Python Project

Towards Data Mining and Text Analysis Exam Sessions:

Tips on how to deliver the Python project

Data Mining and Text Analytics 2025-2026

Dr Alessandro Bruno
IULM University
A.A. 2025 – 2026
Artificial Intelligence for Business and Society

Outline

- Choice of topic
- Task
- Ways to Implementation
- An example:
  - Text Sentiment Analysis
- With a little help of ChatGPT
- Running and configuring the Project on your laptop
- Wrap-up
- Project Delivery
  - Uploading project + documentation to GitHub

Step 1

Pick up a topic of your interest that you can tackle with data mining techniques (note that machine learning and deep learning can also be used for data and text mining)

Example: Sentiment Analysis

Step 2

- Implement a technique to work out a specific problem.
  - For instance, you might be interested in running sentiment analysis on 20 textual reviews of the same item from different e-commerce websites and check whether customers exhibit the same opinion.

Step 3

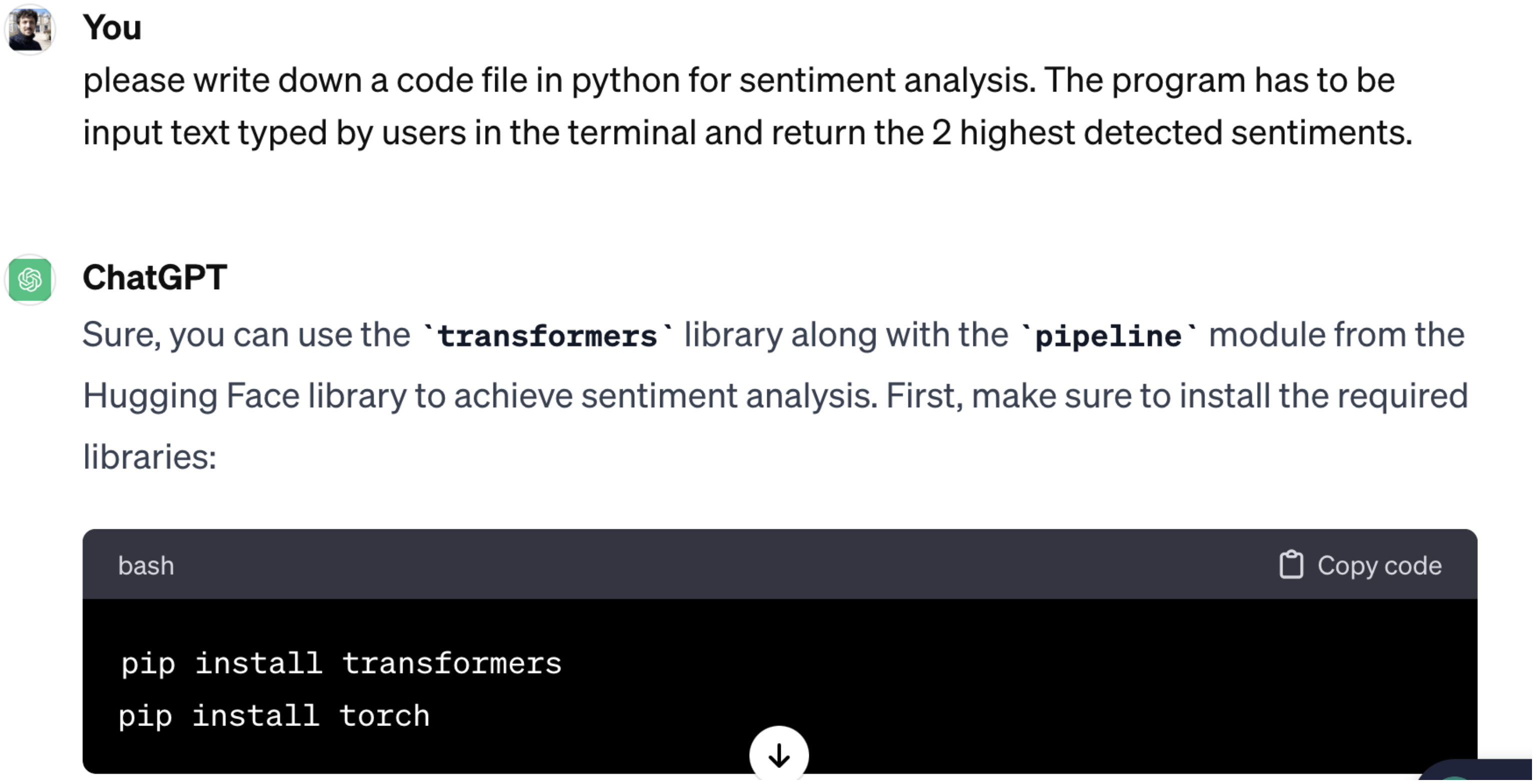
- Decide how to implement the solution:
  - You can code it from scratch (generally it takes a while as you need to design the whole project and know each step involved in the technique)
  - You can use an off-the-shelf solution by downloading from the Internet and testing it on your laptop (it usually saves you some time as you do not necessarily need to know every single step of the technique).
  - You can also use Virtual Chatbot based on LLMs such as ChatGPT and seek practical solutions (to be tested).
  - A compelling example for sentiment analysis is also given below:
  - https://thecleverprogrammer.com/2020/05/25/movie-reviews-sentiment-analysis-binary-classification-with-machine-learning/

Step 4

1. REGARDLESS OF WHETHER YOU FIND A PROJECT OVER THE INTERNET OR SIMPLY ASK CHATGPT, BARD AND OTHER LLM-BASED VIRTUAL CHATBOTS, THERE ARE SOME RECOMMENDATIONS YOU NEED TO STICK TO.
2. YOU NEED TO SET UP A NEW VIRTUAL ENVIRONMENT USING ANACONDA (AS WE DID IN LAB SESSIONS)
3. THE VERY FIRST GOAL IS TO MAKE THE CODE WORK ON YOUR LAPTOP.
4. NO PANIC IF YOU STUMBLE INTO ERRORS (IT HAPPENS ALL THE TIME).
5. YOU CAN USE SEARCH ENGINES AND GENERATIVE-AI TOOLS (CHATGPT, BARD, LLAMA, ETC.) TO WORK OUT ISSUES WITH YOUR CODE.

Step 4 (Example)

- I wanted to run Sentiment Analysis on user typed text from the terminal.
- I asked ChatGPT to make an example with the following requirements:



You

please write down a code file in python for sentiment analysis. The program has to be input text typed by users in the terminal and return the 2 highest detected sentiments.

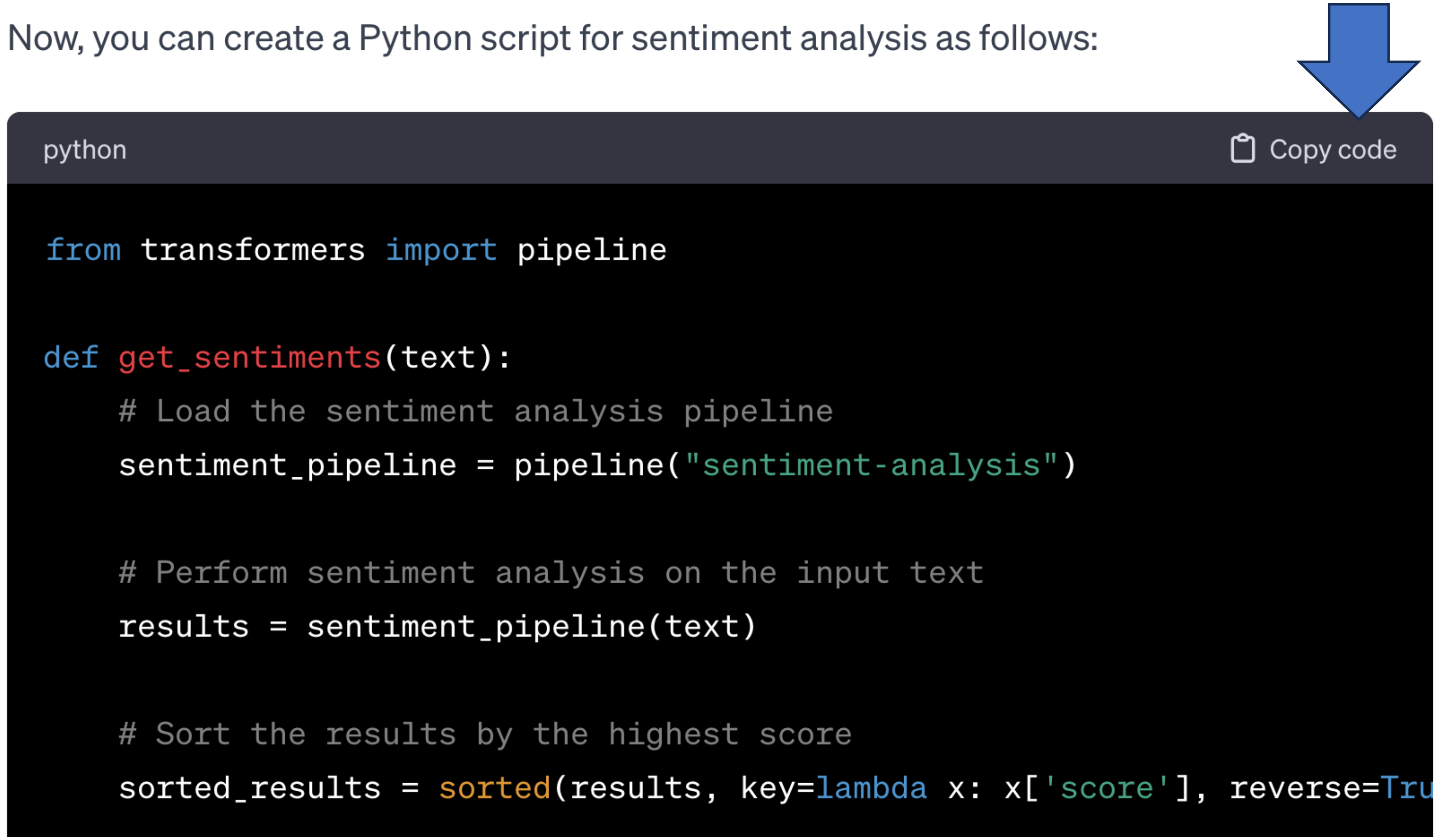
ChatGPT

Sure, you can use the `transformers` library along with the `pipeline` module from the Hugging Face library to achieve sentiment analysis. First, make sure to install the required libraries:

```bash
pip install transformers
pip install torch
```

Step 4 (Example)

