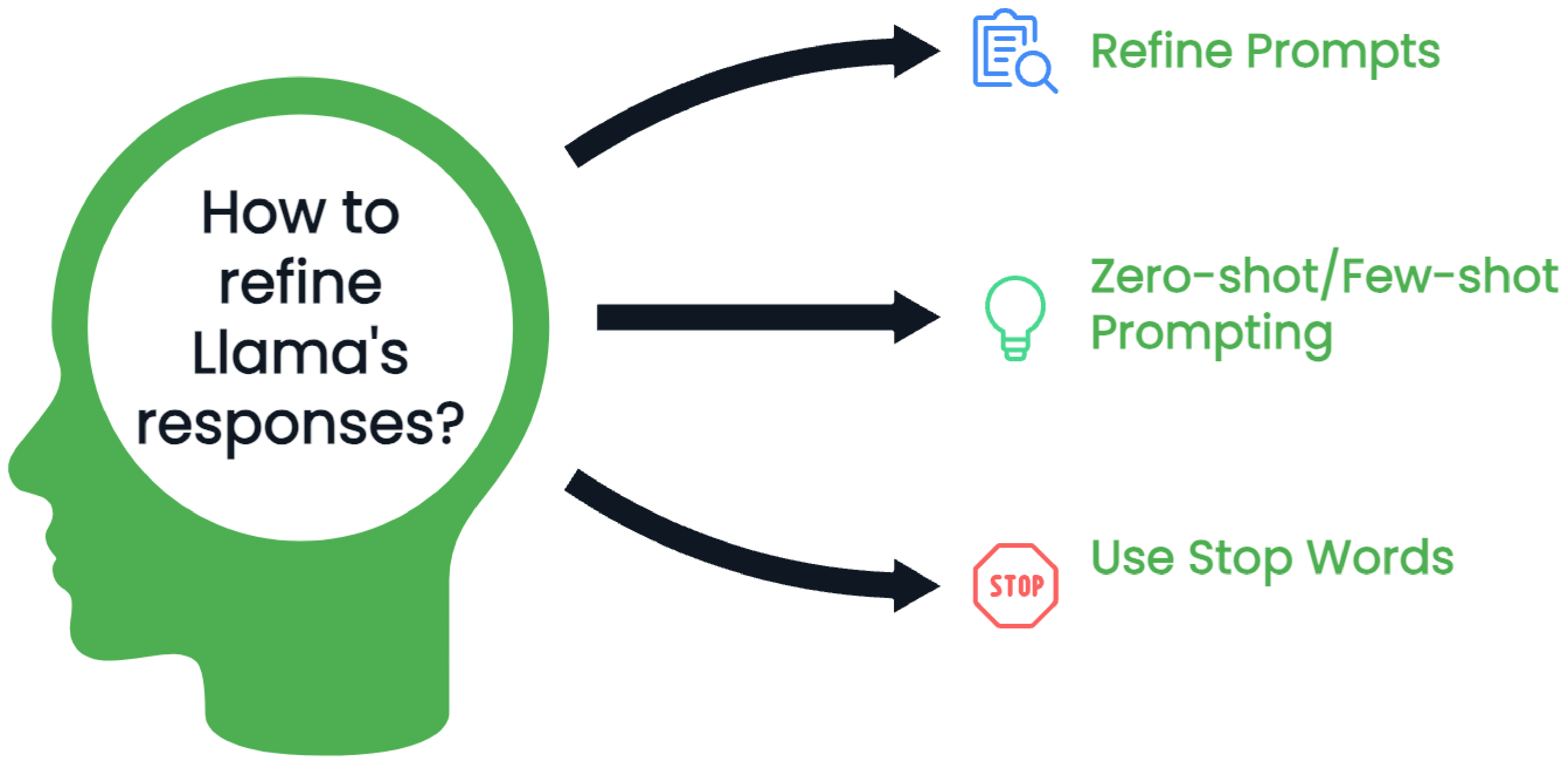

How to refine Llama's responses?
Refine Prompts
Zero-shot/Few-shot Prompting
STOP
Use Stop Words

