# Structuring an API call

DEVELOPING AI SYSTEMS WITH THE OPENAL API



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OpenAl Library

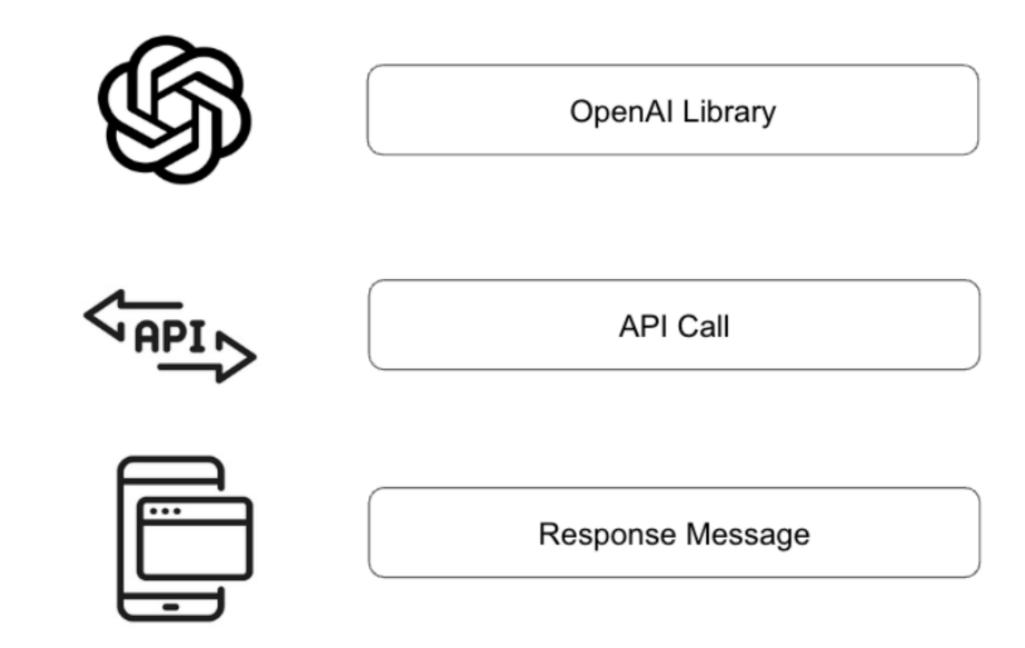


OpenAl Library



API Call







```
from openai import OpenAI
client = OpenAI(api_key="ENTER YOUR KEY HERE")
response = client.chat.completions.create(
  model="gpt-40-mini",
  messages=[
   {"role": "user",
   "content": "Who developed ChatGPT?"}
print(response.choices[0].message.content)
```

ChatGPT was developed by OpenAI, an artificial intelligence research lab.

# Challenges of a production environment





# Challenges of a production environment

- Error Handling
  - Displaying user-friendly error messages
  - Alternatives for when the service is unavailable

- Moderation and Safety
  - Control unwanted inputs
  - Minimizing the risk of data leaks

- Testing and Validation
  - Checking for responses that are out of topic
  - Testing for inconsistent behavior

- Communication with External Systems
  - Calling external functions and APIs
  - Optimizing response times



### Components of an OpenAl API request

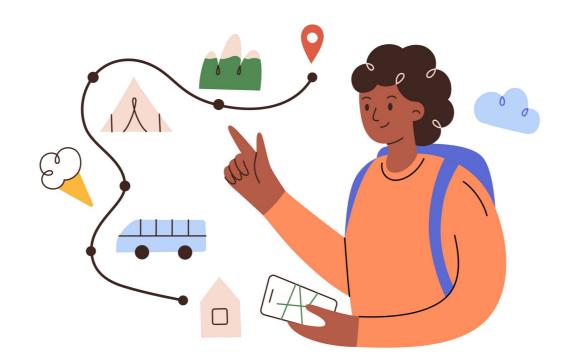
```
from openai import OpenAI
client = OpenAI(api_key="ENTER YOUR KEY HERE")
response = client.chat.completions.create(
  model="gpt-40-mini",
  messages=[
   {"role": "user",
   "content": "Please write down five trees with their scientific names in json format."}
  response_format={"type": "json_object"}
```

### Components of an OpenAl API response

```
print(response.choices[0].message.content)
```

#### What's next

- Integration in production
- Calling external functions
- Best practices



# Let's practice!

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# Handling errors

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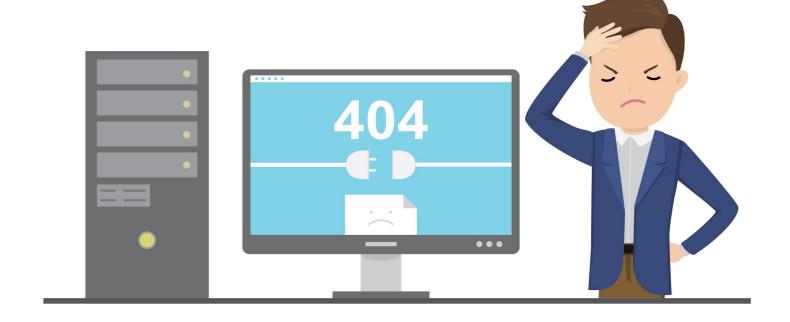


