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Web Application Development

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CO2 Emissions

Introduction

The 2030 Agenda for Sustainable Development, adopted by the United Nations, is a global framework that fosters social, environmental, and economic sustainability. This agenda addresses global challenges such as poverty, inequality, and climate change. One of the key goals within this framework is to reduce pollution, particularly the environmental impact of transportation. This project creates a website that raises awareness about pollution caused by vehicle emissions, specifically in Mexico. The website empowers citizens by providing critical information to make more sustainable transportation choices and advocate for better public policies.

Objectives

The primary objective of this project is to educate the public about the environmental impact of personal vehicles. The website presents data on CO2 emissions and pollution levels caused by transportation, specifically personal cars, enabling users to visualize the direct effects of their daily commuting choices. Another key goal is to empower citizens to act by advocating for cleaner transportation policies and improvements to public transportation systems in Mexico. Ultimately, the website bridges the gap between global Sustainable Development Goals (SDGs) and local actions, providing an interactive and accessible way for people to engage with sustainability efforts.

Target Audience

The website primarily targets the public in Mexico, with the possibility of expanding to other countries, focusing on urban areas that experience significant pollution. It also serves government officials and non-governmental organizations (NGOs) that may use the data for policy development and advocacy. Educators and students interested in sustainable urban mobility and climate change will also benefit from the educational resources available on the site.

Functional Requirements

The website consists of several key features. The home page introduces users to the purpose of the site and explains the UN 2030 Agenda objectives being addressed. It provides a general overview of pollution caused by transportation.

The website features a Pollution Timelapse Map, which displays pollution levels for each state in Mexico over time. This map uses the OpenLayers API for rendering, with historical data sourced from INEGI's database. Users can click on different states to explore the number of cars registered in each state.

In addition to the maps, the website offers graphs that show the map information in a more digestible format. The homepage also includes tips for reducing vehicle use and promoting cleaner transportation alternatives.

Technical Requirements

The website is developed using HTML, CSS, and JavaScript to create a dynamic user experience. It uses interactive elements like clickable graphs powered by ChartJS. For the backend, the website integrates OpenLayers to provide the map functionality, and the INEGI Database for vehicle statistics and historical pollution data.

The website is responsive, ensuring it is easily accessible and user-friendly on both desktop and mobile devices. CSS Flexbox or Grid is used to ensure that all elements adapt to different screen sizes.

UI/UX Design

The design prioritizes user interaction, with clear navigation that makes it easy for visitors to explore the different sections of the site. Interactive elements, like clickable states and dynamic maps, keep users engaged and allow them to easily access the data.

Accessibility is a key consideration, and the website is designed to ensure that text contrasts well with the background for easy reading. Additionally, all images and interactive elements include alt-text and descriptions to ensure the website is accessible to users with disabilities.

Data Flow and User Journey

Upon arriving on the home page, users are introduced to the website's purpose and the specific SDG it addresses. From there, they navigate to the main interactive feature.

The Pollution Timelapse Map allows users to click on different states in Mexico and see pollution levels over time, sourced from INEGI's database. Users explore the environmental impact of their daily transportation choices and see which areas are most affected highlighting them with red color.

Potential Challenges and Risks

Another risk is the integration of the APIs, as ensuring smooth communication between the website may present technical challenges. Ensuring that the data is displayed accurately. While developing the Page we had slow response time from the server and some data from INEGI has years with strange data which is inconsistent with the adjacent years.

Conclusion

This project raises awareness about the environmental impact of transportation and empowers citizens to make informed decisions about their daily commutes. By providing interactive maps, the website helps users visualize the consequences of their transportation choices and encourages them to advocate for cleaner, more sustainable policies. This initiative aligns with the goals of the 2030 Agenda for Sustainable Development, particularly SDG 11: Sustainable Cities and Communities, and seeks to promote a cleaner, healthier urban environment in Mexico.