Going on with ChatGPT



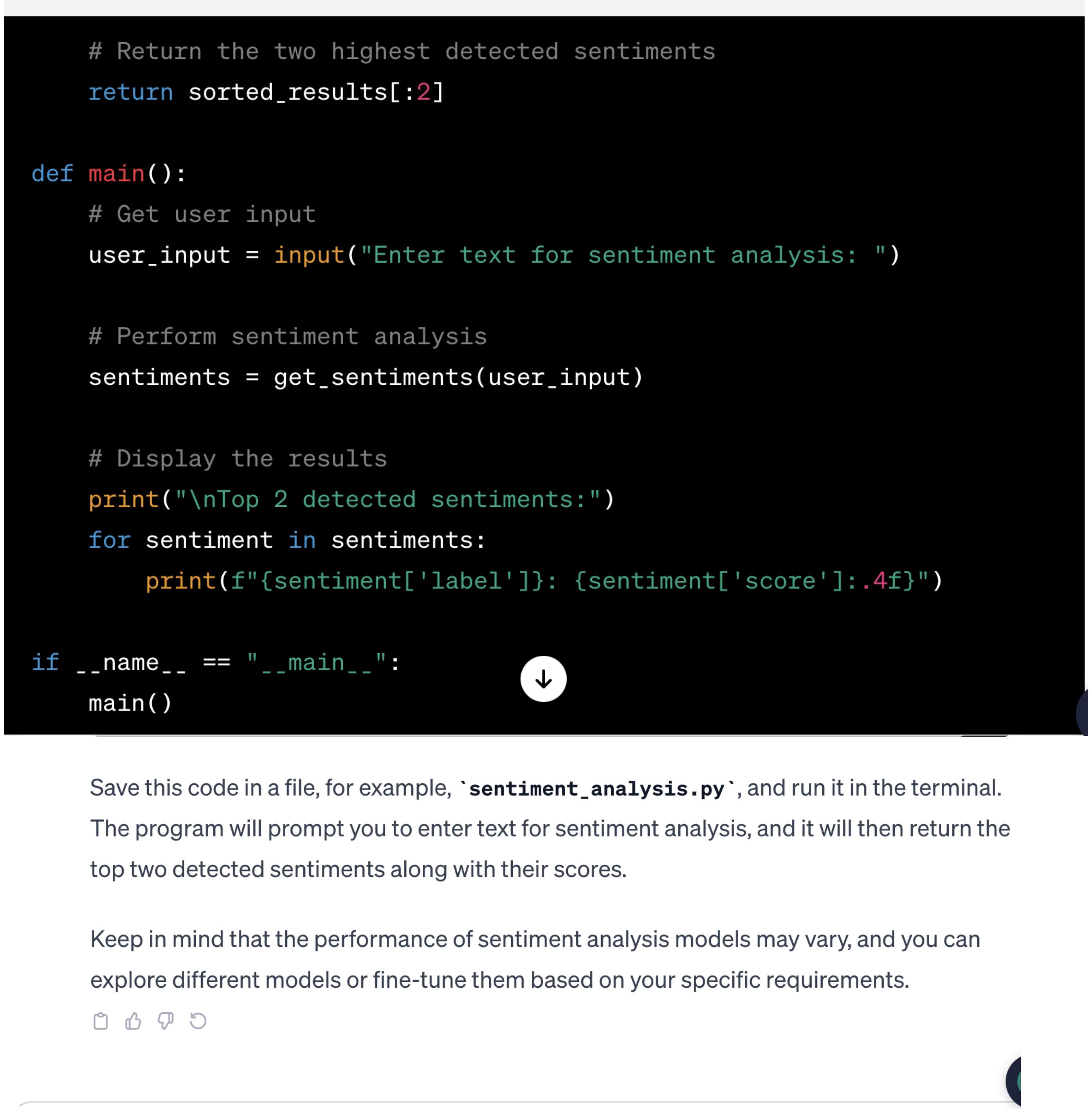
Now, you can create a Python script for sentiment analysis as follows:

```python
from transformers import pipeline

def get_sentiments(text):
    # Load the sentiment analysis pipeline
    sentiment_pipeline = pipeline("sentiment-analysis")

    # Perform sentiment analysis on the input text
    results = sentiment_pipeline(text)

    # Sort the results by the highest score
    sorted_results = sorted(results, key=lambda x: x['score'], reverse=Tru
```

The whole snippet can be copied for your project

Step 4 (Example)

The second code chunk is reported here.



```
    # Return the two highest detected sentiments
    return sorted_results[:2]

def main():
    # Get user input
    user_input = input("Enter text for sentiment analysis: ")

    # Perform sentiment analysis
    sentiments = get_sentiments(user_input)

    # Display the results
    print("\nTop 2 detected sentiments:")
    for sentiment in sentiments:
        print(f"{sentiment['label']}: {sentiment['score']:.4f}")

if __name__ == "__main__":
    main()
```

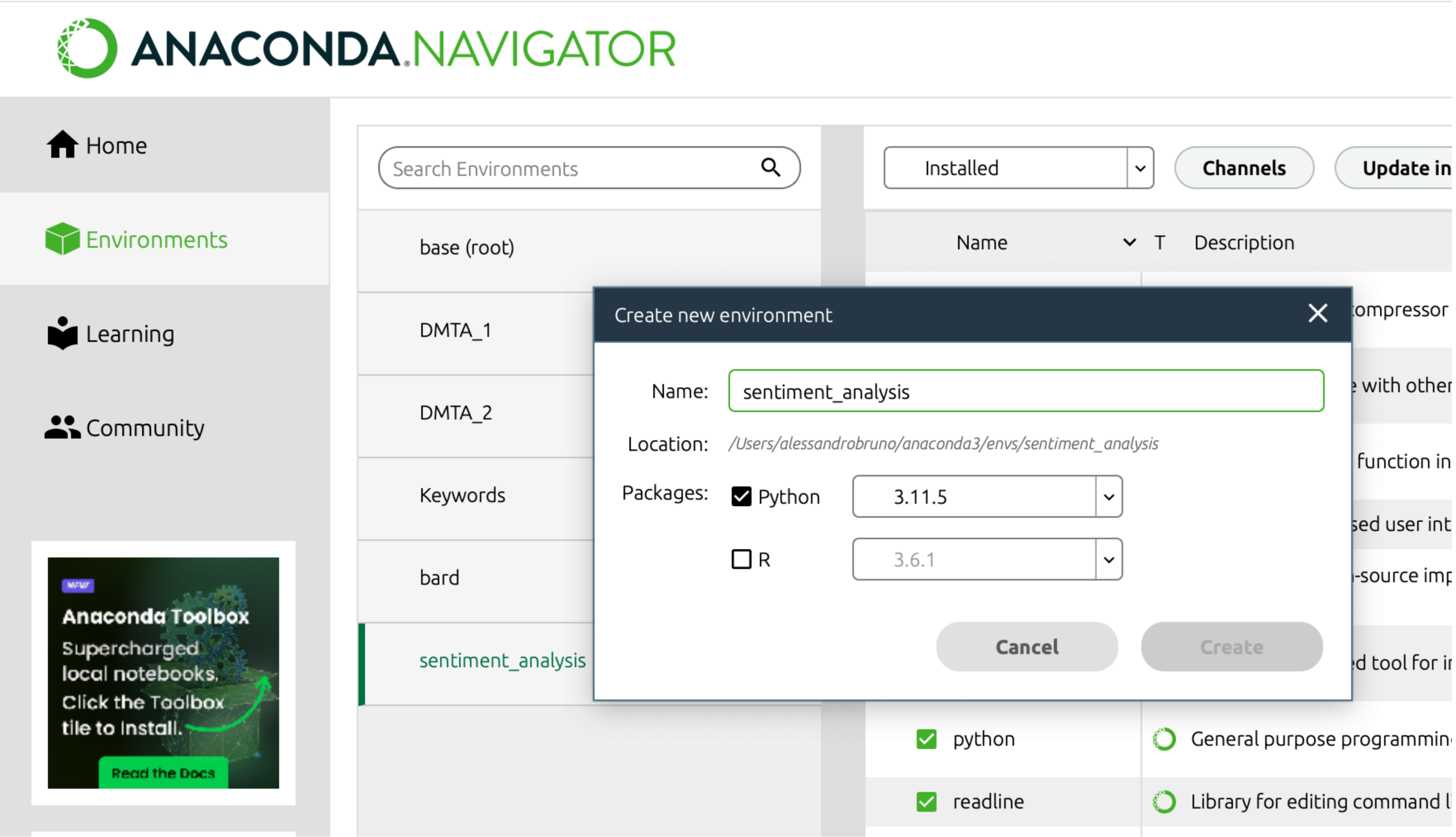
Save this code in a file, for example, `sentiment_analysis.py`, and run it in the terminal. The program will prompt you to enter text for sentiment analysis, and it will then return the top two detected sentiments along with their scores.

Keep in mind that the performance of sentiment analysis models may vary, and you can explore different models or fine-tune them based on your specific requirements.

Step 5 (Running it on your laptop)

Step 5 (Configuring & Running it on your laptop)

From Anaconda Navigator you set up a new environment 'sentiment_analysis' as previously studied in the lab sessions.



