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

Due Date: Sunday midnight, Week 14.

Purpose: The purpose of this assignment is to:

* Study the work/response of Software makers to sustainability and responsibility as global citizens.

References: <https://www.microsoft.com/en-us/corporate-responsibility/sustainability>

<https://www.microsoft.com/en-us/ai/ai-for-earth>, <https://aws.amazon.com/about-aws/sustainability/>, <https://sustainability.google/>

https://platform.openai.com/docs/introduction

<https://platform.openai.com/docs/api-reference/chat/object>

Be sure to read the following general instructions carefully:

- This assignment may be completed in **groups of 5 students**. You could use the same group as in group project.

- Submit your findings using the assignment link on eCentennial shell. You file name should be named “YourFullNameLab5”.

- List the names of all team members

**Exercise 1**

In this assignment you will **study and discuss** the impact of software emerging technologies to the environment and various sustainable solutions provided by top Software makers/providers (Microsoft, Amazon, Google, etc.) You may use more references than listed here. Submit a short report (2-3 pages). Use **BERT** (as in Week12Part1 lecture example) or **OpenAI API**  **to generate your answers/summary for at least one of the articles**. Provide the JavaScript code.

(10 marks)

Group Members:

1 - Alley Chaggar

2 - Ali Khaleel

3 - Brandon Occhiuzzi

4 - Shane Stroud

5 - Ming Jie Wang

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.

To tackle the first part of your assignment regarding the impact of emerging technologies on the environment, we'll gather information from reputable sources on how technologies developed by major software companies impact sustainability. We'll focus on topics such as energy consumption, resource utilization, and ecological footprints.

### Summary: Impact of Emerging Technologies on the Environment

Emerging technologies, especially in the software and IT sectors, significantly impact the environment through direct and indirect channels. Direct impacts stem from the physical infrastructure required to support technologies, including data centers and network systems, which consume large amounts of energy and water. For instance, data centers not only require vast amounts of energy to power servers but also need extensive cooling systems to prevent overheating, leading to high water usage.

Indirect impacts include the production and disposal processes associated with technology. The lifecycle of electronic devices often involves the extraction of rare minerals, which can lead to deforestation, loss of biodiversity, and soil contamination. Furthermore, e-waste, a byproduct of rapid technological advancement, poses significant challenges in waste management due to the hazardous substances contained in electronic devices.

Companies like Microsoft, Google, and Amazon are increasingly aware of these impacts and are taking steps to mitigate them. They invest in renewable energy projects, improve energy efficiencies with better data center designs, and commit to zero-waste policies for their products and operations. For example, Google has been carbon-neutral since 2007 and aims to operate on carbon-free energy 24/7 by 2030. Similarly, Microsoft has committed to being carbon negative by 2030, and Amazon has pledged to meet the Paris Agreement objectives by 2040, a decade ahead of schedule.

These initiatives are crucial as they set a precedent for the industry, highlighting the responsibility of tech companies as global citizens to not only innovate but also ensure that their innovations do not come at the expense of environmental sustainability.

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

Provide one page summary (generated by a BERT summarizer) of the most recent articles here:

Microsoft's sustainability efforts are focused on reducing carbon emissions and fostering biodiversity through innovative cloud solutions and AI technologies. Their initiatives include AI for Earth, which aids researchers in addressing key environmental challenges.

Google has achieved carbon neutrality in its operations and is pioneering the development of AI to optimize energy use in its data centers, significantly reducing their environmental impact.

Amazon's AWS is committed to reaching 100% renewable energy by 2025 for its data centers. Their sustainability efforts include improving energy efficiency, investing in renewable energy projects, and utilizing sustainable materials in construction.

These summaries reflect how each company is addressing sustainability in their operations and future goals, demonstrating a commitment to environmental responsibility.

const axios = require('axios');

const OpenAI = require('openai-api');

// Your OpenAI API key

const OPENAI\_API\_KEY = 'your-api-key-here';

const openai = new OpenAI(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);

// URLs to fetch content from

const urls = [

'https://www.microsoft.com/en-us/corporate-responsibility/sustainability',

'https://www.microsoft.com/en-us/ai/ai-for-earth',

'https://aws.amazon.com/about-aws/sustainability/',

'https://sustainability.google/'

];

async function summarizeContent(url) {

try {

const response = await axios.get(url);

const content = response.data; // This would be more complex in real usage, needing HTML parsing

// Summarize content using OpenAI

const summaryResponse = await openai.complete({

engine: 'davinci',

prompt: `Summarize this content: ${content.slice(0, 2000)}\n`, // Reduce content slice as needed

maxTokens: 150,

temperature: 0.3,

topP: 1.0,

frequencyPenalty: 0.5,

presencePenalty: 0.0,

stop: ["\n"]

});

return summaryResponse.data.choices[0].text.trim();

} catch (error) {

console.error(`Failed to fetch or summarize content from ${url}: ${error}`);

return `Error summarizing content from ${url}`;

}

}

async function createOnePageSummary() {

const summaries = await Promise.all(urls.map(url => summarizeContent(url)));

const finalSummary = summaries.join('\n\n');

console.log(finalSummary);

return finalSummary;

}

createOnePageSummary();

**Evaluation:**

| **Summary of articles on sustainability and environmental impact** |  |
| --- | --- |
| **Quality of summary** | 25% |
| **Relevance of articles** | 25% |
| **Use of summarizer** | 25% |
| **UI for running the summarizer and displaying results** | 25% |
|  |  |
| **Total** | **100%** |