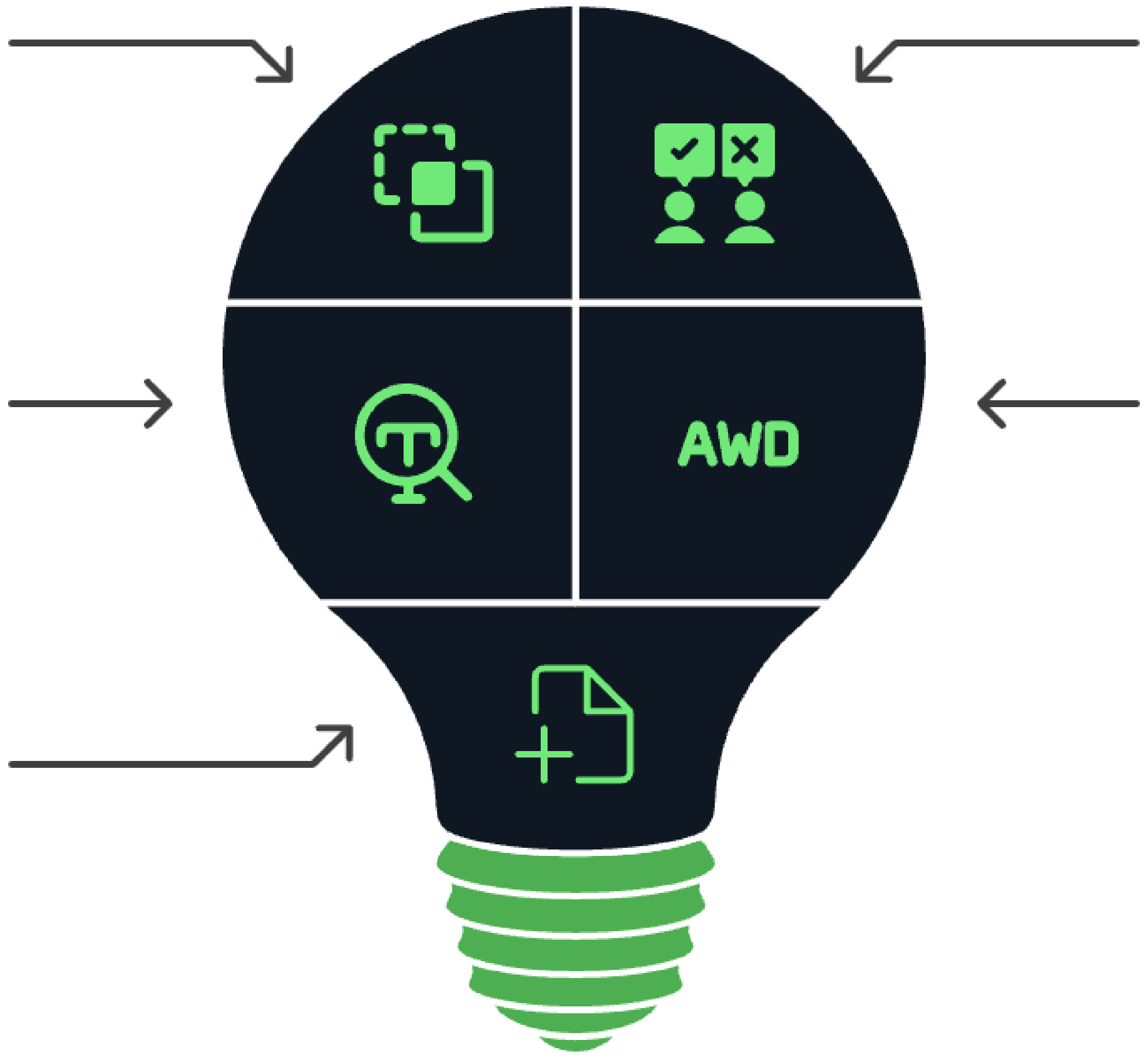
Refining prompts

- Example: summarization

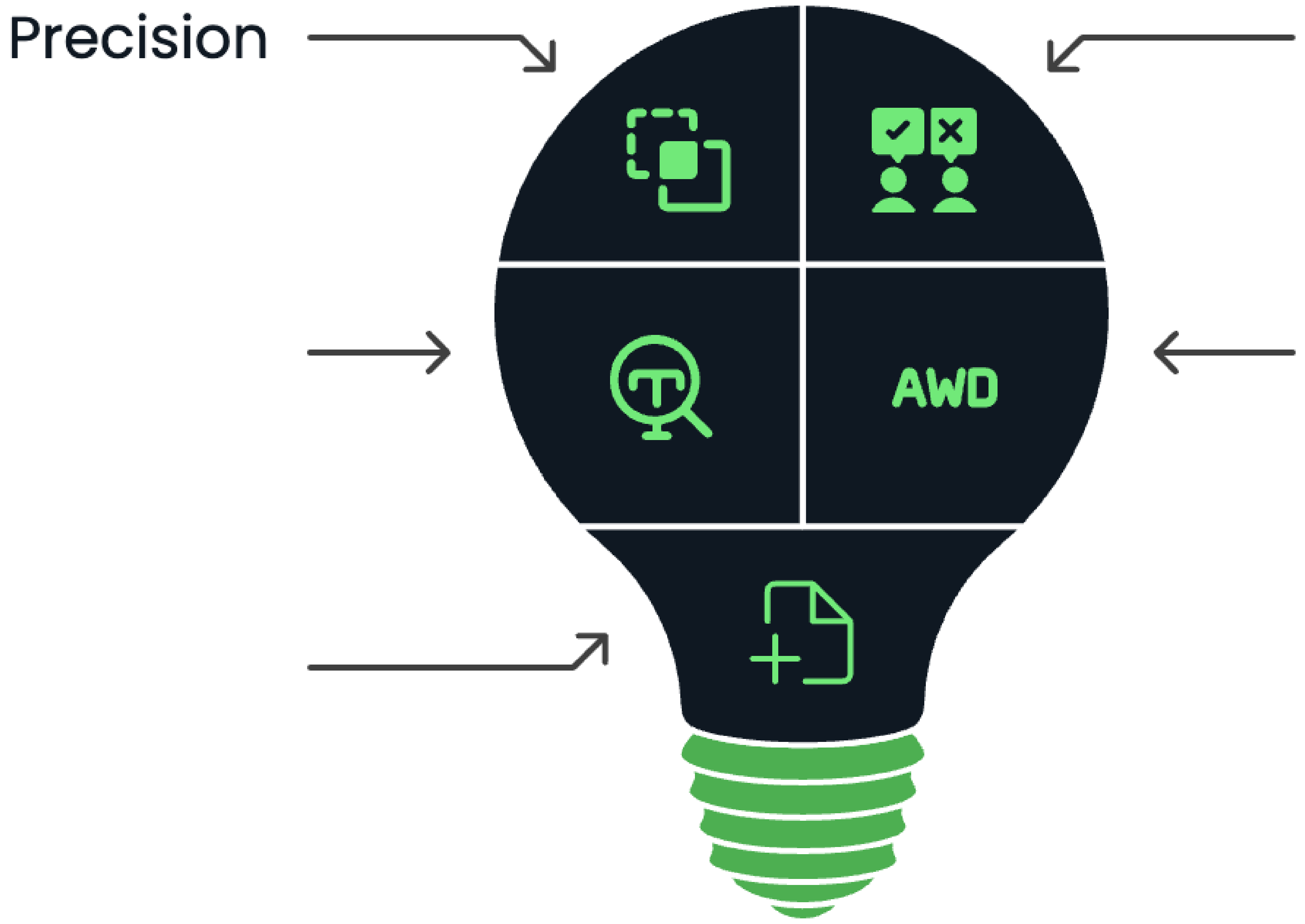
```
text_choice1 = "Summarize key trends in the aviation industry from the last year,
                focusing on fuel efficiency innovations."

text_choice2 = "Tell me about the aviation industry."

output = llm(text_choice1) # More specific prompt is more effective

print(output['choices'][0]['text'])
```

```
The aviation industry has made significant strides in fuel efficiency innovations
over the last year, driven by the need to reduce greenhouse gas emissions and
operating costs. Sustainable Aviation Fuels (SAFs) have emerged as a key trend...
```

