**PROJECT BOOKLET**

|  |  |
| --- | --- |
| Team Number | SIH28 |
| Name of Team Leader | Niraj Vishwas Jadhav |
| Name of Team Members | 1. Aditya Ashok Kachare  2. Aatmaja Mandar Joshi  3. Niraj Vishwas Jadhav  4. Zeenat Imtiyaz Mujawar  5. Sanket Sunil Walhekar  6. Aniket Dadaso Metkari |
| Name of Mentor | 1. Mrs. Vinita Bhandiwad  2. Mrs. Shruti Agrawal |

|  |
| --- |
| **Project Title:**  E-Waste Facility Locator |
| **Abstract:**  The rise of electronic devices in modern society has led to a growing concern regarding electronic waste (e-waste) management. This project presents the development of an EcoTrace, a technological solution designed to address the challenges associated with the disposal and recycling of electronic waste.  The EcoTrace is a user-friendly web application (website) that empowers individuals and businesses to easily identify nearby e-waste collection centers, recycling facilities, and responsible disposal options. Leveraging geolocation services, the app provides real-time information on the closest disposal points, complete with details on acceptable items, operating hours, and contact information.  This project not only aims to promote environmentally responsible e-waste management but also raises awareness about the environmental and health hazards of improper disposal practices. Additionally, it contributes to the global efforts in achieving sustainable development goals related to waste reduction and responsible consumption.  The EcoTrace project exemplifies the potential of technology to promote sustainability and environmental consciousness by facilitating the proper disposal and recycling of electronic waste. Through this project, we aspire to foster a sense of responsibility among users and encourage a more sustainable approach to managing electronic waste, ultimately contributing to a cleaner and healthier environment. |
| **Objectives and Proposed Approach:**  Objectives:  1. Facilitate E-Waste Disposal: The primary objective of the EcoTrace website is to provide a user-friendly platform for individuals and businesses to easily locate nearby e-waste disposal and recycling facilities.  2. Raise Awareness: Create awareness about the environmental and health impacts of improper e-waste disposal and educate users about the importance of responsible recycling.  3. Promote Sustainable Practices: Encourage users to adopt sustainable practices by providing information on recycling options, refurbishment, and donation of electronic devices.  Proposed Approach:  1. User-Friendly Interface: Design a user-friendly and intuitive website interface that allows users to easily search for nearby e-waste facilities based on their location, type of electronic waste, and other relevant criteria.  2. Geolocation Integration: Implement geolocation services to enable users to automatically find the nearest e-waste disposal options, making the process as convenient as possible.  3. Educational Resources: Provide informative content about the environmental impact of e-waste, the benefits of responsible disposal, and guidelines for safe and secure data removal from electronic devices.  4. Continuous Improvement: Continuously update and improve the website based on user feedback, technological advancements, and changes in e-waste management practices to ensure its effectiveness and relevance.  By following this approach, the E-Waste Locator website can effectively address the objectives of promoting responsible e-waste management, raising awareness, and supporting sustainability efforts in the e-waste sector. |
| **Novelty or USP:**  EcoTrace's Unique Selling Proposition (USP) are:  1. Precise Location Services: EcoTrace allows users to pinpoint their exact location and find nearby e-waste disposal centers, providing a practical and convenient solution for responsible e-waste disposal.  2. Facility Locator with Integrated Map: The integrated map feature makes it easy for users to visualize and access information about e-waste disposal centers in their vicinity, enhancing the user experience.  3. Interactive Quizzes: The platform engages users with interactive quizzes that test their knowledge about e-waste. This feature promotes awareness and knowledge about the issue.  4. Fascinating Facts: EcoTrace goes beyond basic information by offering users interesting and insightful facts about e-waste and its significance, making the learning experience engaging.  5. User-Friendly Design: The website's user-friendly design ensures that users can easily navigate and access its features, creating a positive and seamless user experience.  6. Environmental Awareness: By educating users about the environmental impact of e-waste and providing practical solutions for its disposal, EcoTrace contributes to raising awareness and driving positive change. |
| **Background:**  The background for EcoTrace is rooted in the following key factors:  1. E-Waste Crisis: The proliferation of electronic devices has led to a significant increase in e-waste production globally. Improper disposal of e-waste poses environmental and health risks due to the toxic materials contained in electronic devices.  2. Lack of Awareness: Many individuals and businesses are unaware of the proper methods for disposing of e-waste. This lack of awareness results in e-waste being discarded inappropriately, contributing to pollution and resource wastage.  3. Environmental Impact: E-waste contains hazardous substances such as lead, mercury, and cadmium, which can contaminate soil, water, and air if not handled and disposed of correctly. Addressing the environmental impact of e-waste is crucial for sustainability.  4. Need for Convenient Solutions: There is a need for a user-friendly and accessible solution that helps people locate e-waste disposal centers, understand the environmental consequences of improper disposal, and incentivize responsible recycling.  In response to these challenges, EcoTrace was created with the primary goal of providing a practical and informative platform to promote responsible e-waste disposal and raise awareness about the environmental impact of e-waste. It leverages location services, educational content and interactive quizzes to encourage users to take action and make informed decisions regarding their e-waste. The platform aims to empower individuals and businesses to contribute to a cleaner and more sustainable environment by effectively managing their electronic waste. |
