



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DIPARTIMENTO DI
SCIENZE STATISTICHE "PAOLO FORTUNATI"



9 - OpenAI API and GPT

Giovanni Della Lunga
giovanni.dellalunga@unibo.it

Halloween Conference in Quantitative Finance

Bologna - October 25-26-27, 2023

OpenAI API

Open AI API

- OpenAI is a cutting-edge research organization specializing in artificial intelligence.
- Founded in 2015, OpenAI has made significant contributions to AI research, including language models like GPT-3.5 and GPT-4.
- The OpenAI API is a platform that provides developers with access to OpenAI's powerful language models.
- It allows developers to integrate natural language processing capabilities into their applications, products, and services.
- Through API calls, developers can leverage OpenAI's state-of-the-art models for various language-related tasks.

Open AI API - Key Features

- Natural Language Understanding: The API can analyze and understand text in natural language, making it suitable for a wide range of applications.
- Text Generation: It can generate human-like text based on given prompts, enabling content creation and more.
- Language Translation: The API can translate text from one language to another, promoting global accessibility.
- Summarization: It can automatically summarize long documents, making information more digestible.
- Chatbot Capabilities: Developers can create chatbots and virtual assistants using the API.
- Code Generation: The API can generate code snippets in various programming languages.

Open AI API - How to Access OpenAI API

- Account Registration: Users need to create an OpenAI account to access the API.
- API Key Generation: After registration, users generate API keys, which are used for authentication.
- The OpenAI API uses API keys for authentication.
- Documentation: OpenAI provides extensive documentation with code examples to help users get started.
- SDKs and Libraries: There are SDKs and libraries available for popular programming languages to simplify integration.

Open AI API - How to Access OpenAI API


- You can interact with the API through HTTP requests from any language, via our official Python bindings;
- To install the official Python bindings, run the following command:


```
pip install openai
```



Open AI API - Create API Key

To create API keys, sign up to OpenAI, and click on your profile and on "View API keys". There you can create a new key.


[Overview](#)
[Documentation](#)
[API reference](#)
[Examples](#)
[Playground](#)

[Forum](#)
[Help](#)
 Giovanni Della Lunga

ORGANIZATION

[Giovanni Della Lunga](#)

[Settings](#)
[Usage](#)
[Rate limits](#)
[Members](#)
[Billing](#)



USER

[API keys](#)

API keys

Your secret API keys are listed below. Please note that we do not display your secret API keys again after you generate them.

Do not share your API key with others, or expose it in the browser or other client-side code. In order to protect the security of your account, OpenAI may also automatically disable any API key that we've found has leaked publicly.

NAME	KEY	CREATED	LAST USED	
Secret key		26 mag 2023	12 set 2023	 
+ Create new secret key				

Default organization

If you belong to multiple organizations, this setting controls which organization is used by default when making requests with the API keys above.

Giovanni Della Lunga

Note: You can also specify which organization to use for each API request. See [Authentication](#) to learn more.

Open AI API - Create API Key

- A good practice to keep credentials outside the code so the API keys are not committed to your repository. Save the keys in a `.env` file or in an environment variable.
- Now, you can either load the environment variables with `source .env` or you can use a package like `python-dotenv` to load the environment variables automatically in your notebook or Python script.

GPT Models

- To use a GPT model via the OpenAI API, you'll send a request containing the inputs and your API key, and receive a response containing the model's output.
- Our latest models, gpt-4 and gpt-3.5-turbo, are accessed through the chat completions API endpoint.

	MODEL FAMILIES	API ENDPOINT
Newer models (2023-)	gpt-4, gpt-3.5-turbo	https://api.openai.com/v1/chat/completions
Updated base models (2023)	babbage-002, davinci-002	https://api.openai.com/v1/completions
Legacy models (2020-2022)	text-davinci-003, text-davinci-002, davinci, curie, babbage, ada	https://api.openai.com/v1/completions

Completion and Chat Completion

- In the context of GPT (Generative Pre-trained Transformer) programming, **completion** typically refers to the process of generating or completing a sequence of text based on an initial input or prompt.
- GPT models, including GPT-3 and GPT-4, are powerful language models that are trained on a vast amount of text data, allowing them to generate coherent and contextually relevant text based on the input they receive.

Chat Completion

- Chat models take a list of messages as input and return a model-generated message as output.
- Although the chat format is designed to make multi-turn conversations easy, it's just as useful for single-turn tasks without any conversation.
- An example Chat completions API call looks like the following:

```
python ▾ Copy
1 response = openai.ChatCompletion.create(
2     model="gpt-3.5-turbo",
3     messages=[
4         {"role": "system", "content": "You are a helpful assistant."},
5         {"role": "user", "content": "Who won the world series in 2020?"},
6         {"role": "assistant", "content": "The Los Angeles Dodgers won the World Series in 20"},
7         {"role": "user", "content": "Where was it played?"}
8     ]
9 )
```

Chat Completion Response Format

An example Chat completions API response looks as follows:

```
1  {
2    "choices": [
3      {
4        "finish_reason": "stop",
5        "index": 0,
6        "message": {
7          "content": "The 2020 World Series was played in Texas at Globe Life Field",
8          "role": "assistant"
9        }
10     }
11  ],
12  "created": 1677664795,
13  "id": "chatcmpl-7QyqpwhqwjicIEznoc6Q47XAYW",
14  "model": "gpt-3.5-turbo-0613",
15  "object": "chat.completion",
16  "usage": {
17    "completion_tokens": 17,
18    "prompt_tokens": 57,
19    "total_tokens": 74
20  }
21 }
```

Completion API

- The completions API endpoint received its final update in July 2023 and has a different interface than the new chat completions endpoint.
- Instead of the input being a list of messages, the input is a freeform text string called a prompt.
- An example API call looks as follows:

python  Copy

```
1 response = openai.Completion.create(  
2     model="gpt-3.5-turbo-instruct",  
3     prompt="Write a tagline for an ice cream shop."  
4 )
```

ChatCompletion and Completion

- The difference between these APIs derives mainly from the underlying GPT models that are available in each.
- The chat completions API is the interface to the most capable model (gpt-4), and to the most cost effective model (gpt-3.5-turbo).
- See the full API reference documentation to learn more.