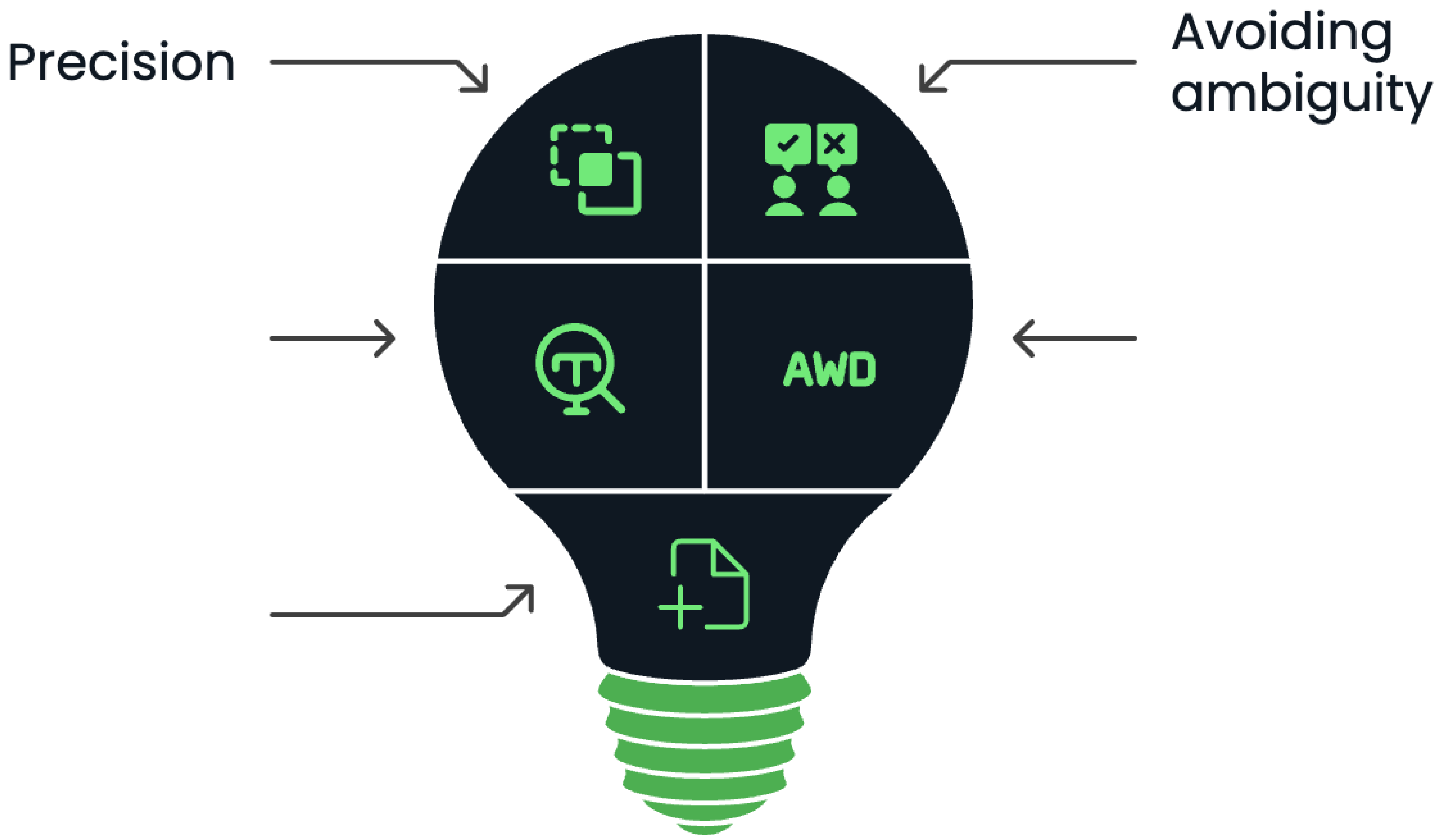
Components of effective prompting



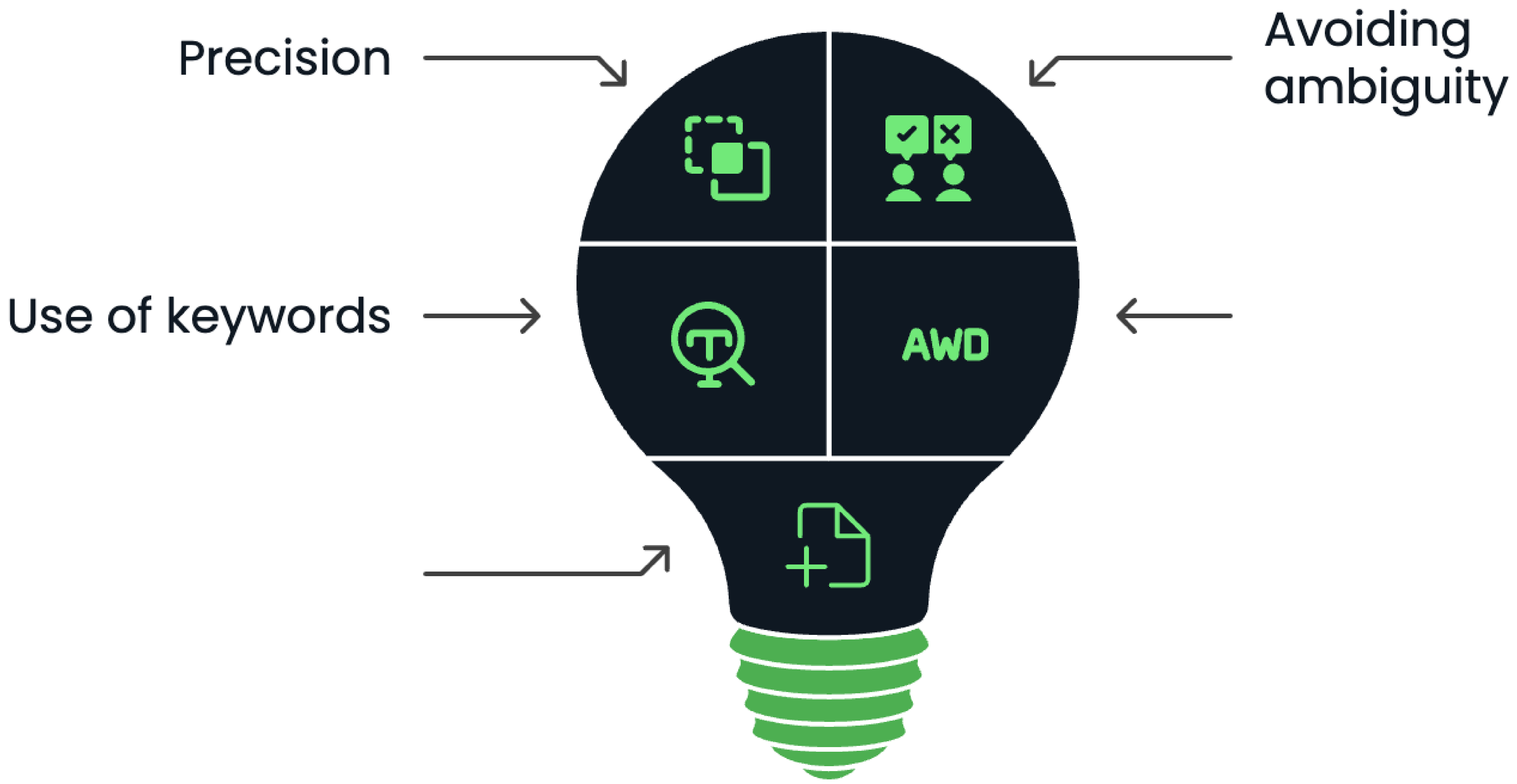
Components of effective prompting



Components of effective prompting



Components of effective prompting



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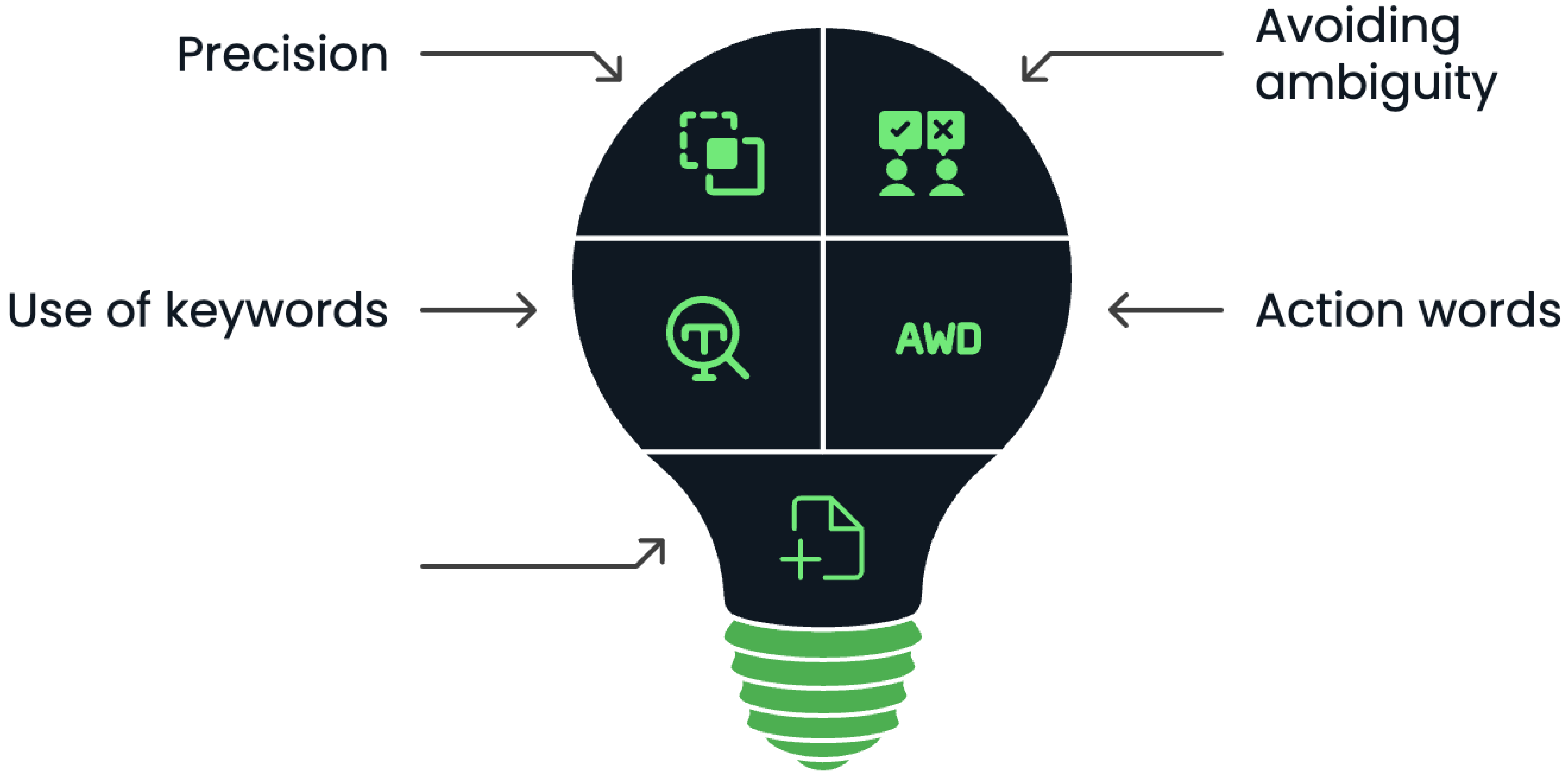
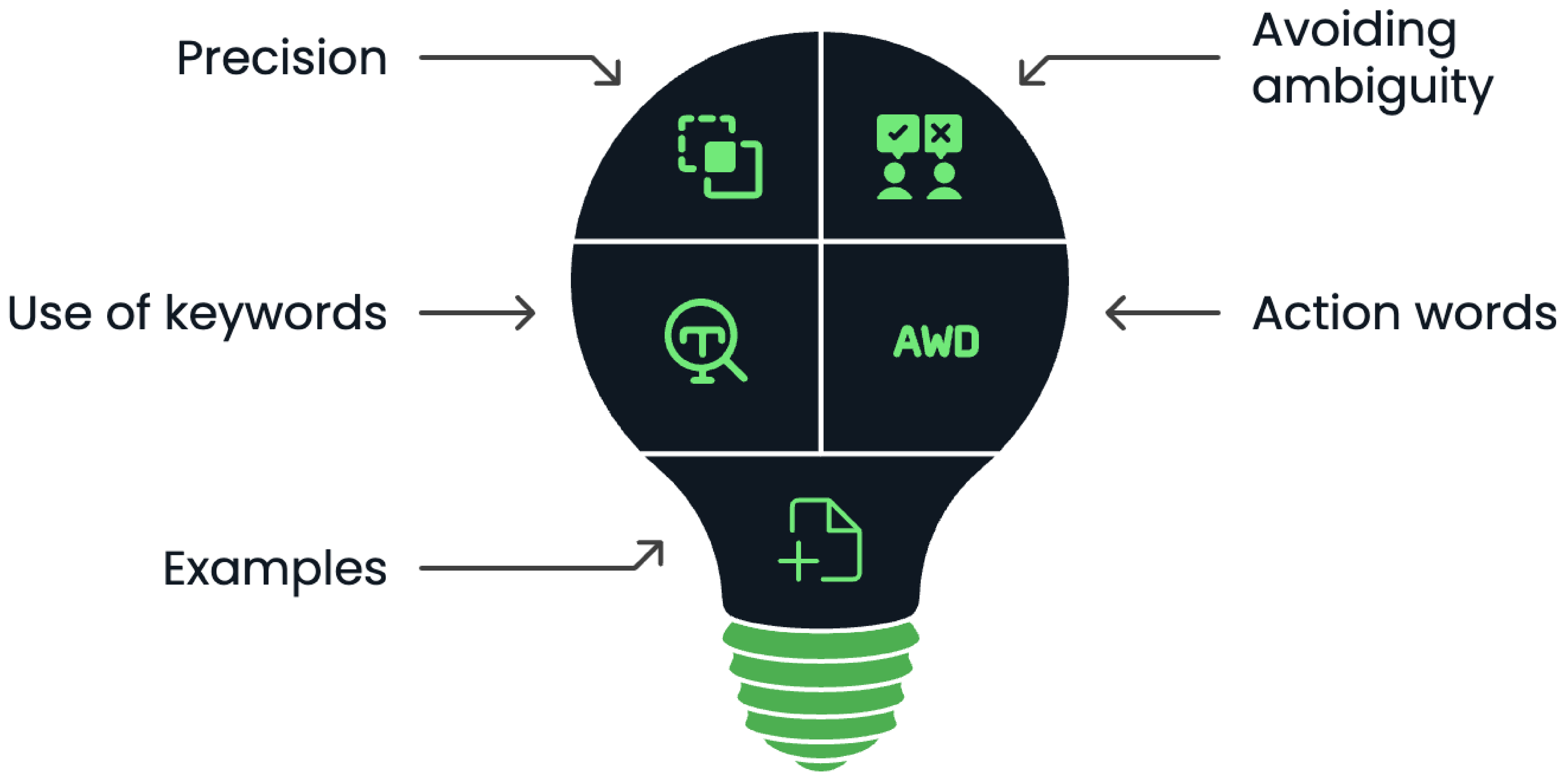