| **Solution Designed or Approach to solve the problem:**  To create an EcoTrace website that utilizes Google Maps to locate e-waste facilities, we took the following structured approach.  1. User-Friendly Website Interface:   * Develop a user-friendly and intuitive website with a clean, responsive design that works well on both desktop and mobile devices. * Ensure an easy-to-navigate interface that guides users to find e-waste facilities quickly.   2. Google Maps Integration:   * Integrate Google Maps API to display a map on the website. * Use geolocation services to identify the user's current location.   3. Search and Direction Functionality:   * Implement a search functionality that uses their device's GPS coordinates to find nearby e-waste facilities. * Provide Range functionality for the users to refine their search by selecting the radius of distance within which they want to search the E-Waste Facility centers. * Provide direction functionality so that the users can easily navigate to the desired E-waste facility center using the map itself.   4. Information Display:   * Display facility markers on the map to show the location of e-waste facilities. Each marker should include key information, such as the facility's name and a brief description. * When a user clicks on a marker, provide detailed information about that facility, including name, address, contact information.   5. Educational Resources:   * Include informative content about e-waste, its environmental impact, recycling guidelines, and the importance of responsible disposal. * Offer resources on how to securely erase data from electronic devices before disposal.   6. Credit point allocation:   * The user will be allocated Credit points or vouchers or coupons that can be used in real world transactions to purchase items. * This credits points will be generated based on the amount of E-waste disposed by the user. * This Credit point generation should motivate the user to do safe and appropriate e-waste disposal.   7. Integrating external Blogs, News and Publications:   * External Blogs, News and Publications or Articles are added to provide awareness about E-waste management and detriments of e-waste on environment. * These blogs can be static that are manually updated or can be dynamically updated through APIs. |
| **Use Cases if any:**  The E-Waste Locator website can serve a variety of use cases, benefiting both individual users and organizations involved in e-waste management.  1. Individual E-Waste Disposal: Individuals looking to dispose of their old electronics: Users can search for the nearest e-waste collection centers or recycling facilities to safely and responsibly dispose of their electronic devices.  2. Business E-Waste Management: Businesses seeking e-waste disposal solutions: Companies can use the website to locate e-waste recycling facilities that can handle large quantities of electronic waste generated by their operations.  3. Educational Resource: Students and researchers: educational institutions and researchers can use the website as a resource for information about e-waste, its environmental impact, and recycling best practices.  4. Environmental Awareness: Environmental awareness can be spread about e-waste and its consequences using the website as a tool to educate others and promote responsible disposal practices.  5. E-Waste Awareness Campaigns: Non-profit organizations and government initiatives: These entities can collaborate with the website to promote e-waste awareness campaigns and encourage responsible disposal practices. |
| **Technology Stack:**   1. Front-end:  * HTML/CSS: For structuring and styling the website's user interface. * JavaScript\*: For interactive features, such as maps, quizzes, and user interactions. * Bootstrap: For responsive design and layout components to ensure the website is mobile-friendly.  1. API:  * Google Maps API: To integrate the map feature for locating e-waste disposal centers.  1. Authentication and Security:  * HTTPS: To ensure secure data transmission and protect user privacy.  1. Content Management:  * Content Management System (CMS): For managing and updating articles, educational content, and quizzes.  1. Version Control:  * Git/GitHub: For version control and collaboration among developers.  1. Development Tools:  * Code Editor (e.g., Visual Studio Code): For writing and debugging code.  1. Responsive Design:  * CSS Media Queries: To ensure the website's responsiveness across various screen sizes and devices.   This technology stack provides the foundation for developing EcoTrace's core features, including location services, educational content, quizzes, and user interactions, without considering potential future scope features. It's designed to deliver a user-friendly and informative experience for individuals and businesses looking to responsibly manage their e-waste. |
| **Block Diagram and Explanation (in case of Hardware project):** |
| **Algorithm and Flowchart:**  Algorithm:  Step 1: Input  1.1. Gather the user's current location (latitude and longitude) through GPS or user input.  Step 2: Data Preparation  2.1. Load the google map Api by which the map will be loaded on the page.  2.2. Define a maximum search radius to limit the search results.  Step 3: Output  3.1. Present the user with a list of e-waste recycling facilities, including their names, addresses, contact information, and distance from the user's location.  3.2. Display the results on a map with markers for each facility.  3.3. Allow the user to select a facility for more details or directions.  Step 4: Error Handling  4.1. Handle potential errors, such as inability to access the user's location, database loading issues, or network connectivity problems.  4.2. Provide clear error messages and guidance on how to resolve them.  Step 5: User Interaction  5.1. Allow the user to adjust the search radius if they want to expand or narrow down their search.  5.2. Offer options for filtering results based on geographical range.  Step 6: Direction Display  6.1. Once the user clicks on the desired E-waste Facility pin/marker directions to that location should be displayed on the map itself for navigation.  Step 7: Additional Details of the E-waste Facility  7.1. When the user clicks on the E-waste Facility pin/marker the details of the location should be displayed in the Location Information table which should include Name, Address and Phone Number.  7.2 Information of single location should be displayed.  Step 8. Direction Change facility  8.1. Users should be able to change the E-waste Facility whenever they wish and the directions for the same should be changed accordingly.  8.2. New directions should be calculated and displayed on the map and the information of the newly selected location should be displayed in the table.  Step 9. Additional Features  9.1. Users should be able to play/answer trivia questions about E-waste management and environmental detriment of E-waste.  Flowchart:  User enters the EcoTrace Website  Check if the location permission is granted  **No**    Ask the user for location access permission  **granted**  **Yes granted**  Collect the coordinates and Show the Current Location of the user on map  **Not granted**  Current location of the user will not be displayed  User clicks on desired location marker  Calculate the distance between the user location and selected marker  Display the shortest route between the user and selected location on map |
| **References:**  <https://youtu.be/aFelEcWBqII?si=NpEl0hBhCx7GwqQ9>  <https://youtu.be/xPRoykeA4Hw?si=GmuZMA-AndLmB8CR>  <https://youtu.be/OGTG1l7yin4?si=ikhlABkC4mr2tBYb>  <https://developers.google.com/maps/documentation/javascript/reference> |