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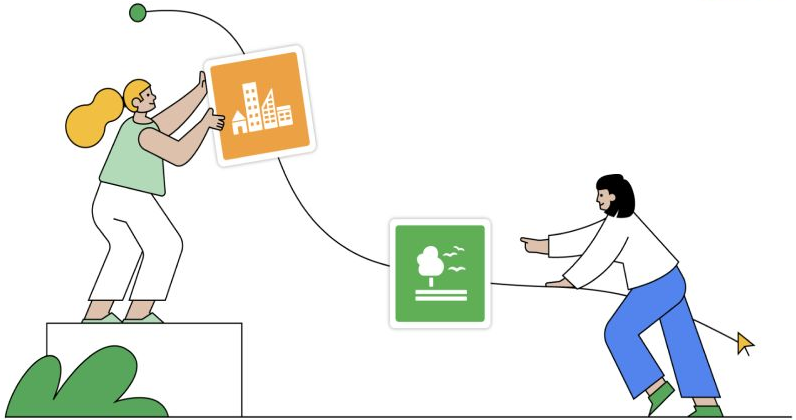
Solution Challenge

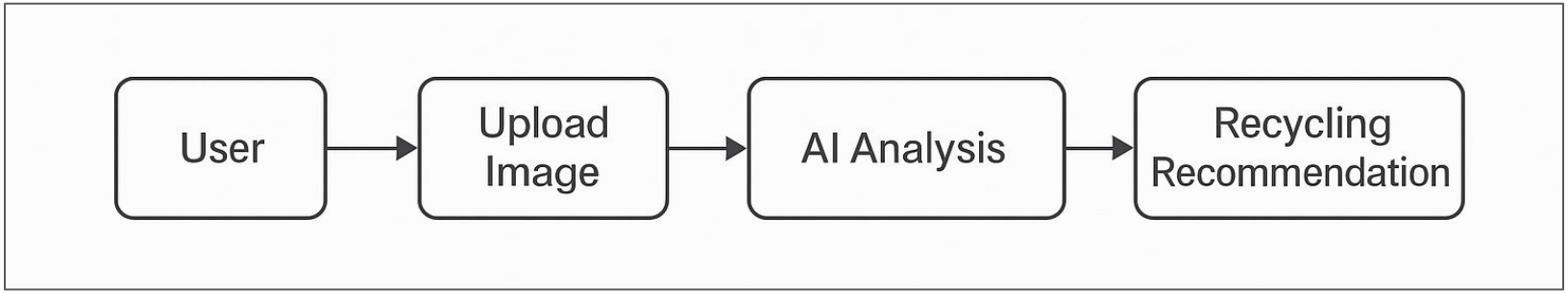


Team Details

a. Team name: Hades' Hackers
b. Team leader name: Ramprakash R
c. Problem Statement: The Growing Crisis of E-Waste

EcoScan - AI-Powered E-Waste Management

- **AI-Based Identification:** Users upload an image of e-waste, analyzed by **Google's Gemini API** to recognize the item and determine its reusability or recyclability.
- **Smart Recommendations:** Based on analysis, EcoScan suggests whether to **repair, reuse, recycle, or dispose** of the item responsibly.
- **Location-Based Recycling Centers:** If recycling is recommended, users get a **list of nearby recycling centers** based on their location.
- **User-Friendly Web Application:** Accessible from any device with a simple interface for easy e-waste management.



Opportunities

a) How is EcoScan Different from Existing Ideas?

🔹 **Bringing E-Waste Management to Everyday Users** – Unlike existing solutions focused on industrial waste, EcoScan is **designed for individuals**. Anyone can take a picture of an old electronic device at home and receive **personalized recommendations** on whether to **reuse, repair, recycle, or dispose of it safely**.

🔹 **Simplified & AI-Driven Approach** – Many existing solutions use **complex methodologies** for assessing usability, making them **inaccessible to common users**. EcoScan, powered by **Google Gemini API**, provides **instant, easy-to-understand insights** on e-waste.

🔹 **Seamless Integration with Google Maps** – Most projects **lack direct user assistance** in locating **recycling centers**. EcoScan **automatically finds nearby e-waste collection centers** based on the user's location, ensuring a **hassle-free recycling process**.