Create new environment

Name: sentiment_analysis

Location: /Users/alessandrobruno/anaconda3/envs/sentiment_analysis

Packages: ☑ Python 3.11.5

☐ R 3.6.1

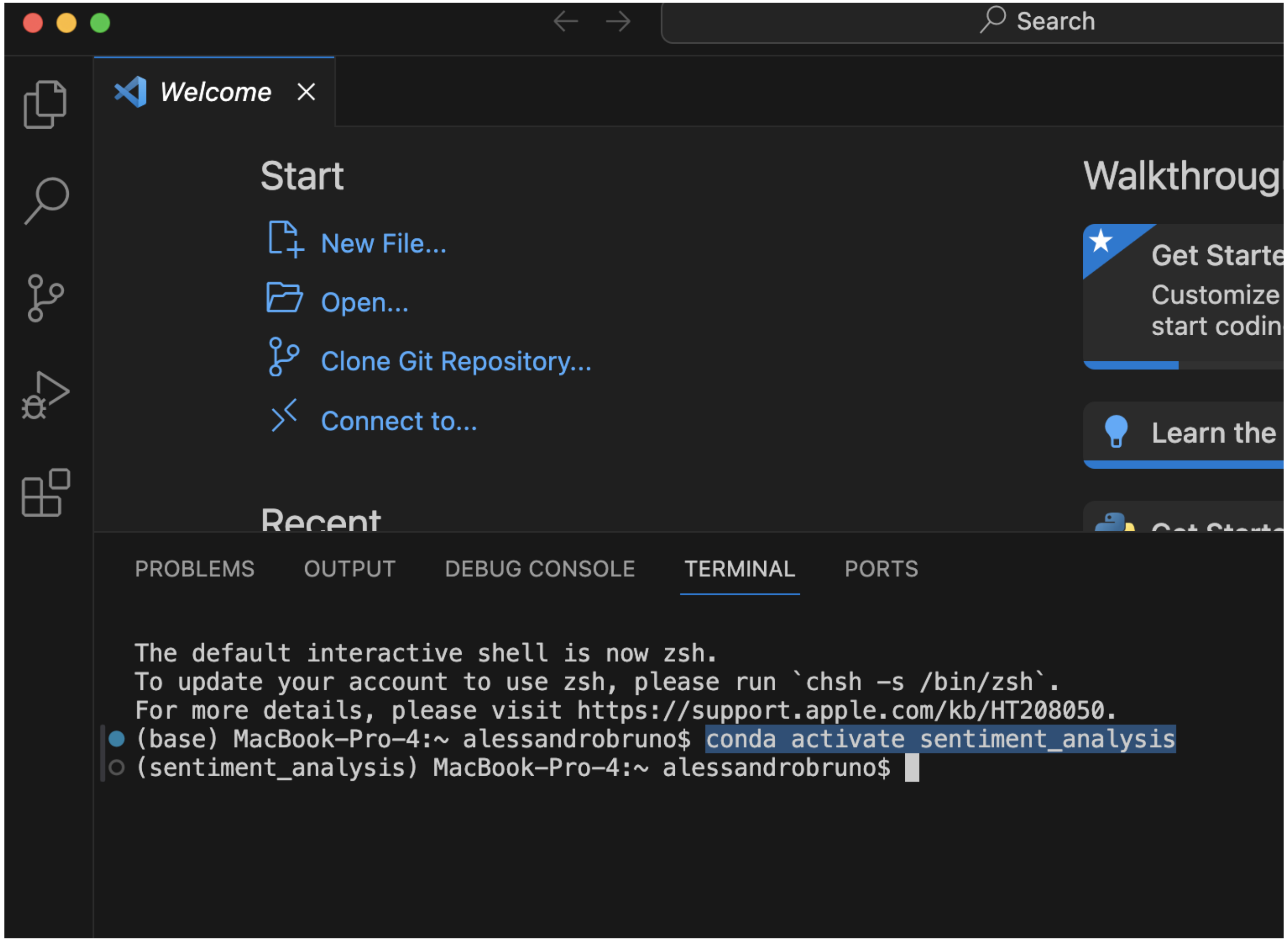
Step 4 (Running on your laptop)

Open Visual Studio Code and go to the Terminal.

Activate your new environment using conda just like in the example by typing
conda activate sentiment_analysis

Now, you need to create a project folder containing all the project files.

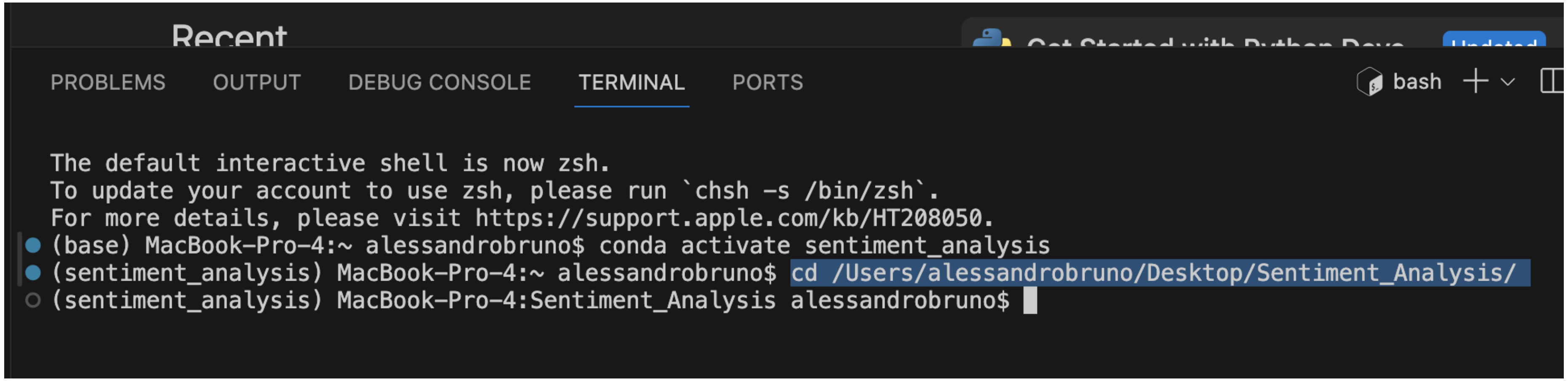
For simplicity's sake, I set up a directory named Sentiment_Analysis on my desktop.



```
The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro-4:~ alessandrobruno$ conda activate sentiment_analysis
(sentiment_analysis) MacBook-Pro-4:~ alessandrobruno$
```

Step 5 (Running it on your laptop)

- Enter the project folder with your terminal

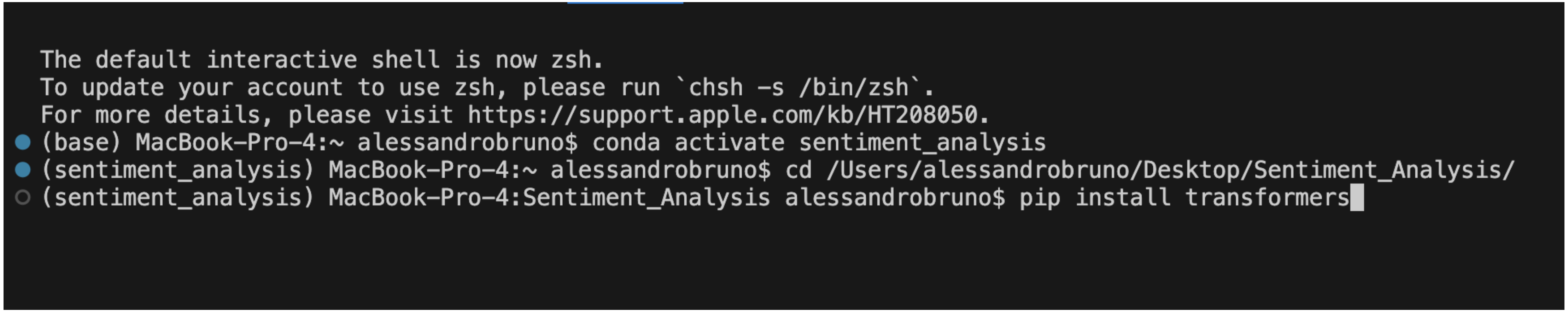


```
The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro-4:~ alessandrobruno$ conda activate sentiment_analysis
(sentiment_analysis) MacBook-Pro-4:~ alessandrobruno$ cd /Users/alessandrobruno/Desktop/Sentiment_Analysis/
(sentiment_analysis) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$
```

- Note that I use the path of the folder I set up on my laptop as an example. Double-check you are in the correct project folder!

Step 5 (Running it on your laptop)

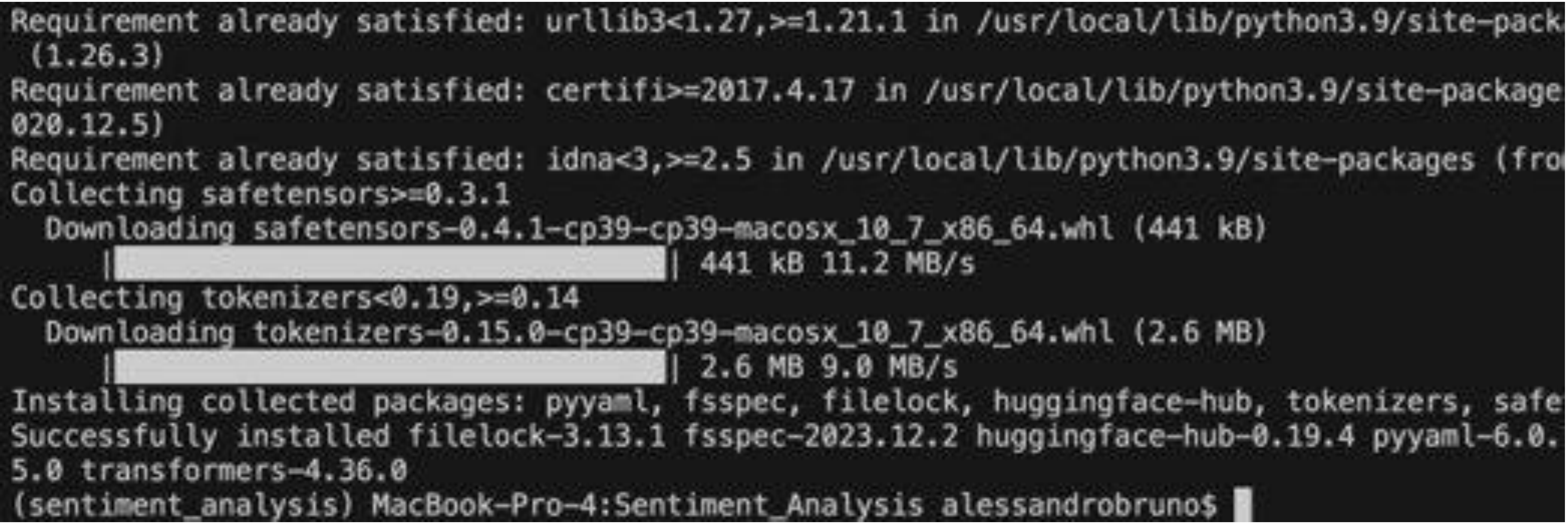
- Now, let's check out ChatGPT's instructions
- We need to configure the environment with two libraries: transformers and torch.
- We can do that on the terminal by using 'pip install name_of_library'
- In this case:
- **pip install transformers**
- **pip install torch**



