**Lab Assignment #5 – Emerging Technologies, sustainability and responsibility as global citizens**

**Due Date**: Wednesday 12:30pm, Week 14.

**Purpose:** This assignment aims to:

* Examine the initiatives and responses of leading software companies concerning sustainability and their roles as global citizens.
* Utilize Generative AI APIs from platforms such as Gemini , OpenAI, or Llama to generate summaries of pertinent content.

**References:**

* [Microsoft's Environmental Sustainability](https://www.microsoft.com/en-us/corporate-responsibility/sustainability)
* [Microsoft's AI for Earth](https://www.microsoft.com/en-us/ai/ai-for-earth)
* [Amazon's Sustainability Initiatives](https://aws.amazon.com/about-aws/sustainability/)
* [Google's Sustainability Efforts](https://sustainability.google/)
* [OpenAI Platform Introduction](https://platform.openai.com/docs/introduction)
* [OpenAI API Reference](https://platform.openai.com/docs/api-reference/chat/object)
* <https://ai.google.dev/gemini-api/docs/api-key>
* <https://ollama.com/>
* <https://docs.llama-api.com/quickstart>
* <https://ai.google.dev/gemini-api/docs>

Be sure to read the following general instructions carefully:

* This assignment **may be completed in groups of 4-5 students**. You may use the same group as in the group project.
* Submit your findings using the assignment link on the eCentennial shell. Your file should be named “YourFullNameLab5”.
* Demonstrate the solution in class on the assigned date.
* List the names of all team members in your submission.

**Exercise 1**

In this assignment, you will study and discuss the impact of emerging software technologies on the environment and explore various sustainable solutions provided by top software makers/providers (Microsoft, Amazon, Google, Meta, etc.). You may use more references than those listed here. Submit a short report (2-3 pages). Use the GEMINI API (as demonstrated in Week 12 Part 1 lecture) or the OpenAI API to generate your answers/summary for at least one of the articles. Provide the JavaScript code.

(10 marks)

Group Members:

1 - \_Alberto Mcwhirter Javier\_\_\_\_\_\_\_\_\_\_

2 - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3 - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4 – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5 – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use the spaces below for both summaries:

**I. Impact of Emerging Technologies to the environment**

Provide one page summary of the most recent articles here.

**Summary:**

Emerging technologies, particularly data centers supporting cloud computing and artificial intelligence, have significant environmental impacts. A joint investigation by SourceMaterial and The Guardian revealed that tech giants like Amazon, Microsoft, and Google are establishing data centers in water-scarce regions, exacerbating local water shortages. These data centers require substantial water for cooling purposes. For instance, in Spain's arid Aragon region, new Amazon data centers could consume more electricity than the region's total current usage, diverting water needed for local agriculture. Despite claims of becoming "water positive" by 2030 through water offsetting, sustainability experts question the effectiveness of such strategies. Critics warn that the tech industry's growing water demand, compounded by climate change, risks ecological collapse and deprioritizes communities’ access to water. ​

Articles:  
[https://www.theguardian.com/environment/2025/apr/09/big-tech-datacentres-water?](https://www.theguardian.com/environment/2025/apr/09/big-tech-datacentres-water?utm_source=chatgpt.com)   
  
[https://www.polygon.com/news/455500/xbox-energy-saving-green-power?](https://www.polygon.com/news/455500/xbox-energy-saving-green-power?utm_source=chatgpt.com)   
  
https://www.microsoft.com/en-us/corporate-responsibility/sustainability/report

**2. Sustainable solutions provided by top Software makers**

Provide a one-page summary (generated by GEMINI, GPT-4, Llama 3) of the most recent articles here:

**Summary:**

Microsoft has been actively pursuing sustainability initiatives to mitigate its environmental impact. In its 2024 Environmental Sustainability Report, the company outlined progress towards becoming carbon negative, water positive, and achieving zero waste by 2030. Key strategies include reducing emissions, increasing renewable energy use, and advancing circularity. Additionally, Microsoft is investing in AI to accelerate sustainability solutions and empower customers and partners in their own sustainability journeys.

Articles:  
  
https://www.microsoft.com/en-us/corporate-responsibility/sustainability/report   
  
https://sustainabilityreports.com/reports/microsoft-corporation-2024-environmental-sustainability-report-pdf/

**Evaluation:**

|  |  |
| --- | --- |
| **Summary of articles on sustainability and environmental impact** |  |
| **Quality of summary** | 45% |
| **Relevance of articles** | 25% |
| **Use of summarizer (GEMINI, OpenAI, or Llama)** | 15% |
| **UI for running the summarizer and displaying results** | 15% |
|  |  |
| **Total** | **100%** |

**Additional Guidance:**

* + Include any recent links and articles related to the environmental initiatives of software makers to ensure your findings are up-to-date.
  + Provide process documentation (in the README file) explaining how you implemented the summarizer, selected articles, and tested the solution.
  + Collaborate effectively within your group to divide tasks and ensure a cohesive submission.
  + Ensure the README file includes clear instructions for running your summarizer code and UI.