🔹 **A Unique Fusion of AI & Location Intelligence** – The combination of **AI-driven waste classification and real-time mapping for recycling** is a **new approach** that does not currently exist in mainstream e-waste management solutions.

b) How Will EcoScan Solve the Problem?

- **Educates Users** – Analyzes e-waste with **Google Gemini API** and provides insights on reusability, recyclability, and value.
- **Encourages Responsible Actions** – Offers **clear, step-by-step guidance** on **repairing, reusing, or recycling** e-waste.
- **Highlights E-Waste Profitability** – Many don't realize e-waste **holds value**. EcoScan educates users on how **repairing, recycling, or selling** old electronics is **more beneficial than discarding them**.
- **Reduces Landfill Waste** – Connects users to **nearby recycling centers**, ensuring proper disposal and minimizing environmental harm.
- **Promotes Sustainability** – Encourages a **circular economy** by **maximizing e-waste utility** and reducing improper disposal.

c) Unique Selling Proposition (USP) of EcoScan

🌍 **AI-Powered Smart E-Waste Classification** – Uses advanced AI for real-time analysis.
📍 **Location-Based Recycling Assistance** – Finds the nearest recycling centers instantly.
💡 **User-Friendly & Accessible** – No need for an app; works directly through a website.
♻️ **Encourages Repair & Reuse** – Suggests alternatives before disposal, reducing waste.

List of features offered by the solution:

i) AI-Powered E-Waste Recognition

EcoScan uses Google's Gemini API to analyze uploaded images and identify the type of electronic waste. It evaluates its condition and determines whether it can be reused, repaired, recycled, or safely disposed of.

ii) Personalized Smart Recommendations

Based on the analysis, EcoScan provides tailored advice to users on the best course of action—be it reusing, repairing, recycling, or discarding the item in an eco-friendly way.

iii) Nearby Recycling Center Locator

The platform fetches the user's location and integrates with Google Maps to display nearby certified recycling centers or local drop-off points.

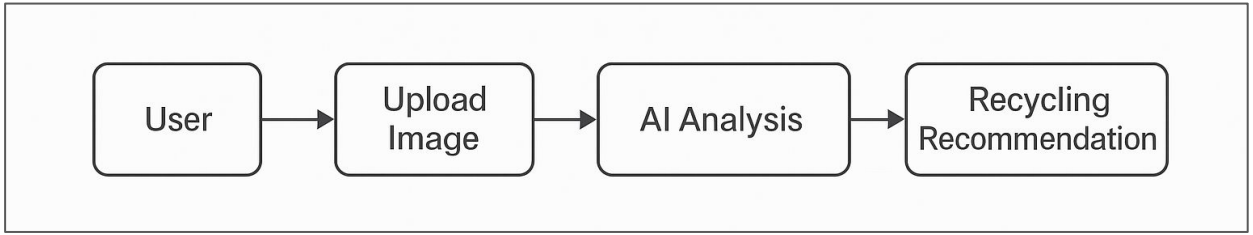
iv) Web-Based and User-Friendly

EcoScan is fully web-based, requiring no installation. It works smoothly on both mobile and desktop browsers, making it easily accessible to all users.