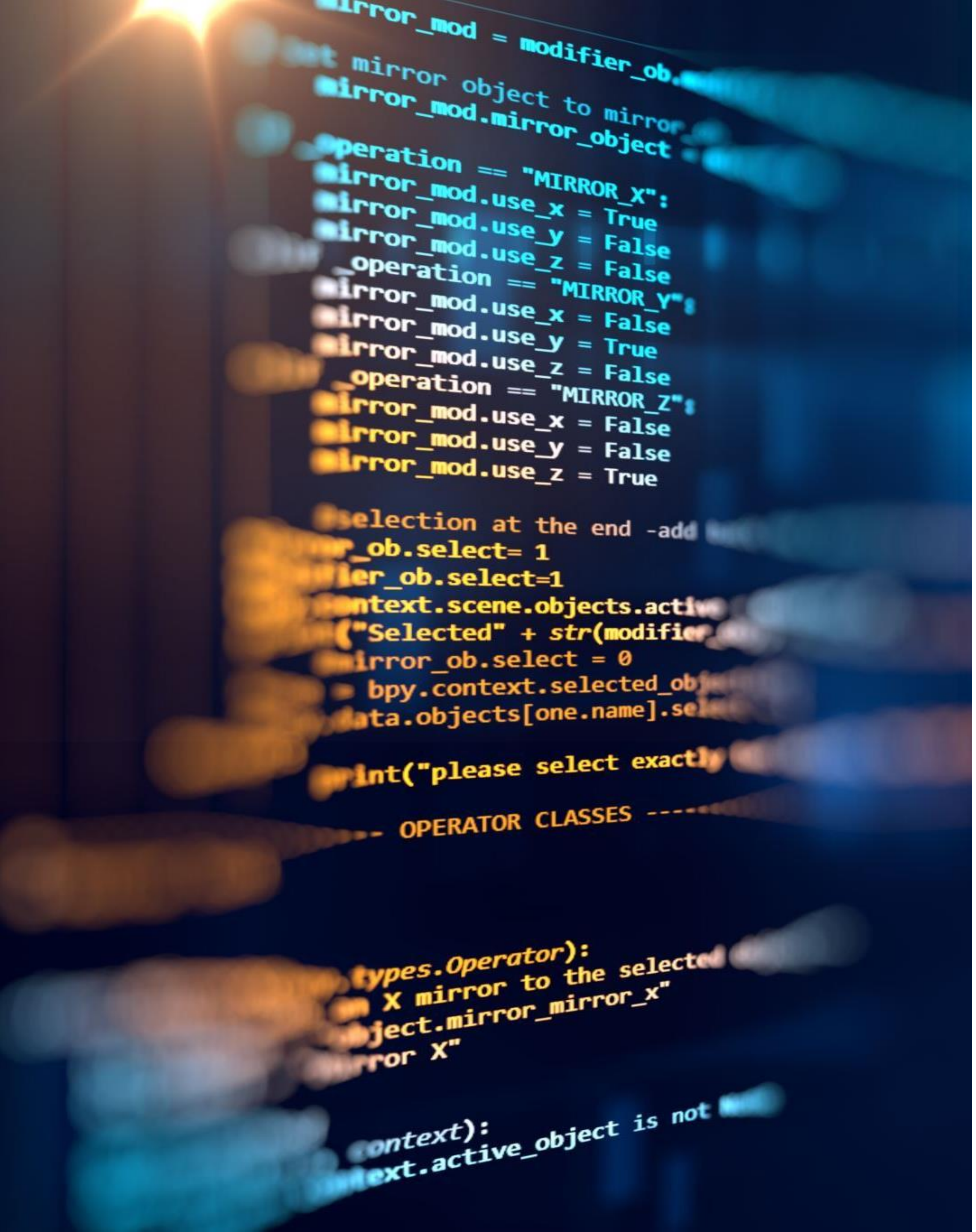
```
The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
(base) MacBook-Pro-4:~ alessandrobruno$ conda activate sentiment_analysis
(sentiment_analysis) MacBook-Pro-4:~ alessandrobruno$ cd /Users/alessandrobruno/Desktop/Sentiment_Analysis/
(sentiment_analysis) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$ pip install transformers
```

Step 5 (Running it on your laptop)

- If the environment is correcly configured you should see some lines rolling down on your terminal and some ending statements on the successful installation of the package. The procedure needs to be accomplished for both packages (transformers and torch).



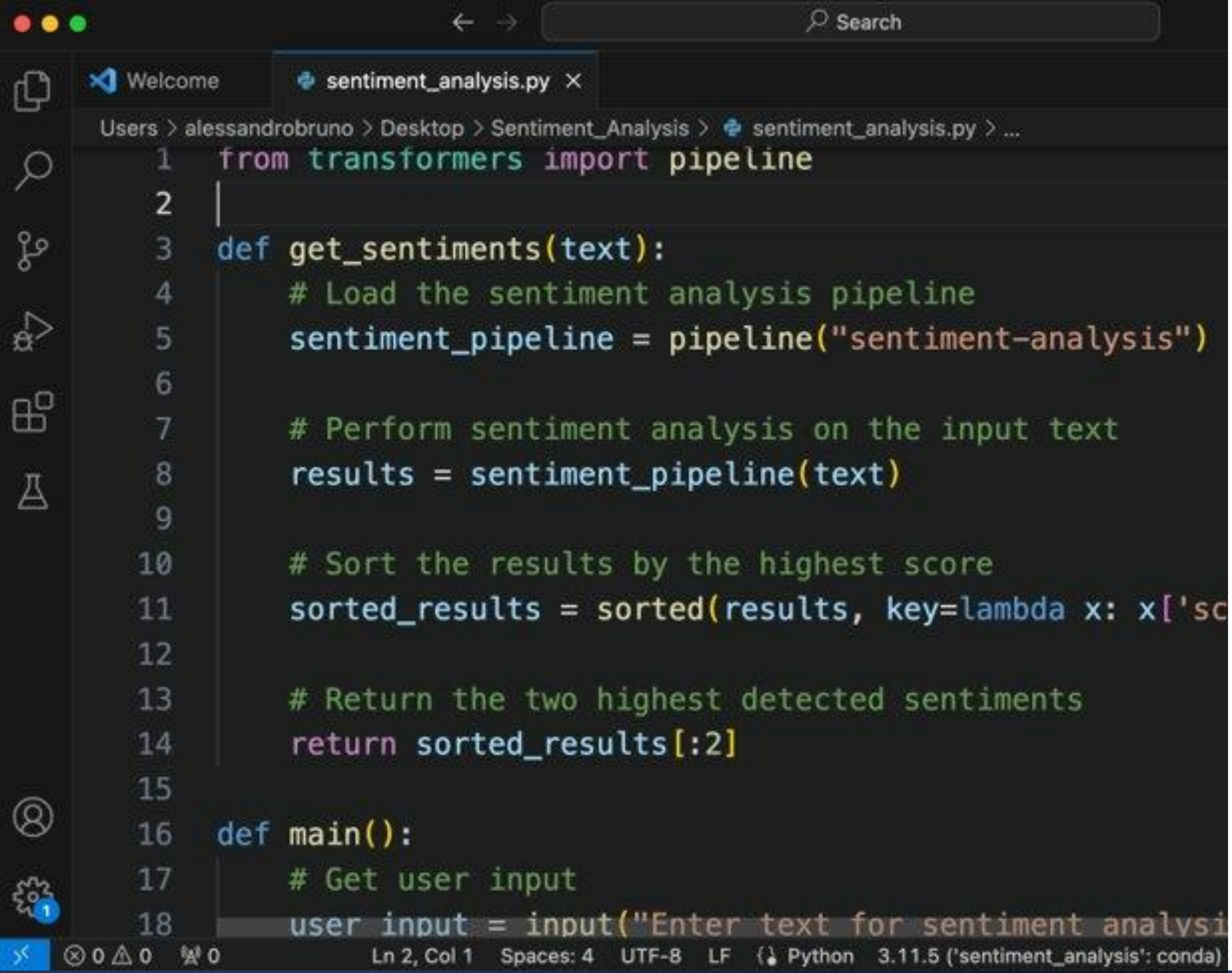
```
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.9/site-pack
 (1.26.3)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.9/site-package
020.12.5)
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.9/site-packages (fro
Collecting safetensors>=0.3.1
  Downloading safetensors-0.4.1-cp39-cp39-macosx_10_7_x86_64.whl (441 kB)
     |████████████████████████████████| 441 kB 11.2 MB/s
Collecting tokenizers<0.19,>=0.14
  Downloading tokenizers-0.15.0-cp39-cp39-macosx_10_7_x86_64.whl (2.6 MB)
     |████████████████████████████████| 2.6 MB 9.0 MB/s
Installing collected packages: pyyaml, fsspec, filelock, huggingface-hub, tokenizers, safe
Successfully installed filelock-3.13.1 fsspec-2023.12.2 huggingface-hub-0.19.4 pyyaml-6.0.
5.0 transformers-4.36.0
(sentiment_analysis) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$ █
```



Step 5 (Running it on your laptop)

- Everything is set and done with your environment:
  - Packages installed
  - Environment correctly configured on Anaconda Navigator
- Now, it is all about testing the example provided by ChatGPT.
- Copy and paste it in a new Python file in the **Project Folder**
- I set up a project folder named "**Sentiment_Analysis**" on my Desktop

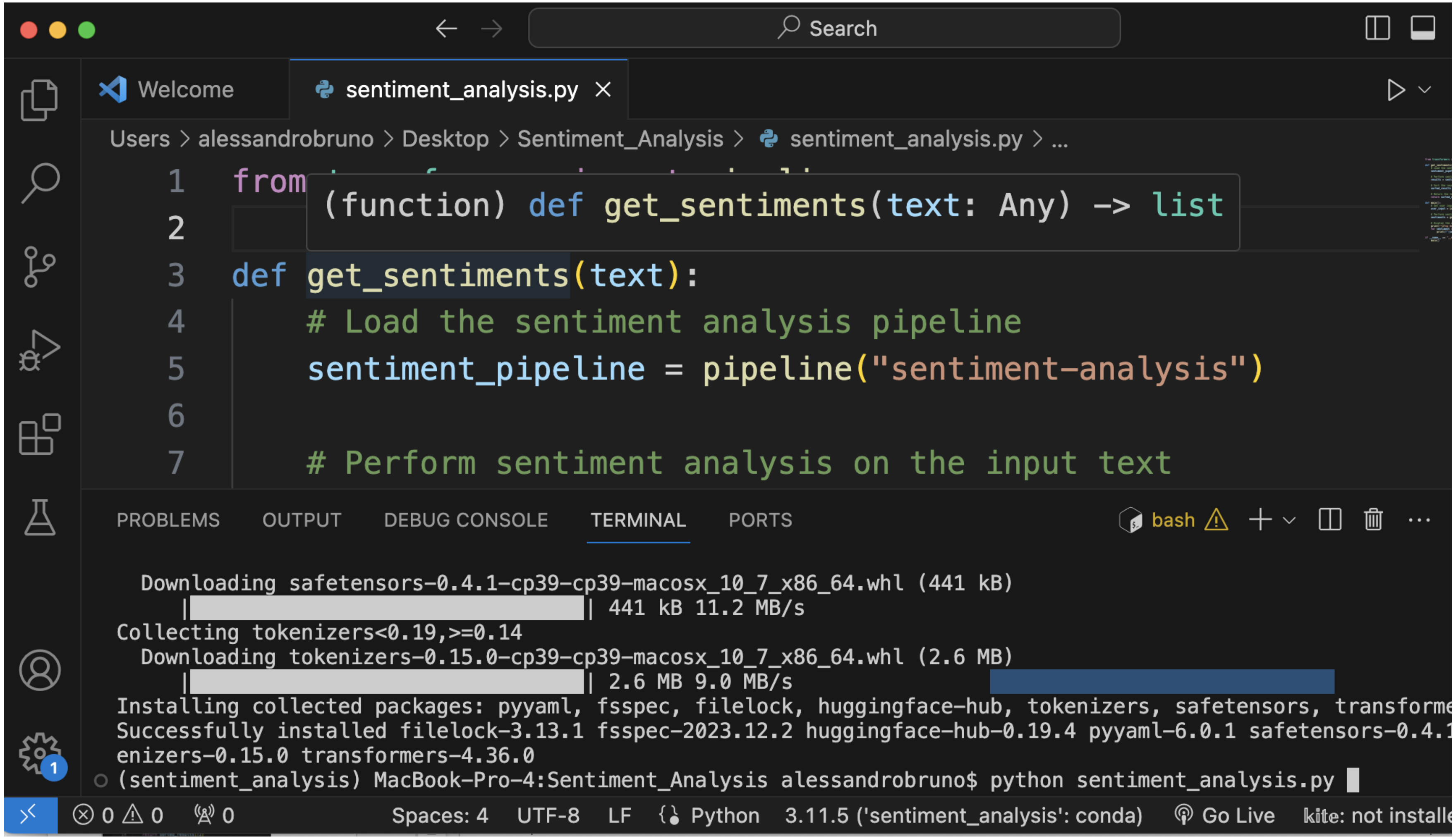
Step 5 (Running it on your laptop)