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# Errors in Al applications

- Simplifying the user experience
- Eliminating barriers



# Errors in the OpenAl API library

```
response = client.chat.completions.create(
model="text-davinci-001",
messages=[
    "role": "user",
    "content": "List two data science professions with related skills in json format."
response_format={"type": "json_object"}
```

```
NotFoundError: Error code: 404 - {'error': {'message': 'The model `text-davinci-001` has been deprecated, learn more here: https://platform.openai.com/docs/deprecations'}}
```

#### **Connection errors**

Generally due to connection issues on either the user's or the service's side

• Examples: InternalServerError, APIConnectionError, APITimeoutError

- Potential solution:
  - Checking your connection configuration
  - Reaching out to support if that fails

#### Resource limits errors

Generally due limits on the frequency of requests or the amount of text passed

• Examples: ConflictError, RateLimitError

- Potential solution:
  - Checking limit restrictions
  - Ensure requests are within limits

#### **Authentication errors**

```
client = OpenAI(api_key="This is an Invalid Key")
response = client.chat.completions.create(
model="gpt-4o-mini",
messages=[
    "role": "user",
    "content": "List two data science professions with related skills in json format."
   }
 response_format={"type": "json_object"}
```

```
AuthenticationError: Error code: 401 - {'error': {'message': 'Incorrect API key provided: ThisIsNo*AKey. You can find your API key at https://platform.openai.com/account/api-keys.'}}
```

### **Bad request errors**

```
response = client.chat.completions.create(
model="gpt-4o-mini",
messages=[
    {"role": "This is not a Valid Role", "content": "List two data science
    professions with related skills in json format."}
],
response_format={"type": "json_object"}
)
```

```
BadRequestError: Error code: 400 - {'error': {'message': "'NotARole' is not one of
['system', 'assistant', 'user', 'function'] - 'messages.O.role'",
'type': 'invalid_request_error', 'param': None, 'code': None}}
```

# Handling exceptions

```
try:
    response = client.chat.completions.create(
     model="gpt-4o-mini",
     messages=[{"role": "user",
      "content": "List five data science professions."}])
except openai.AuthenticationError as e:
  print(f"OpenAI API failed to authenticate: {e}")
  pass
except openai.RateLimitError as e:
  print(f"OpenAI API request exceeded rate limit: {e}")
  pass
except Exception as e:
  print(f"Unable to generate a response. Exception: {e}")
  pass
```

# Let's practice!

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# Batching

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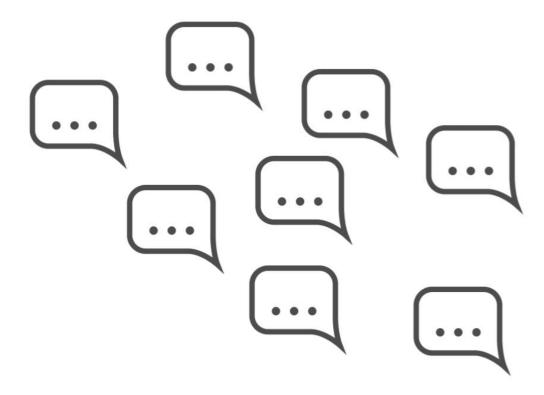


#### What are rate limits

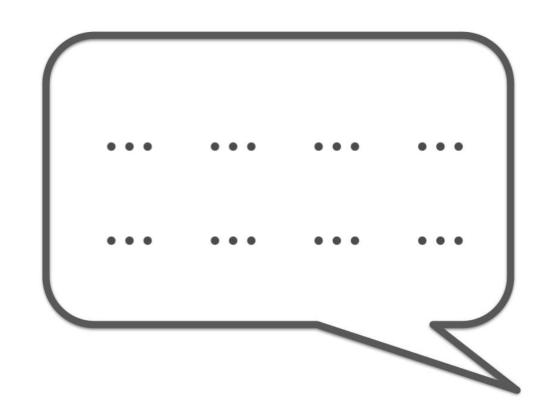


#### How rate limits occur

Too many requests



Too much text in the request



# **Avoiding rate limits**

- Retry
  - Short wait between requests

- Batching
  - Processing multiple messages in one request

- Reducing tokens
  - Quantifying and cutting down the number of tokens

# Retrying

```
from tenacity import (
    retry,
    stop_after_attempt,
    wait_random_exponential
)
@retry(wait=wait_random_exponential(min=1, max=60), stop=stop_after_attempt(6))
```

# Retrying

```
@retry(wait=wait_random_exponential(min=1, max=60), stop=stop_after_attempt(6))
def get_response(model, message):
    response = client.chat.completions.create(
        model=model,
        messages=[message],
        response_format={"type": "json_object"}
    )
    return response.choices[0].message.content
```

### Batching

```
countries = ["United States", "Ireland", "India"]
message=[
    "role": "system",
    "content": """You are given a series of countries and are asked to return the
    country and capital city. Provide each of the questions with an answer in the
    response as separate content."",
    }]
[message.append({"role": "user", "content": i }) for i in countries]
```

# Batching

```
response = client.chat.completions.create(
    model="gpt-4o-mini",
    messages=message
)
print(response.choices[0].message.content)
```

```
United States: Washington D.C.
Ireland: Dublin
India: New Delhi
```

# Reducing tokens

Number of tokens in prompt: 17



# Let's practice!

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