Discovery Piscine - AI/ML

Module 2 - Intelligent Agents

Summary: You will learn how to develop a Python chatbot-like that uses an external API to answer weather-related questions.

Version: 1.01

Contents

Chapter I

General instructions

Unless explicitly specified, the following rules will apply to this project.

- This subject is the one and only trustable source. Don't trust any rumor.
- Your assignments will be evaluated by your peers.
- You have a question? Ask your left neighbor. Otherwise, try your luck with your right neighbor.
- You must read the examples thoroughly. They can reveal requirements that are not obvious in the assignment's description.
- Good luck and good work on this project!

Chapter II

Exercise 0: Virtual environment

	Exercise : 00
Exercise 0: Virtual environment	
Turn-in directory : *ex*00/	
Files to turn in :	
Forbidden functions : `None`	

Python provides the capability to create virtual environments, which allow users to install specific configurations without requiring administrator access on a computer.
We recommend researching online documentation about these environments, commonly referred to as ‘venv‘, and creating one for this project.

Withing this newly created virtual environment, you will need to install the appropriate Python libraries to use an open and free weather API.
We suggest using https://open-meteo.com/.
The documentation on the website is clear and should enable you to complete this task independently.

During the evaluation, the evaluator will verify that:

- The virtual environment is correctly created.
- It can be activated.
- It includes the necessary packages, at least the *openmeteo-requests* package if you choose to use the open-meteo.com API.

`Note`: This project relies on external APIs and documentations, which may change over time. For the four exercises, you are allowed to use a different weather API or a different Python package to access the API if the suggested ones are unavailable or if you prefer an alternative solution.

Chapter III

Exercise 1: Get weather information

	Exercise : 01
Exercise 1: Get weather information	
Turn-in directory : *ex*01/	
Files to turn in : `weather.py`	
Forbidden functions : `None`	

Create a Python program that asks for a longitude, a latitude, and display the current weather for that location.
The program should work in the previously created virtual environment. It can use the open-meteo.com API to retrieve the necessary information.

`Example Execution`:

```
./weather.py
Latitude?: 48.866667
Longitude?: 2.333333
The current weather for this location is:
- temperature(C): 11
- humidity: 64\%
- cloud: 72\%
- wind: 13km/h
```

You can choose to display additional information id desired. Ensure that any errors are handled appropriately, with clear messages. The program should not crash under any circumstances.

Chapter IV

Exercise 2: Geolocalisation

	Exercise : 02
Exercise 2: Geolocalisation	
Turn-in directory : *ex*02/	
Files to turn in : `weather_geoloc.py`	
Forbidden functions : `None`	

Copy your previous Python program and modify it to accept a location name instead of latitude and longitude.
The same open-meteo.com API offers a geolocation service.

`Example Execution`:

```
./weather_geoloc.py
Location?: Paris
The current weather in Paris is:
- temperature(C): 11
- humidity: 64\%
- cloud: 72\%
- wind: 13km/h\\
```

You can choose to display more information if desired. Ensure that the program handles all possible errors with appropriate messages. It should not crash under any circumstances.

Chapter V

Exercise 3: Is this a Chat-Bot?

	Exercise : 03
Exercise 3: Is this a Chat-Bot?	
Turn-in directory : *ex*03/	
Files to turn in : `weather_bot.py`	
Forbidden functions : `None`	

This final exercise is more challenging and can be approached in two different ways.

The expected behaviour is as follows: you run the Python program, ask the chatbot a question about the weather in a specific location, and the chatbot responds. You can then ask additional questions.

`Example Execution`:

```
./weather_bot.py
Ask?: Can you tell me the current weather in Paris?
The current weather in Paris is a temperature of 11 degrees (C), a humidity of 64\%, there are a lot of
     clouds in the sky and a wind of 13km/h.
Ask?: What is the weather in Los Angeles?
The current weather in Los Angeles is a temperature of 8 degrees (C), a humidity of 89\%, there are no
     clouds in the sky and a wind of 2km/h.
```

`Approach 1`:
A straightforward, though imperfect, approach is to scan the input question for specific keywords (e.g., "weather", "temperature", "time") to identify the relevant parts of the sentence and extract the location.
Using the location, you can perform an API request and return the desired information. If the question is not related to the weather, an error message should be displayed.
`Approach 2`:
A more advanced option is to interact with the API of a real Large Language Model (LLM) like ChatGPT, Gemini, or Claude.
You can directly send the user's question to the LLM API, and its response could be displayed if it provides the appropriate information. This method involves understanding how to interact with the LLM APIs, including managing access tokens, which might be more complex.

As you can see,this exercise allows significant flexibility, and results may vary depending on your approach.
The evaluation will account for this flexibility, with minimal expectations for completion and bonus points for high quality projects.

`Note`: Ensure that all potential errors are handled with appropriate messages, and the program does not crash under any circumstances.

Chapter VI

Submission and peer-evaluation

- Create an `ai-ml_discovery` folder at the root of your home, and move around in it.

- Create a new module folder with this format:

  ```
  module[number_of_the_module]
  example: module3 (for module 3)
  ```

  and navigate to it.

- From now on, all exercises should be in the correct folder rendering. Exercise 00 in the `ex00` folder, Exercise 01 in the `ex01` folder, etc.
  for example:

  ```
  [module3/ex00]
  [module3/ex01]
  etc...
  ```

⚠ Please note, during your defense anything that is not present in the folder for the day will not be checked.