Components of effective prompting



Zero-shot prompting

- Zero-shot prompting: a single instruction

```python
text = "Summarize recent mergers in the airline industry."

output = llm(text)

print(output['choices'][0]['text'])
```

```
Recent mergers in the airline industry include Alaska Air Group's acquisition of
Hawaiian Airlines in 2024, with both airlines continuing to operate as separate
brands. In 2022, Delta Air Lines purchased 20% of LATAM Airlines Group...
```

Refining zero-shot prompts

- Need to distinguish task, expected output, additional context
- Zero-shot prompting with labels

```
text = """
       INSTRUCTION: Write concisely and in 2-3 sentences that cover only key points.
       QUESTION: Summarize recent mergers in the airline industry.
       ANSWER:
       """
```

Few-shot prompting

- Few-shot prompting: use of multiple examples

```
text = """
Aircraft Model: Boeing 787-9
Passenger Capacity: 296
Fuel Consumption: 2.5 liters per seat per 100 km

Aircraft Model: Airbus A321XLR
Passenger Capacity: 244
Fuel Consumption: 2.9 liters per seat per 100 km

Aircraft Model:
"""
```

Few-shot prompting

- Few-shot prompting: use of multiple examples

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Few-shot prompting

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Aircraft Model:
"""
```

Few-shot prompting

```python
output = llm(f"Continue the entries: {text}")

print(output['choices'][0]['text'])
```

```
Aircraft Model: Airbus A350-900
Passenger Capacity: 350
Fuel Consumption: 2.39 liters per seat per 100 km
```

Using stop words

- Need concise insights
- Use `stop` words to end the response at a specific point
- Example: question-answering application

```python
text = "Which airlines operate direct flights from London to Singapore?"

output = llm(text, stop=["Q:"]) # Stop responses at "Q:"
print(output['choices'][0]['text'])
```

```
You can fly direct from London to Singapore with Singapore Airlines and
British Airways.
```

Let's practice!

WORKING WITH LLAMA 3

Generating structured output

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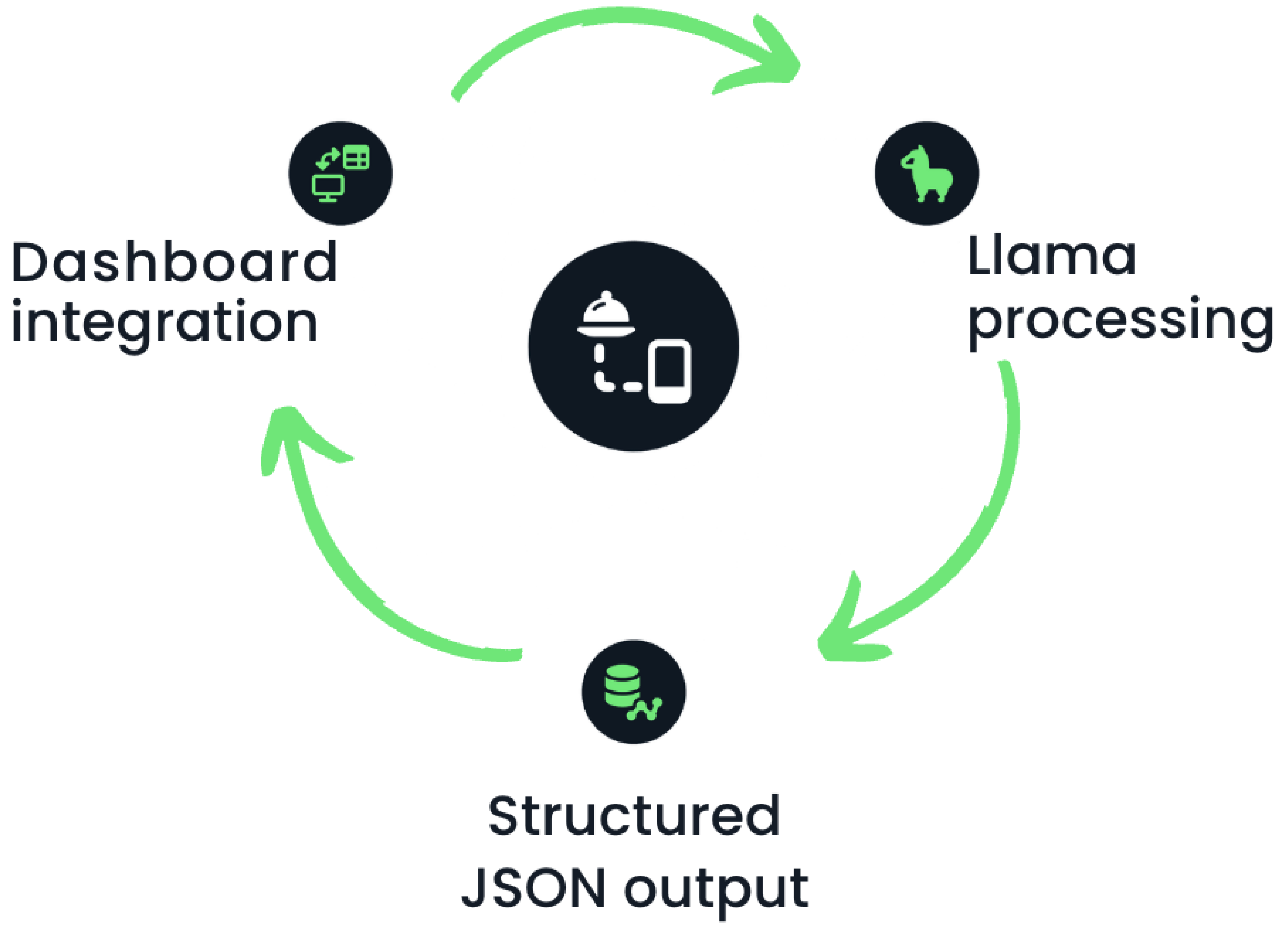
Imtihan Ahmed
Machine Learning Engineer

Structured output in JSON

- Example: Llama responses might be input to a dashboard
- Plain text responses won't work
- We need structured outputs



JSON responses with chat completion