Search
Welcome
sentiment_analysis.py
Users > alessandrobruno > Desktop > Sentiment_Analysis > sentiment_analysis.py > ...
⊗ 0 ⚠ 0
0
Ln 2, Col 1
Spaces: 4
UTF-8
LF
{} Python
3.11.5 ('sentiment_analysis': conda)

```python
from transformers import pipeline

def get_sentiments(text):
    # Load the sentiment analysis pipeline
    sentiment_pipeline = pipeline("sentiment-analysis")

    # Perform sentiment analysis on the input text
    results = sentiment_pipeline(text)

    # Sort the results by the highest score
    sorted_results = sorted(results, key=lambda x: x['sc

    # Return the two highest detected sentiments
    return sorted_results[:2]

def main():
    # Get user input
    user_input = input("Enter text for sentiment analysi
```

- Here is the Python file saved as sentiment_analysis.py in the project folder
- Now, let's run it!

Step 5 (Running it on your laptop)



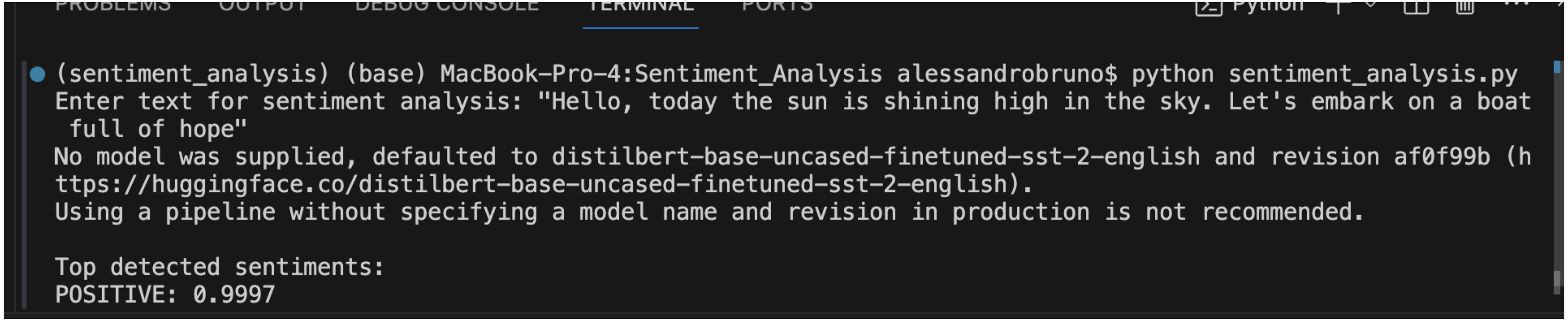
```
(function) def get_sentiments(text: Any) -> list
```

```
from

def get_sentiments(text):
    # Load the sentiment analysis pipeline
    sentiment_pipeline = pipeline("sentiment-analysis")

    # Perform sentiment analysis on the input text
```

```
  Downloading safetensors-0.4.1-cp39-cp39-macosx_10_7_x86_64.whl (441 kB)
     |████████████████████████████████| 441 kB 11.2 MB/s
Collecting tokenizers<0.19,>=0.14
  Downloading tokenizers-0.15.0-cp39-cp39-macosx_10_7_x86_64.whl (2.6 MB)
     |████████████████████████████████| 2.6 MB 9.0 MB/s
Installing collected packages: pyyaml, fsspec, filelock, huggingface-hub, tokenizers, safetensors, transforme
Successfully installed filelock-3.13.1 fsspec-2023.12.2 huggingface-hub-0.19.4 pyyaml-6.0.1 safetensors-0.4.1
enizers-0.15.0 transformers-4.36.0
(sentiment_analysis) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$ python sentiment_analysis.py
```

Option 1:
Type
python sentiment_analysis.py
on your terminal and press
enter

Running it on your laptop

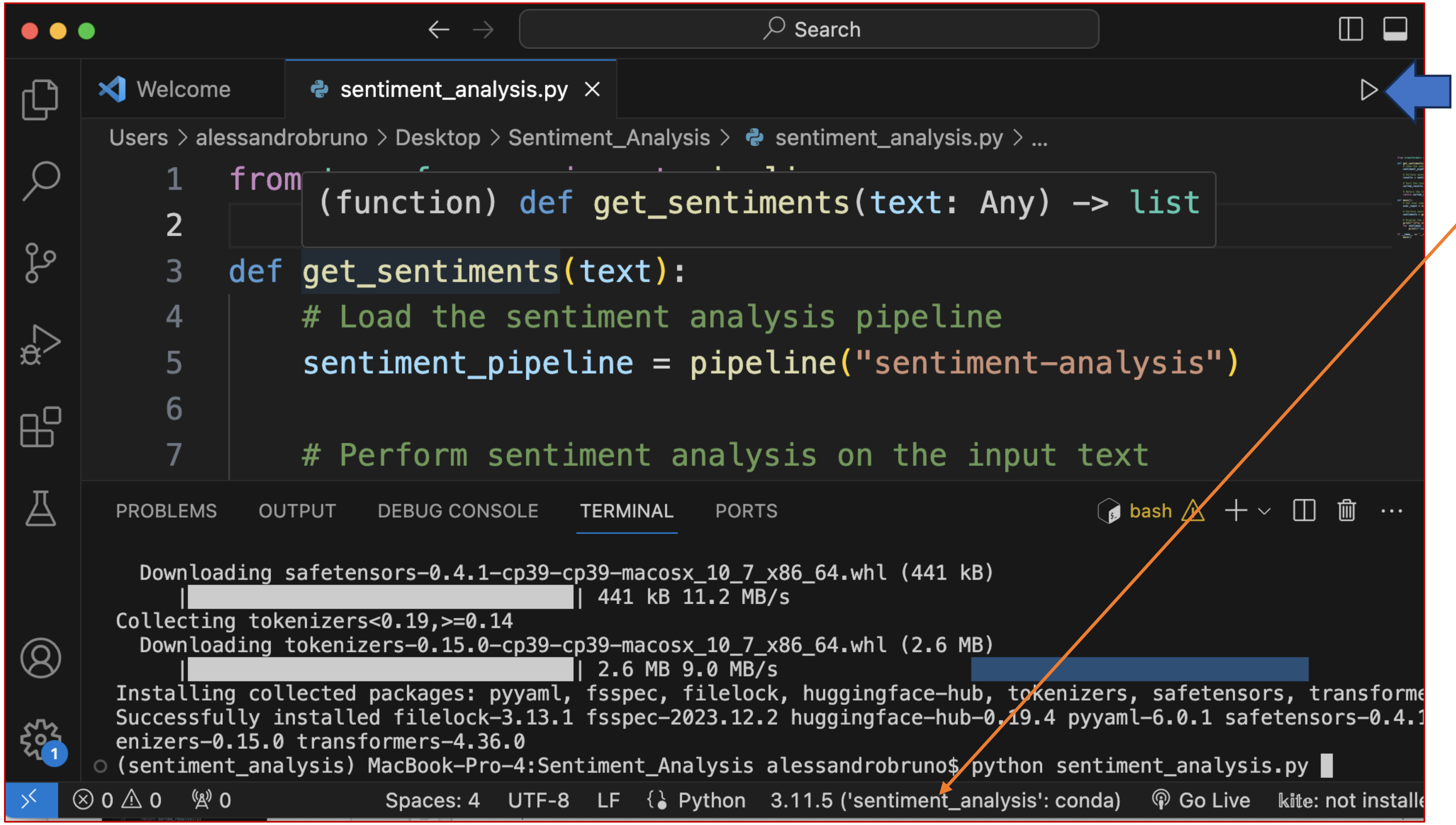


```
(sentiment_analysis) (base) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$ python sentiment_analysis.py
Enter text for sentiment analysis: "Hello, today the sun is shining high in the sky. Let's embark on a boat
 full of hope"
No model was supplied, defaulted to distilbert-base-uncased-finetuned-sst-2-english and revision af0f99b (h
ttps://huggingface.co/distilbert-base-uncased-finetuned-sst-2-english).
Using a pipeline without specifying a model name and revision in production is not recommended.

Top detected sentiments:
POSITIVE: 0.9997
```

The Python interpreter alerts us that we do not explicitly state a model for sentiment analysis. Therefore, it has defaulted to an available model for sentiment analysis on the statement I typed on the Terminal.

You can tell the program works well as the sentiment detected is 99% positive.

