Claude API in Python

Cheat Sheet

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Introduction

Claude is a family of large language models developed by Anthropic, designed for reasoning, analysis, coding, and multimodal understanding.

The Claude API lets you send messages, stream responses, use tools, generate embeddings, and manage conversations via the Python SDK.

> Getting Started

Install the Python SDK

```
pip install anthropic
```

Set your API key

Use Bash

```
export ANTHROPIC_API_KEY="your_api_key_here"
```

Or use Python

```
import os
os.environ["ANTHROPIC_API_KEY"] = "your_api_key_here"
```

Create a Claude client

```
from anthropic import Anthropic
# Initialize the Claude client using your API key
claude_client = Anthropic()
```

> Overview

Core SDK methods

- Send messages with `claude_client.messages.create()`
- Stream responses with `claude_client.messages.stream()`
- Generate embeddings with `claude_client.embeddings.create()`
- Estimate tokens with `claude_client.messages.count_tokens()`
- List models with `claude_client.models.list()`

Key Jargon

- **Model:** Which version of Claude is used.
- **Messages API:** Used to send messages between user and model.
- **System Message:** Used to define assistant behavior and constraints.
- **Conversation:** The message history (user and AI).
- **Streaming:** Receive output incrementally rather than all at once.
- **Tool Use:** Allow Claude to call other software like a web browser or file system.
- **Embeddings:** Numeric vector representations of text.
- **Temperature:** Controls the randomness of model output.
- **Token Counting:** Estimate cost before sending.
- **Context Window:** How many tokens of conversation can be stored.

> Workflows

1) Basic Message

Use for one-off prompts without conversation state.

```
# Send a user message with generation controls
response = claude_client.messages.create(
    model="claude-sonnet-4-6",
    max_tokens=300,  # Always set token limit
    messages=[
        {"role"   : "user",
         "content": "What is the best LLM?"}
    ],
)
# Claude returns structured content blocks
print(response.content[0].text)
```

2) Count Tokens Before Sending

Estimate cost or prevent context window overflow.

```
# Estimate how many tokens the input will use
token_count = claude_client.messages.count_tokens(
    model="claude-opus-4-6",
    messages=[{
        "role"   : "user",
        "content": "Explain machine learning like I'm five."}],
)
# Access estimated input token count
print(token_count.input_tokens)
```

3) Multi-Turn Conversation

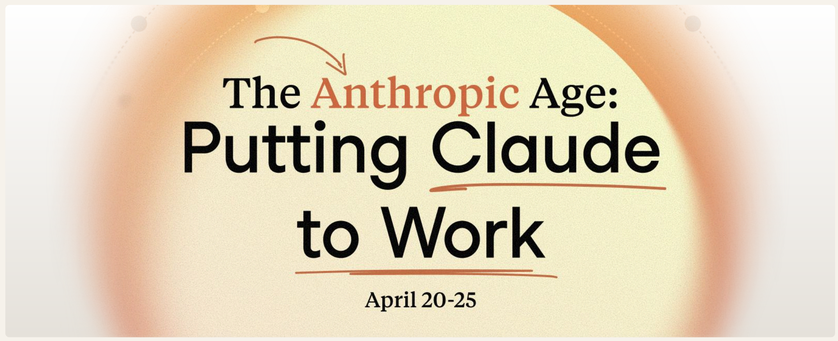
Maintain conversation state client-side, resend full history each request.

```
# Define conversation including a system instruction
conversation_history = [
    {"role"   : "system",
     "content": "You are a concise technical assistant."},
    {"role"   : "user",
     "content": "Explain transformers simply."},
    {"role"   : "assistant",
     "content": "Transformers model sequences efficiently."},
    {"role"   : "user",
     "content": "How are they different from RNNs?"}]
# Send conversation history to Claude
response = claude_client.messages.create(
    model="claude-sonnet-4-6",
    max_tokens=300,
    messages=conversation_history  # Send full history
)
# Print assistant reply
print(response.content[0].text)
```

4) Streaming Responses

Use for long outputs or real-time interfaces.

```
# Stream response to reduce perceived latency
with claude_client.messages.stream(
    model="claude-sonnet-4-6",
    max_tokens=300,
    messages=[{
        "role"   : "user",
        "content": "Write a poem about AI."}],
) as stream:
    # Print text as it is generated
    for chunk in stream.text_stream:
        print(chunk, end="", flush=True)
```



> Workflows

5) Vision / Document Q&A

Send images or PDFs alongside text questions.

```
import base64

# Encode an image file
with open("invoice.png", "rb") as img_file:
    encoded_img = base64.b64encode(img_file.read()) \
        .decode("utf-8")
# Send image and question to Claude
vision_response = claude_client.messages.create(
    model="claude-sonnet-4-6",
    max_tokens=300,
    messages=[{
        "role"   : "user",
        "content": [{
                "type"  : "image",
                "source": {
                    "type"      : "base64",
                    "media_type": "image/png",
                    "data"      : encoded_img
                }
            },
            {"type": "text",
             "text": "What is the invoice total?"}],
    }],
)
# Print assistant reply
print(vision_response.content[0].text)
```

6) Tool Use

Allow Claude to request functionality from other software.

```
# Define a tool schema
weather_tool = {
    "name"        : "get_weather",
    "description" : "Get current weather for a city",
    "input_schema": {
        "type"       : "object",
        "properties" : {"city": {"type": "string"}},
        "required"   : ["city"]
    }
}
# Send request with tool definitions
tool_response = claude_client.messages.create(
    model="claude-opus-4-6",
    max_tokens=300,
    tools=[weather_tool],  # Provide tool schema
    messages=[{
        "role"   : "user",
        "content": "What's the weather in London?"}],
)
# Print assistant reply (may include tool call request)
print(tool_response.content)
```

7) Embeddings for search and RAG

Generate vectors for retrieval systems. Anthropic recommends using Voyage AI embeddings.

```
# Install the official Voyage AI package
pip install -U voyageai

# Use the API key from your environment
from voyageai import Client

# Initialize a Voyage AI client (reads VOYAGE_API_KEY)
voyage = Client()

# Generate an embedding vector for semantic search
embedding_response = voyage.embed(
    ["Semantic search example text"],
    model="voyage-4"
)

# Access the embedding vector
embedding_vector = embedding_response.embeddings[0]
print(len(embedding_vector))  # dimensionality (e.g., 1024)
```

8) Model Discovery

List available models and their IDs.

```
# Retrieve available models
available_models = claude_client.models.list()
# Print model IDs
for model in available_models.data:
    print(model.id)  # List model IDs
```