```
response_format = {"type": "json_object"}

message_list = [
       {"role": "system", # System role defined as market analyst
        "content": "You are a food industry market analyst. You
         analyze sales data and generate structured JSON reports
         of top-selling beverages."},
       {"role": "user", # User role to pass the request
        "content": "Provide a structured report on the top-selling beverages
         this year."}
        ]
```

JSON responses with chat completion

```
output = llm.create_chat_completion(
          messages = message_list,
          response_format = "json_object"
)
```

- Response **format** specified as **JSON**
- Llama generates structured response, no free-flowing text

Extracting the JSON response

```python
print(output['choices'][0]['message']['content'])
```

```
{
  "report_name": "Top-Selling Beverages 2024",
  "top_beverages": [
    {
      "rank": 1,
      "beverage_name": "Coca-Cola Classic",
      "sales_volume": 2.1,
      "growth_rate": 1.9
    },... ]
}
```

Defining a schema

```
response_format = {
"type": "json_object",
"schema": {
    "type": "object",
    "properties": {
            "Product Name": {"type": "string"},
            "Category": {"type": "string"},
            "Sales Growth": {"type": "float"}}
            }
}
```

- Can specify a **schema:** rules to define how the data should be formatted

Defining a schema

```
output = llm.create_chat_completion(
            messages = message_list,
            response_format = response_format)

print(output['choices'][0]['message']['content'])
```

```
{
  "Product Name": "Coca-Cola",
  "Category": "Soft Drink",
  "Sales Growth": 12.5
}
```

Let's practice!

WORKING WITH LLAMA 3

Building conversations

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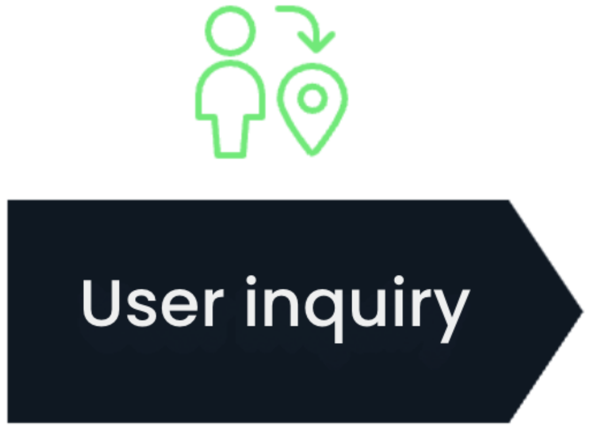
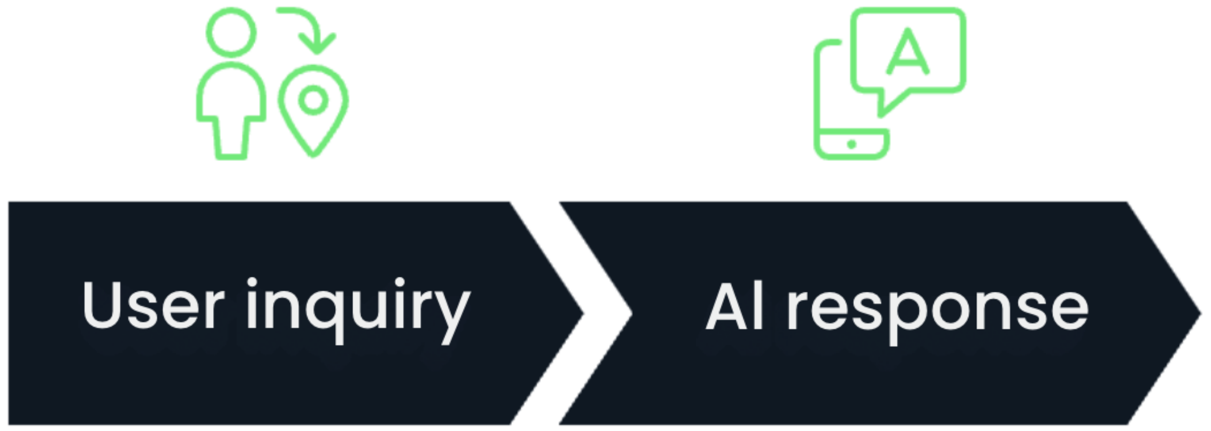
Imtihan Ahmed
Machine Learning Engineer

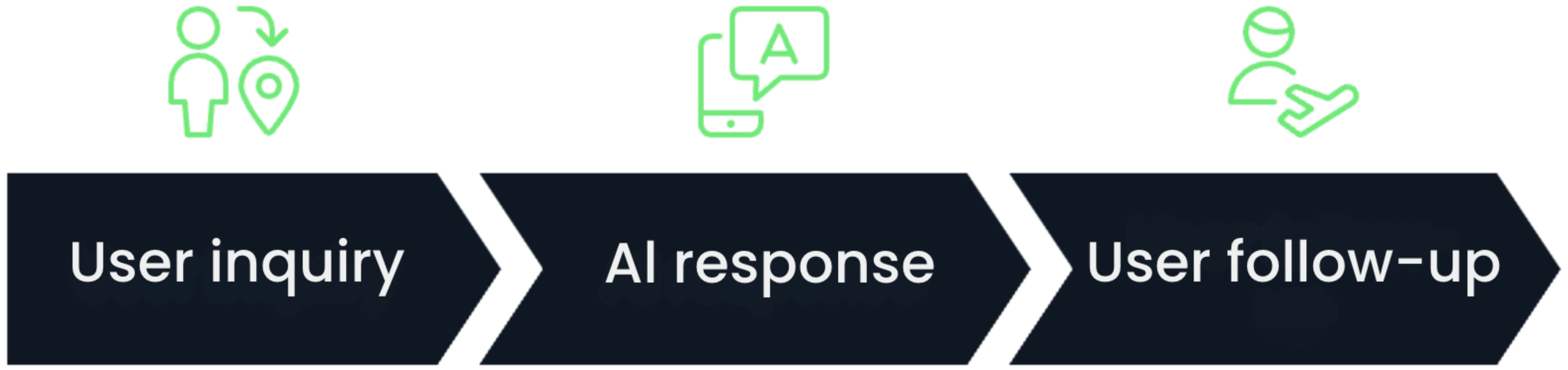
Maintaining context



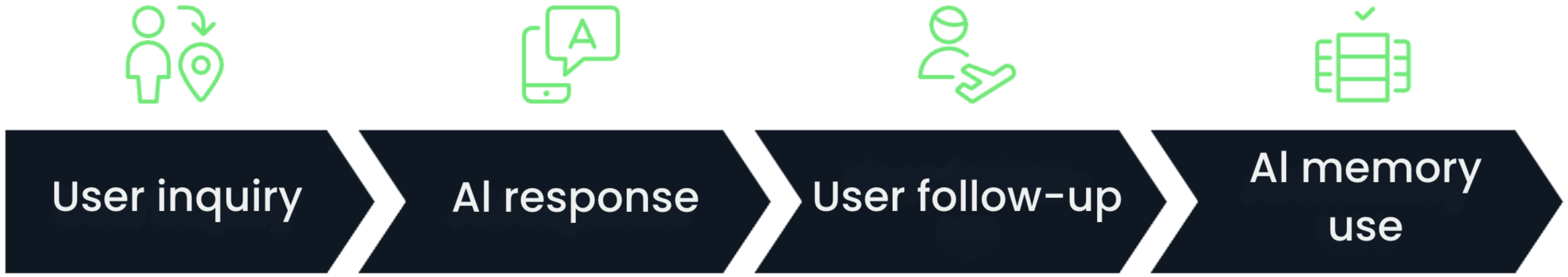
Maintaining context



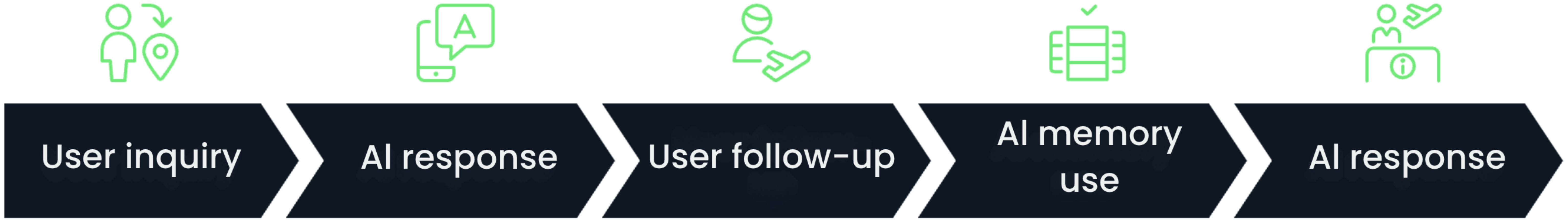
Maintaining context



Maintaining context



Maintaining context



- Track a chat history with a `Conversation` class

Conversation class

- Can store a history of prior messages