Step 5 (Running it on your laptop)



```
from
(function) def get_sentiments(text: Any) -> list

def get_sentiments(text):
    # Load the sentiment analysis pipeline
    sentiment_pipeline = pipeline("sentiment-analysis")

    # Perform sentiment analysis on the input text
```

```
  Downloading safetensors-0.4.1-cp39-cp39-macosx_10_7_x86_64.whl (441 kB)
     |████████████████████████████████| 441 kB 11.2 MB/s
Collecting tokenizers<0.19,>=0.14
  Downloading tokenizers-0.15.0-cp39-cp39-macosx_10_7_x86_64.whl (2.6 MB)
     |████████████████████████████████| 2.6 MB 9.0 MB/s
Installing collected packages: pyyaml, fsspec, filelock, huggingface-hub, tokenizers, safetensors, transforme
Successfully installed filelock-3.13.1 fsspec-2023.12.2 huggingface-hub-0.19.4 pyyaml-6.0.1 safetensors-0.4.1
enizers-0.15.0 transformers-4.36.0
○ (sentiment_analysis) MacBook-Pro-4:Sentiment_Analysis alessandrobruno$ python sentiment_analysis.py
```

Option 2:
Click on the "run" icon over here, which will use the interpreter configured in the current session of Visual Studio Code.
Be advised to DOUBLE-CHECK it to avoid any mismatch between your environment interpreter and interpreters for other projects.
If the interpreter is not the right one, click on it and pick the one from a dropdown menu.

Step 6 (Project Wrap-up)

Project Documentation

- README
- License
- Acknowledgment
- Project Folder (program files)

README file

- The README.md file is an indispensable asset for any GitHub repository, acting as a user-friendly guide that empowers individuals to effectively understand, utilize, and contribute to the project.
- By carefully crafting and maintaining a comprehensive README file, developers can enhance the project's visibility, adoption, and overall success.

README file of the project (Example)

- # Sentiment Analysis with Transformers
- This project demonstrates a simple sentiment analysis program using the Hugging Face Transformers library. It allows users to input text in the terminal, and the program returns the top two detected sentiments along with their scores.
- ## Getting Started
- ### Prerequisites
- Make sure you have Python installed on your machine. You can install the required packages using the following command:

-
  ```bash
- pip install transformers torch
  ```

README file of the project (Example)

- Installation

Clone the repository:

```
git clone https://github.com/your-username/sentiment-analysis.git
```

- Navigate to the project directory:

```
cd sentiment-analysis
```

- Usage

Run the script by executing the following command in the terminal:

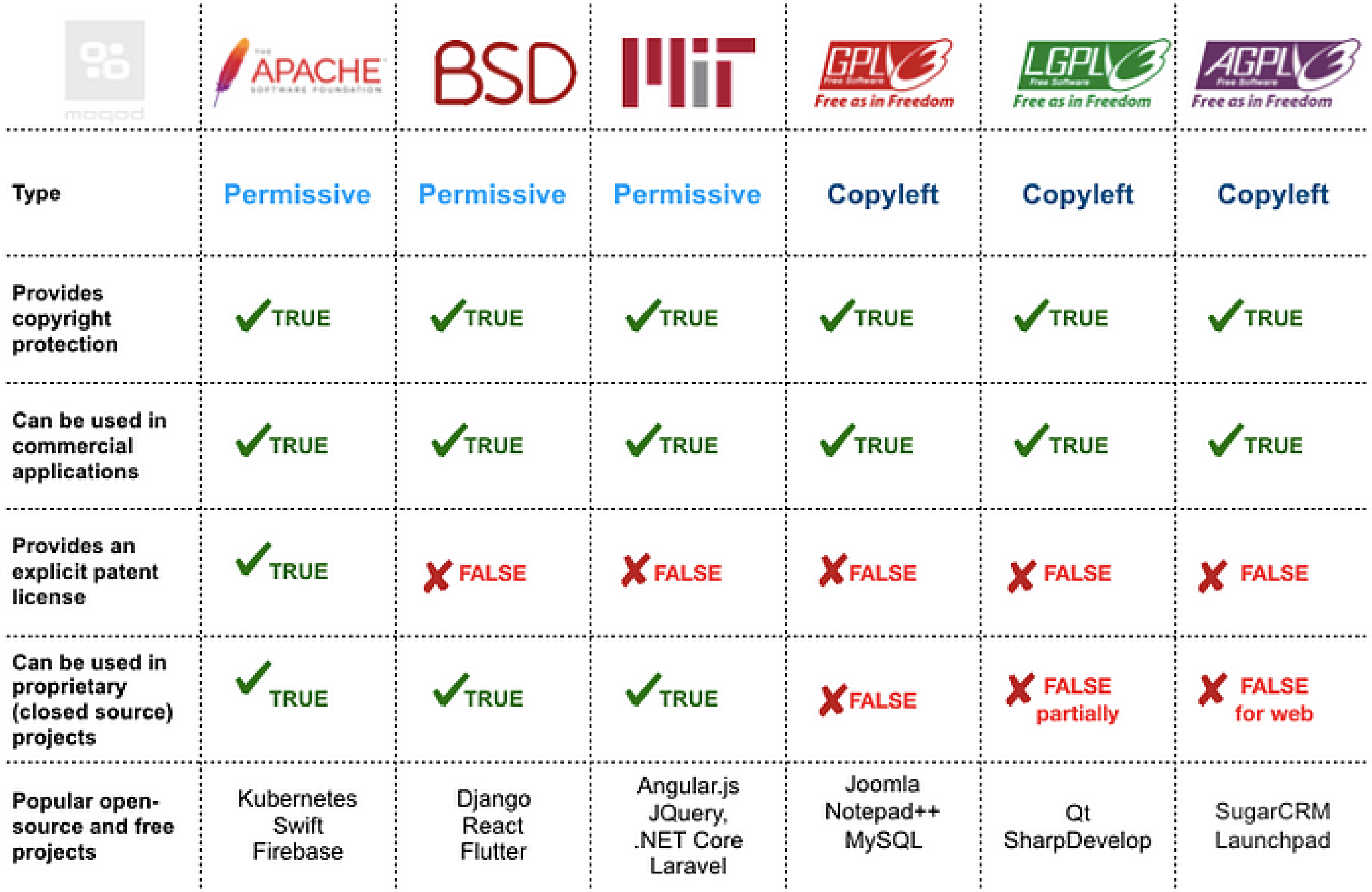
```
python sentiment_analysis.py
```

LICENSE

- Concerning the license, that's a matter you should dig in using the straightforward guidelines at the following link:
- https://choosealicense.com/
- Most of the time you will need to opt for a license regarding use, reproduction, commercialisation, liability and other legal and ethical aspects.
- The projcet you are going to deal with has only education purposes, therefore you can pick up the most permessive use license.
- However, reading the content of popular licenses such as MIT, and Apache 2.0.

Overview of GitHub licenses

- Credits: [Licenses on GitHub]()



moqod	APACHE	BSD	MIT	GPLv3	LGPLv3	AGPLv3
Type	Permissive	Permissive	Permissive	Copyleft	Copyleft	Copyleft
Provides copyright protection	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE
Can be used in commercial applications	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE	✓ TRUE
Provides an explicit patent license	✓ TRUE	✗ FALSE	✗ FALSE	✗ FALSE	✗ FALSE	✗ FALSE
Can be used in proprietary (closed source) projects	✓ TRUE	✓ TRUE	✓ TRUE	✗ FALSE	✗ FALSE partially	✗ FALSE for web
Popular open-source and free projects	Kubernetes Swift Firebase	Django React Flutter	Angular.js JQuery, .NET Core Laravel	Joomla Notepad++ MySQL	Qt SharpDevelop	SugarCRM Launchpad

Acknowledgement

Generally, you can acknowledge other people's work, projects, sources you find inspiring for your work in this document.

It is a sort of "Credits" section. Here is a an example:

Acknowledgement

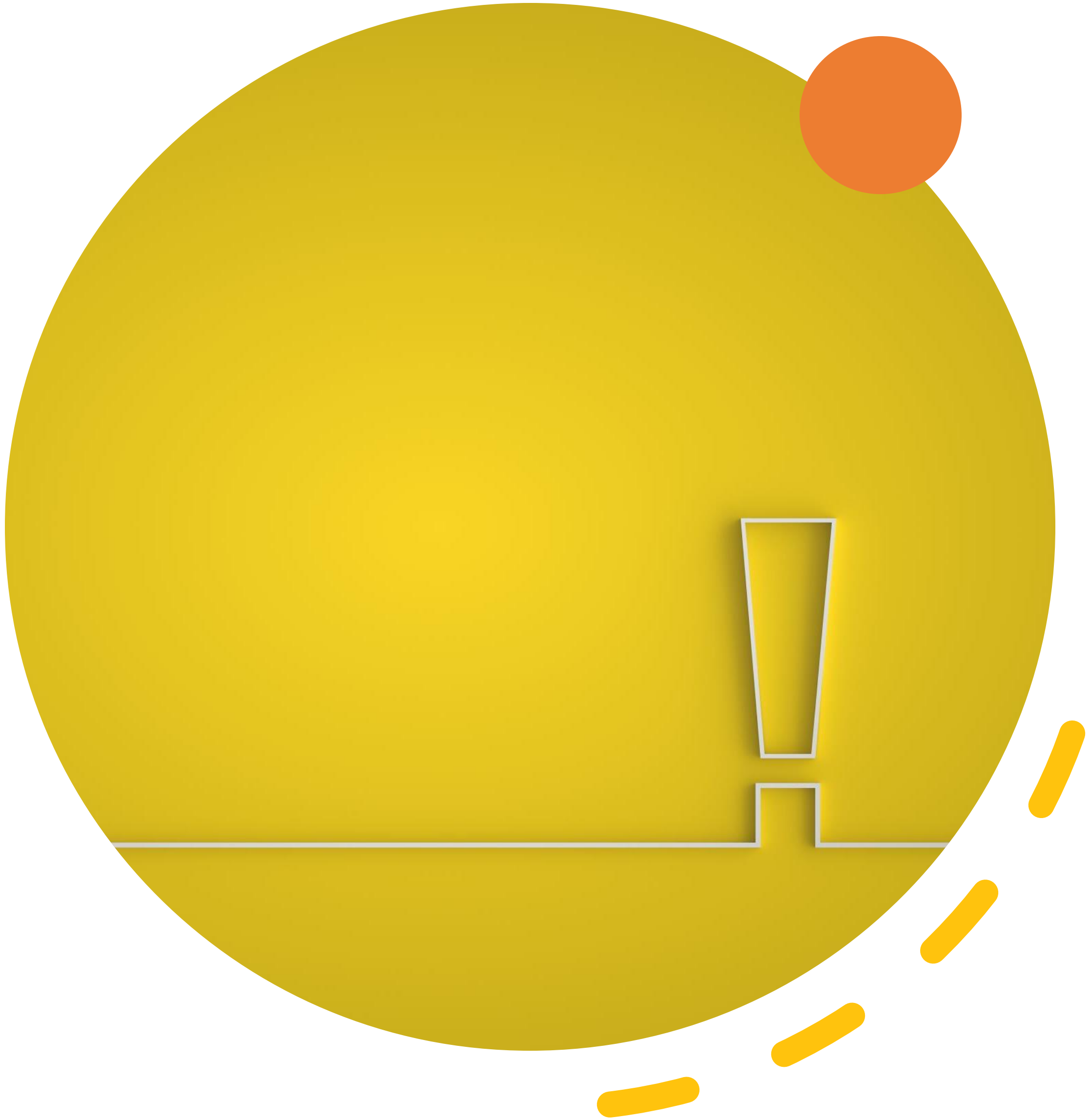
'The authors of the project acknowledge the platform "Kaggle.com". It has been broadly used to gather data for the project.

