This Python script fetches coffee-related news articles, performs sentiment analysis, analyzes potential supply chain risks, and fetches weather data for various coffee-producing countries. The results are saved to CSV files for further analysis. Here's a breakdown of the key parts of the code:

**1. Imports and API Keys:**

* Various Python libraries such as time, openai, requests, pandas, and transformers are imported.
* API keys are set for OpenAI, OpenWeatherMap, and News API, allowing access to weather data, news articles, and OpenAI's GPT model.

**2. Sentiment Analysis Pipeline:**

* The script uses a sentiment analysis pipeline from Meta’s LLaMA (Facebook BART model) for text classification. It helps analyze whether the content of a news article has a positive, negative, or neutral sentiment.

**3. Weather Data Fetching:**

* The fetch\_weather\_data() function fetches weather information (temperature, weather description, wind speed, humidity) for a specific city using the OpenWeatherMap API.
* This function returns the weather data as a dictionary if the API call is successful.

**4. Fetching Coffee-related News:**

* The fetch\_coffee\_news() function queries the News API for coffee-related news articles, focusing on keywords like coffee production, export, crop, and related topics.
* The articles are filtered to ensure they are about coffee and from coffee-producing countries (Brazil, Vietnam, Colombia, etc.).
* The function returns the data as a pandas DataFrame.

**5. Sentiment Analysis:**

* The analyze\_sentiment() function uses the sentiment analysis pipeline to classify the sentiment of a given text (e.g., a news article).

**6. Risk Analysis:**

* The analyze\_risk() function uses OpenAI's GPT model to analyze whether a news article mentions any potential supply chain risks (e.g., disruptions, extreme weather, delays).
* The function returns the risk analysis and checks if any risk keywords (e.g., "storm," "delay," "damage") are present.

**7. Retry Logic:**

* The analyze\_sentiment\_and\_risk\_with\_retry() function ensures that sentiment and risk analysis are retried a few times in case of failures (e.g., rate limiting or temporary API issues).
* It retries up to 3 times with a 20-second delay between attempts.

**8. Processing News Articles:**

* The process\_and\_analyze\_sentiment\_and\_risk() function processes the fetched news articles by performing sentiment and risk analysis on each article's content.
* It creates a results list containing the analysis results (title, sentiment, risk analysis, and whether a risk was detected) and returns it as a DataFrame.

**9. Main Function:**

* In the main() function:
  + Coffee-related news is fetched and processed.
  + Weather data for a set of coffee-producing countries is fetched and stored.
  + The sentiment and risk analysis are performed on the news articles.
  + Results are saved as CSV files (sentiment\_and\_risk\_analysis\_results.csv and weather\_data.csv).
  + Risky articles (those that mention supply chain risks) are filtered and printed.

**10. Outputs:**

* **Sentiment and Risk Analysis Results:** Saved to a CSV file (sentiment\_and\_risk\_analysis\_results.csv), which includes article titles, sources, published dates, sentiment, risk analysis, and whether a risk was detected.
* **Weather Data:** Saved to a CSV file (weather\_data.csv), which includes weather information for each coffee-producing country.
* **Risky Articles:** A list of articles with potential supply chain risks is displayed in the console.

**Summary of Workflow:**

1. Fetch coffee-related news articles.
2. Perform sentiment analysis and risk analysis on each article.
3. Fetch weather data for coffee-producing countries.
4. Save sentiment, risk, and weather data to CSV files.
5. Print and save risky articles that mention potential supply chain risks.