```
class Conversation:
    def __init__(self, llm: Llama, system_prompt='', history=[]):
        self.llm = llm
        self.system_prompt = system_prompt
        self.history = [{"role": "system", "content": self.system_prompt}] + history
```

Conversation class

- Can store a history of prior messages

```python
class Conversation:
    def __init__(self, llm: Llama, system_prompt='', history=[]):
        self.llm = llm
        self.system_prompt = system_prompt
        self.history = [{"role": "system", "content": self.system_prompt}] + history

    def create_completion(self, user_prompt=''):
        self.history.append({"role": "user", "content": user_prompt}) # Append input
        output = self.llm.create_chat_completion(messages=self.history)
        conversation_result = output['choices'][0]['message']
        self.history.append(conversation_result) # Append output
        return conversation_result['content'] # Return output
```

Running a multi-turn conversation

```
conversation = Conversation(llm, system_prompt="You are a virtual travel assistant
                                                helping with planning trips.")

response1 = conversation.create_completion("What are some destinations in France for a
                                            short weekend break?")
print(f"Response 1: {response1}")

response2 = conversation.create_completion("How about Spain?")

print(f"Response 2: {response2}")
```

Running a multi-turn conversation

```python
print(f"Response 1: {response1}")


print(f"Response 2: {response2}")
```

```
Response 1: France is ideal for a short weekend break:
1.  **Paris**: The capital city is famous for its iconic landmarks like the ...
2.  **Provence**: Known for its beautiful landscapes, mild climate, and ...
Response 2:  Here are some destinations in Spain for a short weekend break:
1.  **Barcelona**: Visit the famous landmarks like the Sagrada Familia, ...
```

Running a multi-turn conversation

```python
print(f"Response 1: {response1}")


print(f"Response 2: {response2}")
```

```
Response 1: France is ideal for a short weekend break:
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1.  **Barcelona**: Visit the famous landmarks like the Sagrada Familia, ...
```

Let's practice!

WORKING WITH LLAMA 3

Congratulations!

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Imtihan Ahmed
Machine Learning Engineer

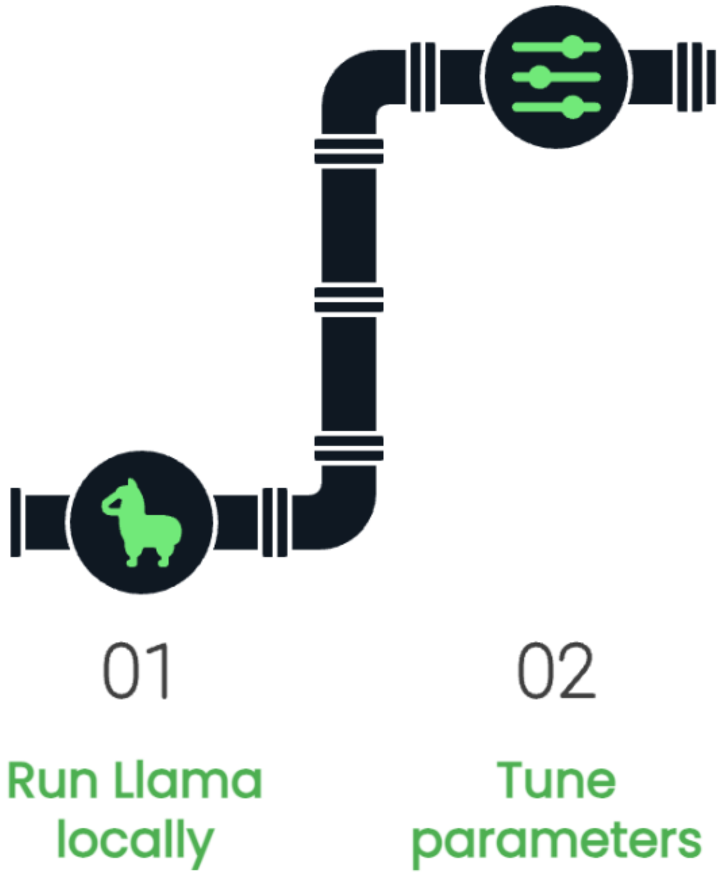
Let's recall

01

Run Llama locally

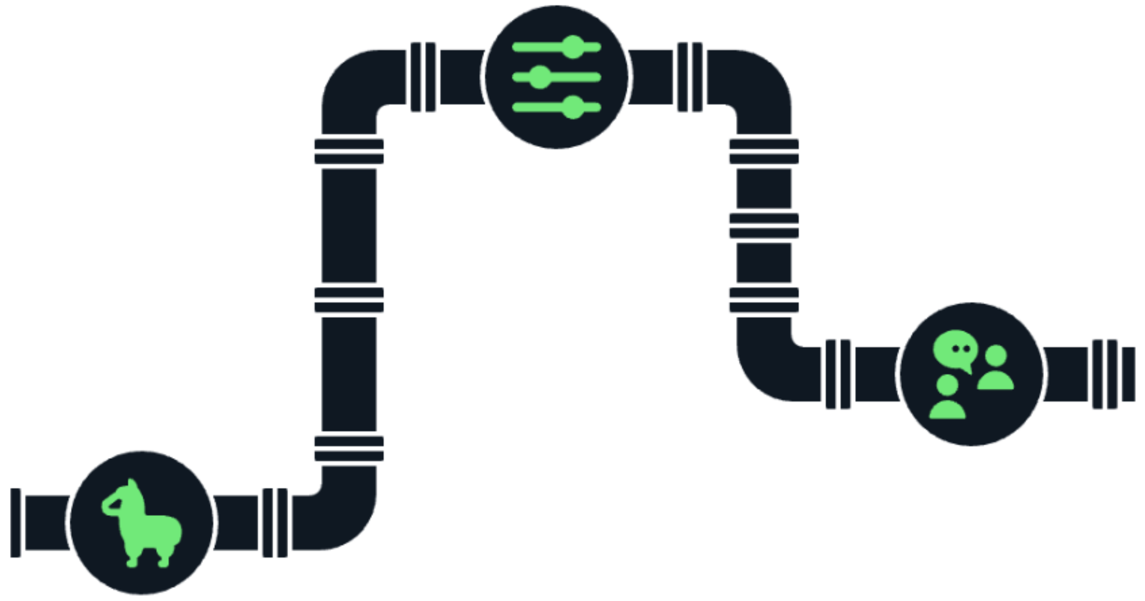
```
from llama_cpp import Llama