Regargind the authors' contribution, here is how we developed the project pipeline. (Use initials of full names to indicate each team member followed by the task he or she was involved in the project).
A.B. ran an extensive research over the Internet. M.M. checked out the project steps using Generative AI platforms such as ChatGPT. C.A. dealt with the code debugging using Visual Studio Code and ChatGPT. A.B. and M.M. wrapped up the code. C.A. wrote the documentation. All the team members worked along to upload the final version of the project to GitHub.

Step 7 (Project Delivery)

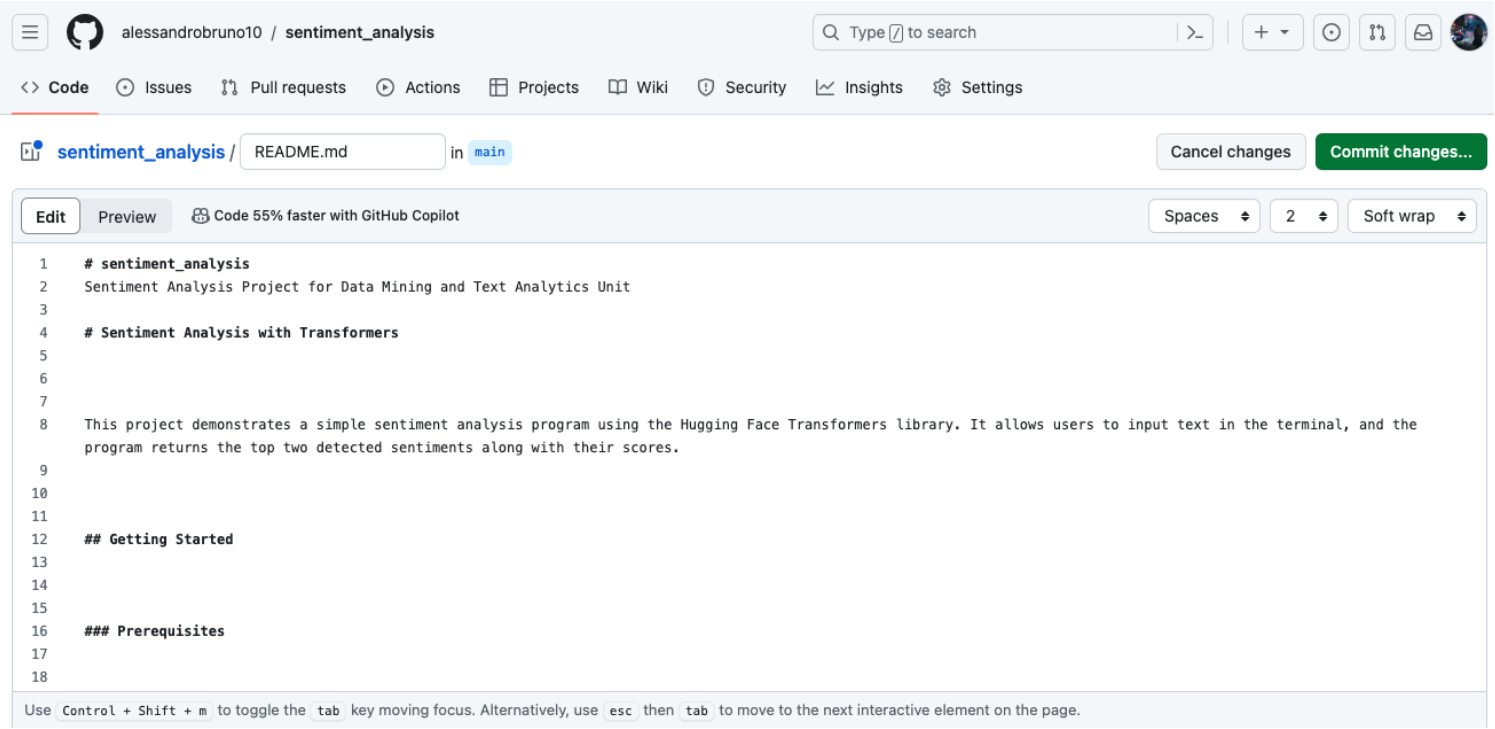
Upload to GitHub Repository

- A recap on the files to pack in the GitHub Repo:
- Project Files (python, libraries, datasets)
- README file
- LICENSE
- ACKNOWLEDGMENTS



GitHub Repo

- Set up your Project repo on GitHub
- If you need to edit your README file, you can do that accessing it making changes.
- Note that all changes need to be committed as shown below.

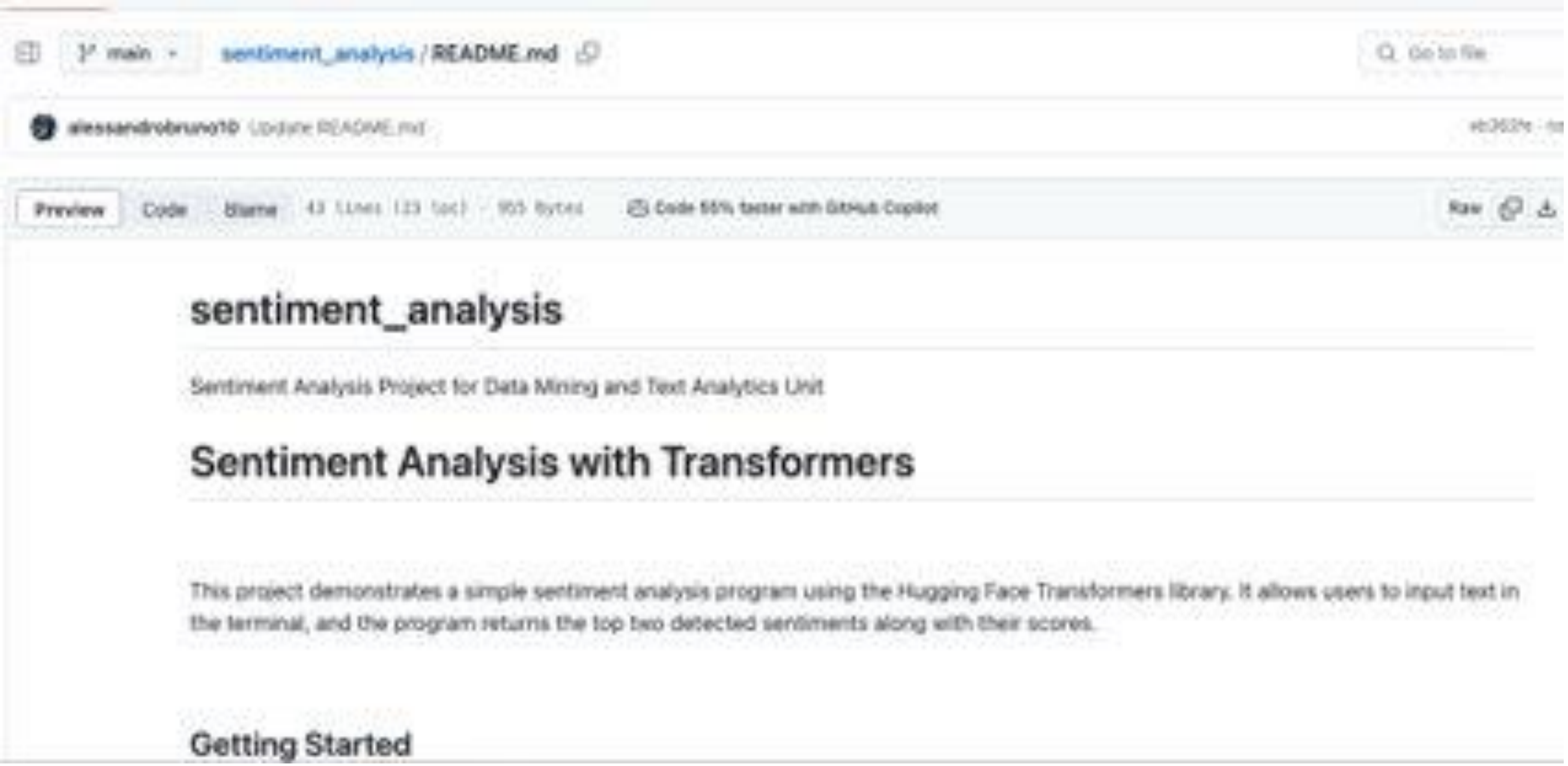


```
# sentiment_analysis
Sentiment Analysis Project for Data Mining and Text Analytics Unit

# Sentiment Analysis with Transformers



This project demonstrates a simple sentiment analysis program using the Hugging Face Transformers library. It allows users to input text in the terminal, and the
program returns the top two detected sentiments along with their scores.



## Getting Started



### Prerequisites


```

Use `Control + Shift + m` to toggle the `tab` key moving focus. Alternatively, use `esc` then `tab` to move to the next interactive element on the page.

Click over here after you make changes

README file after committing changes


main
sentiment_analysis / README.md
Go to file
alessandrobruno10 Update README.md
Preview
Code
Blame
43 Lines (33 loc) · 955 Bytes
Code 55% faster with GitHub Copilot
Raw

sentiment_analysis

Sentiment Analysis Project for Data Mining and Text Analytics Unit

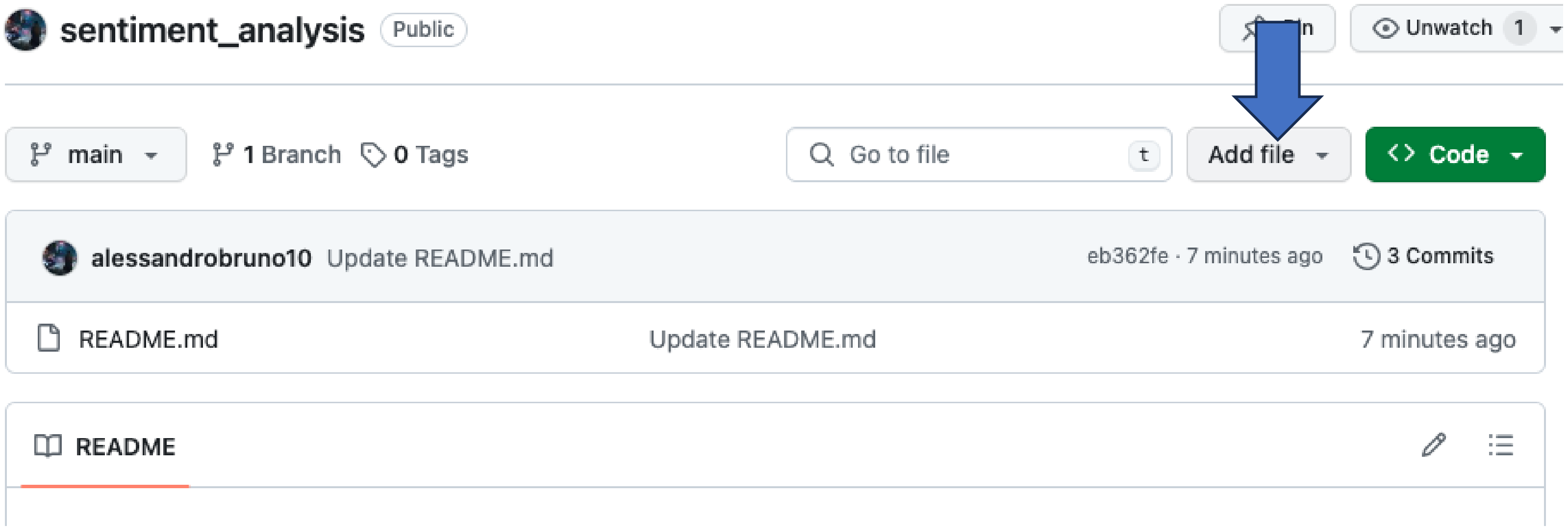
Sentiment Analysis with Transformers

This project demonstrates a simple sentiment analysis program using the Hugging Face Transformers library. It allows users to input text in the terminal, and the program returns the top two detected sentiments along with their scores.

Getting Started

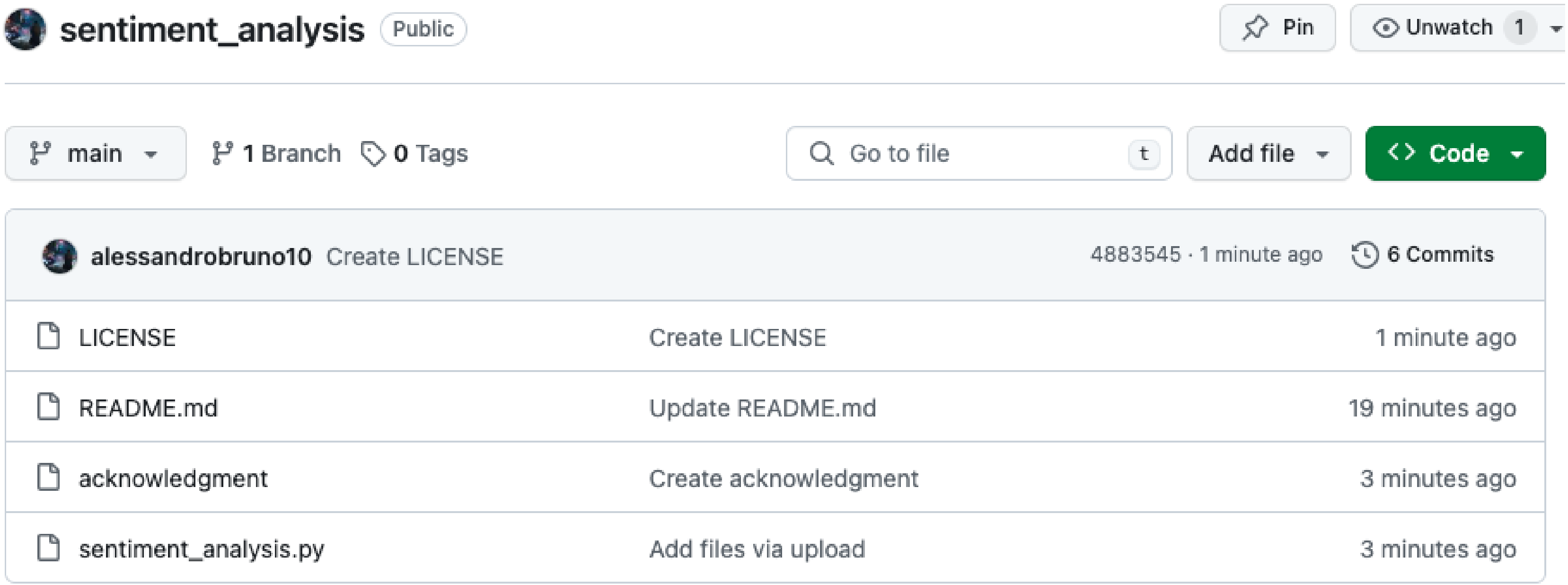
One approach for all files

- You can use the same approach for all documentation files.
- Make all edits you need to for your files and commit changes.
- Moreover, If you forget adding the Acknowledgment or other files, you can always upload it straight up to the branch of your GitHub repo.



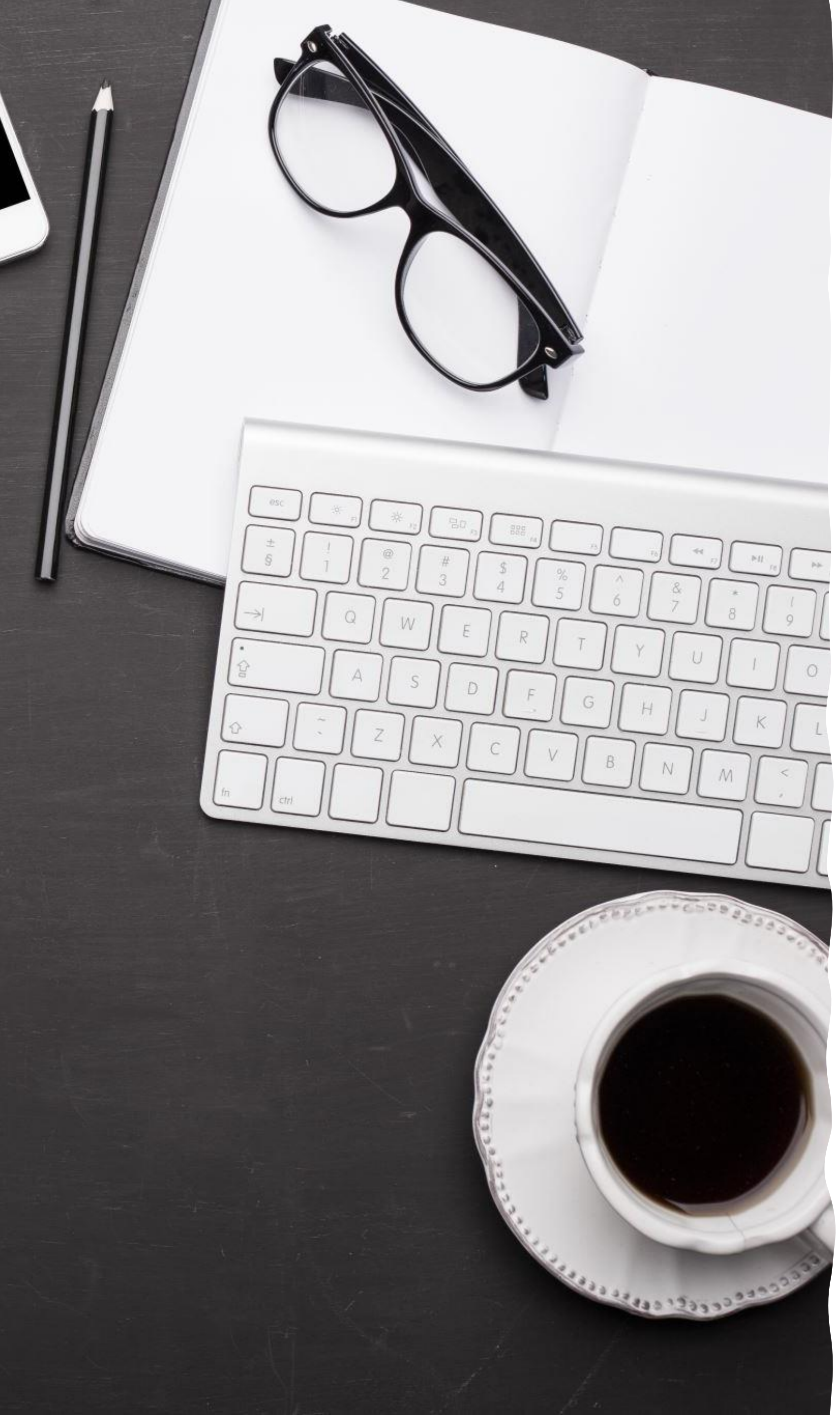
Final Release

- You can visit the GitHub repo at the following link and check out the final release of the project:
- https://github.com/alessandrobruno10/sentiment_analysis/



alessandrobruno10 Create LICENSE 4883545 · 1 minute ago 6 Commits

LICENSE	Create LICENSE	1 minute ago
README.md	Update README.md	19 minutes ago
acknowledgment	Create acknowledgment	3 minutes ago
sentiment_analysis.py	Add files via upload	3 minutes ago



What else?

- What should I use to present my Python project during the exam session?
  - Just bring your laptop with your project and configurations set and done for a quick demo.
  - Get your GitHub repo up-to-date
  - Each team member will be given 10 minutes to talk about the solution. No need for slide decks or pptx files.
  - You can describe the project by showing how it works locally on your laptop and how you wrapped it up on GitHub,

Running short of ideas for your project?
Check out the list on the righthand side

- Customer Churn Prediction
- Market Trends Analysis via regression
- Keywords Extraction from Documents
- Sentiment Analysis from Documents
- Topic Modeling
- Opinion Mining
- Recommendation Systems
  - Movies
  - Music genres
  - Items
- Virtual Chatbots
- Face Detection
- Object Detection
- Saliency Detection

Read it carefully!

- With coding it is easy to overcomplicate a project development especially when we add new interesting tasks to the orginal idea.
- There are way so many brilliant ideas that are worth coding.
- HOWEVER, My advice is: "Don't overdo it!"
- Pick up a project with simple tasks and try following the documentation you find over the Internet (you can also ask ChatGPT) and check whether things go smooth.
- Stick to a bottom-up approach, starting off with simple tasks.
- Then, try building up on what you already achieved.

Final thoughts

- If you feel like you are not sure about how to proceed or start off with your project, drop me a message at alessandro.bruno@iulm.it
- Brainstorming sessions can help to unleash our creativity or streamline projects and ideas.
- Remember: **we are here to learn!**