llm = Llama(model_path = "path/to/model.gguf")
```

Let's recall



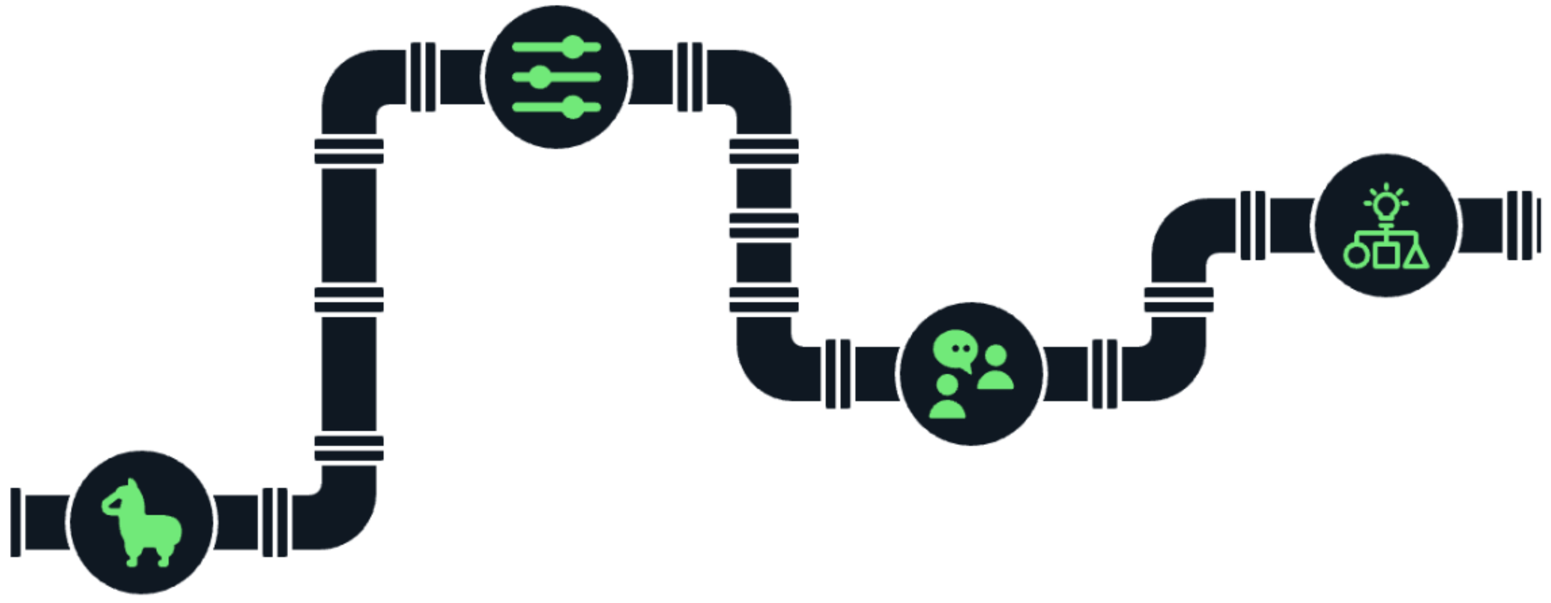
- `temperature` , `top_k` , `top_p` parameters

Let's recall



```
message_list = [{"role": "system", "content": system_message},
                {"role": "user", "content": user_message}]
```

Let's recall



01
Run Llama locally

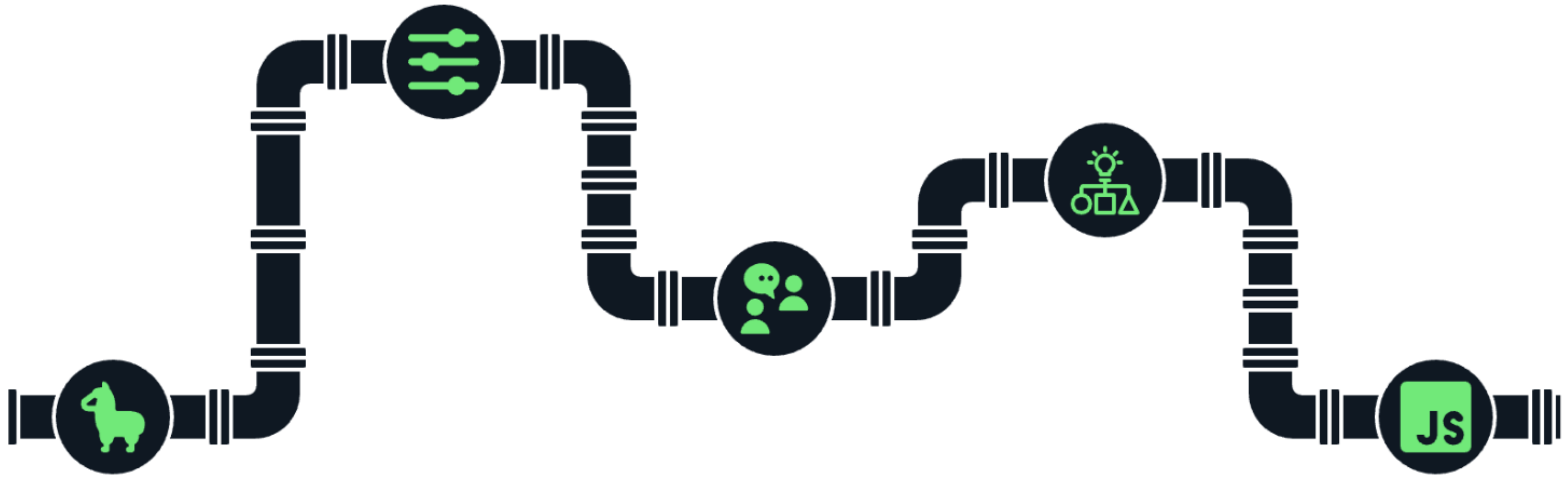
02
Tune parameters

03
Assign roles

04
Guide outputs

- Precise prompts
- `stop` words
- Zero-shot/Few-shot prompting

Let's recall



01

Run Llama locally

02

Tune parameters

03

Assign roles

04

Guide outputs

05

Explore JSON responses

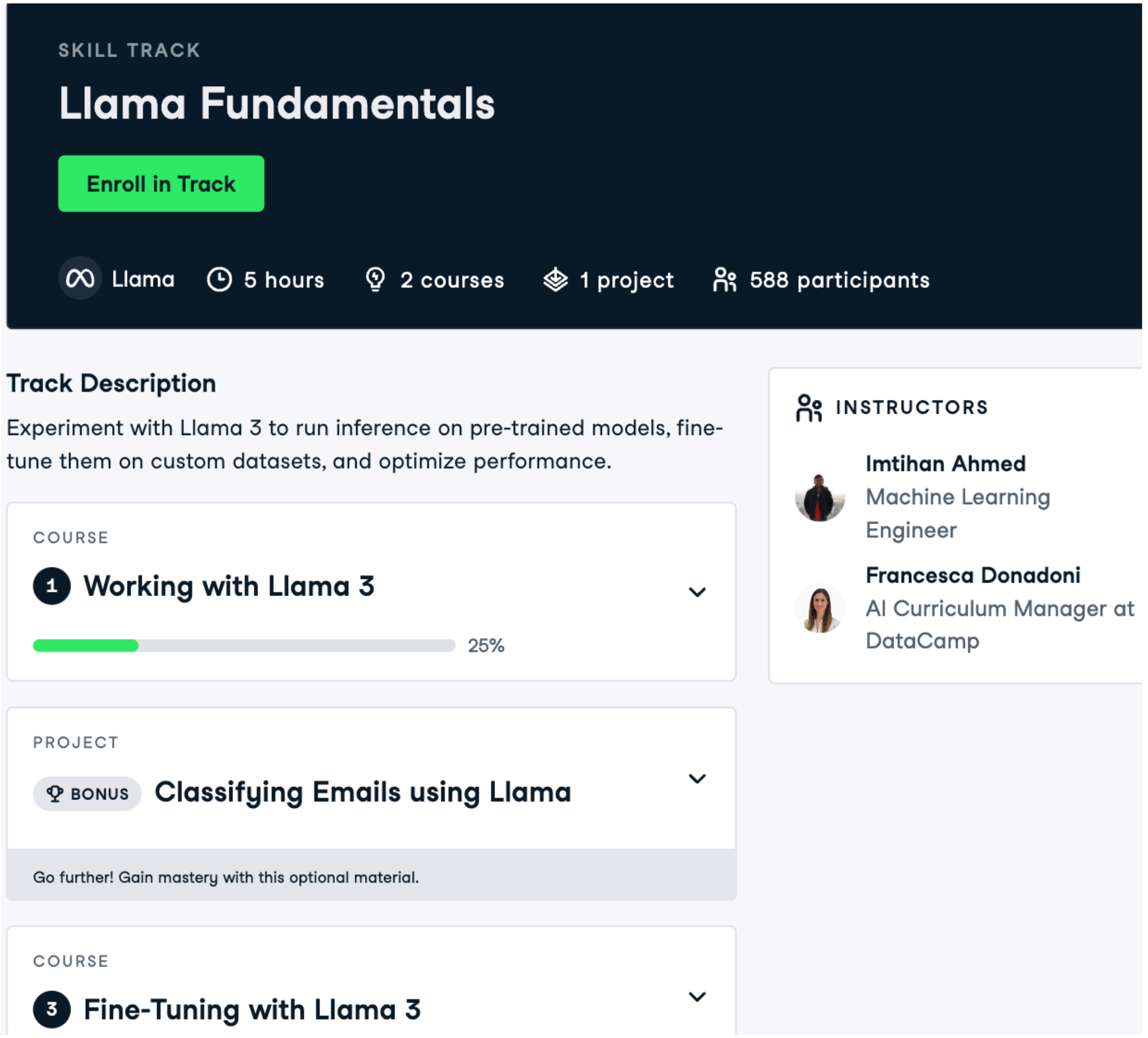
```
response_format = {"type": "json_object"}
```

Let's recall

01
Run Llama locally
02
Tune parameters
03
Assign roles
04
Guide outputs
05
Explore JSON responses
06
Build multi-turn conversations

- `Conversation` class
- `.create_completion()` method

What's next?



SKILL TRACK

Llama Fundamentals

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Llama · 5 hours · 2 courses · 1 project · 588 participants

Track Description

Experiment with Llama 3 to run inference on pre-trained models, fine-tune them on custom datasets, and optimize performance.

COURSE

1 Working with Llama 3

25%

PROJECT

BONUS Classifying Emails using Llama

Go further! Gain mastery with this optional material.

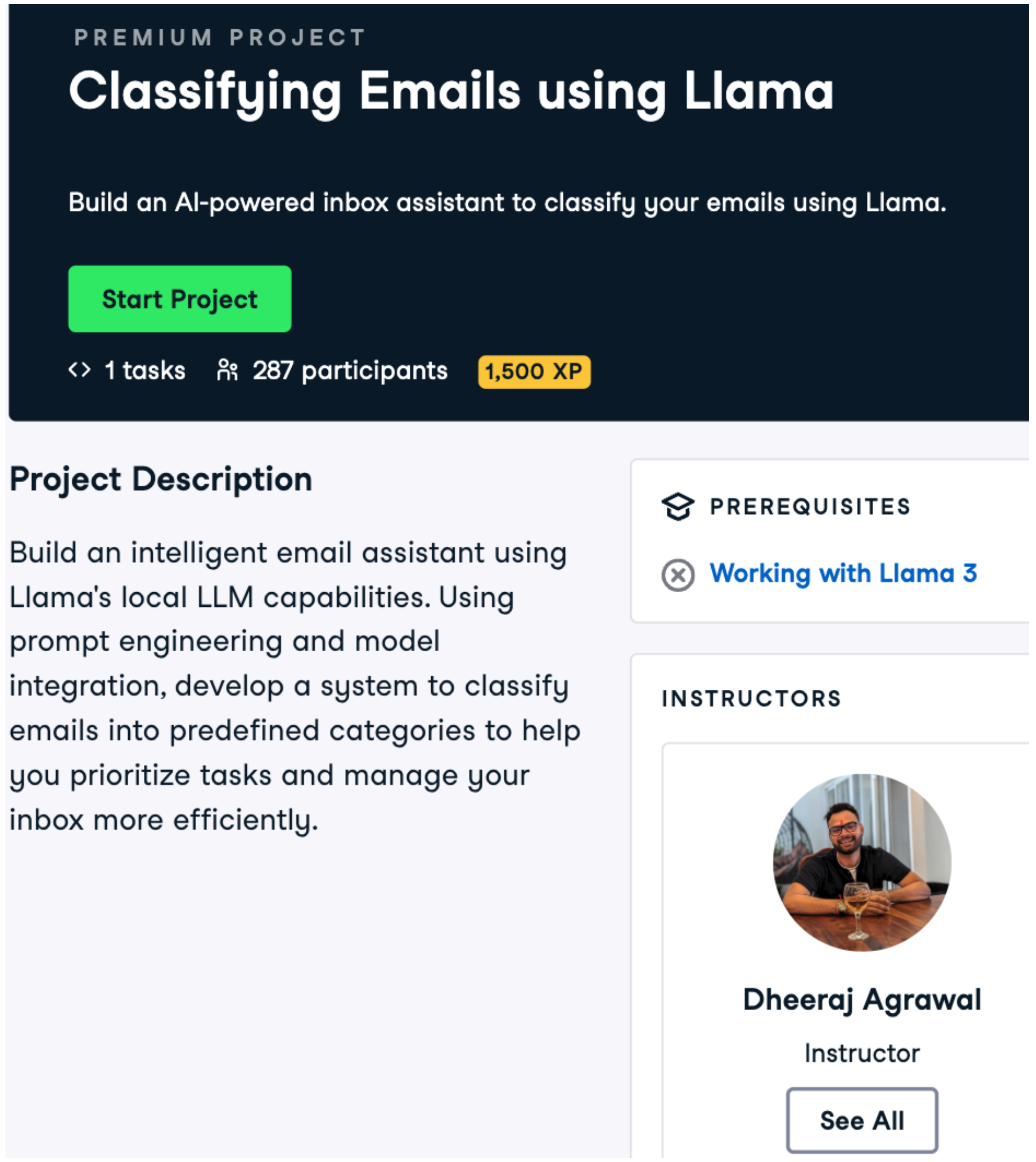
COURSE

3 Fine-Tuning with Llama 3

INSTRUCTORS

Imtihan Ahmed
Machine Learning Engineer

Francesca Donadoni
AI Curriculum Manager at DataCamp



PREMIUM PROJECT

Classifying Emails using Llama

Build an AI-powered inbox assistant to classify your emails using Llama.

Start Project

1 tasks · 287 participants · 1,500 XP

Project Description

Build an intelligent email assistant using Llama's local LLM capabilities. Using prompt engineering and model integration, develop a system to classify emails into predefined categories to help you prioritize tasks and manage your inbox more efficiently.

PREREQUISITES

Working with Llama 3

INSTRUCTORS

Dheeraj Agrawal
Instructor

See All

Llama Fundamentals

Classifying Emails using Llama

Thank you!

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