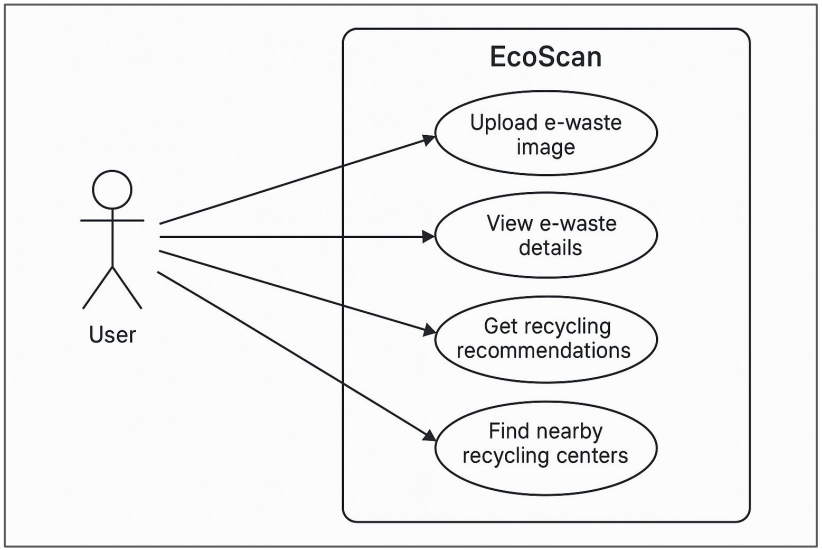
v) Sustainability & Awareness

The platform promotes sustainable practices by educating users on the environmental impact of e-waste and encouraging a circular approach to electronics usage.

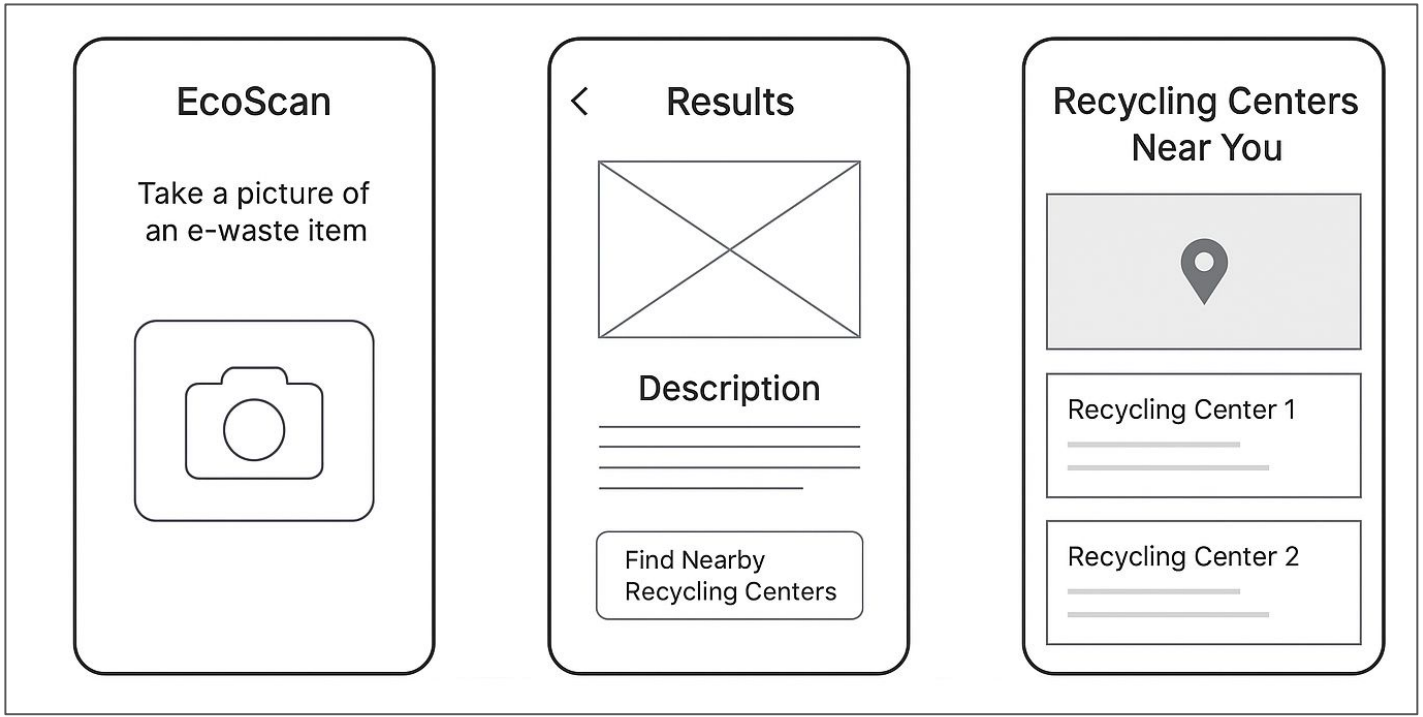
Process flow diagram:



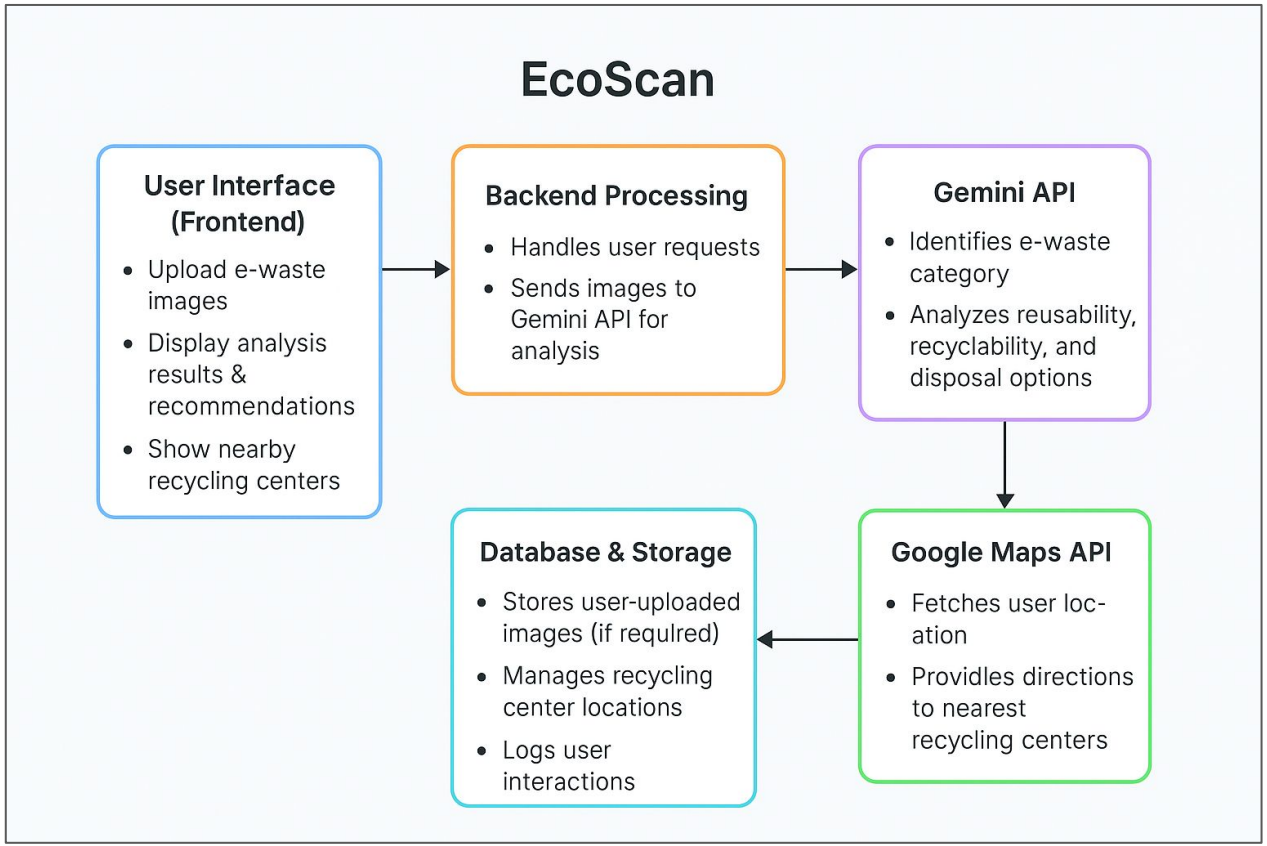
Process Use Case diagram:



Wireframes/Mock diagrams of the proposed solution:



Architecture diagram of the proposed solution



Technologies Used:

🖥️ **Frontend:**

- **HTML, CSS, JavaScript** – For a responsive web interface.

⚙️ **Backend & AI Processing:**

- **Python (Flask/Django)** – Handles API requests.
- **Google Gemini API** – Recognizes e-waste and provides insights.

🗺️ **Location & Navigation:**

- **Google Maps API** – Finds nearby recycling centers.

☁️ **Cloud & Deployment:**

- **Google Cloud / IDX** – For hosting and backend management.

✨ **Extra Points:**
✅ **Built on Google IDX**
✅ **Uses Google Gemini API**

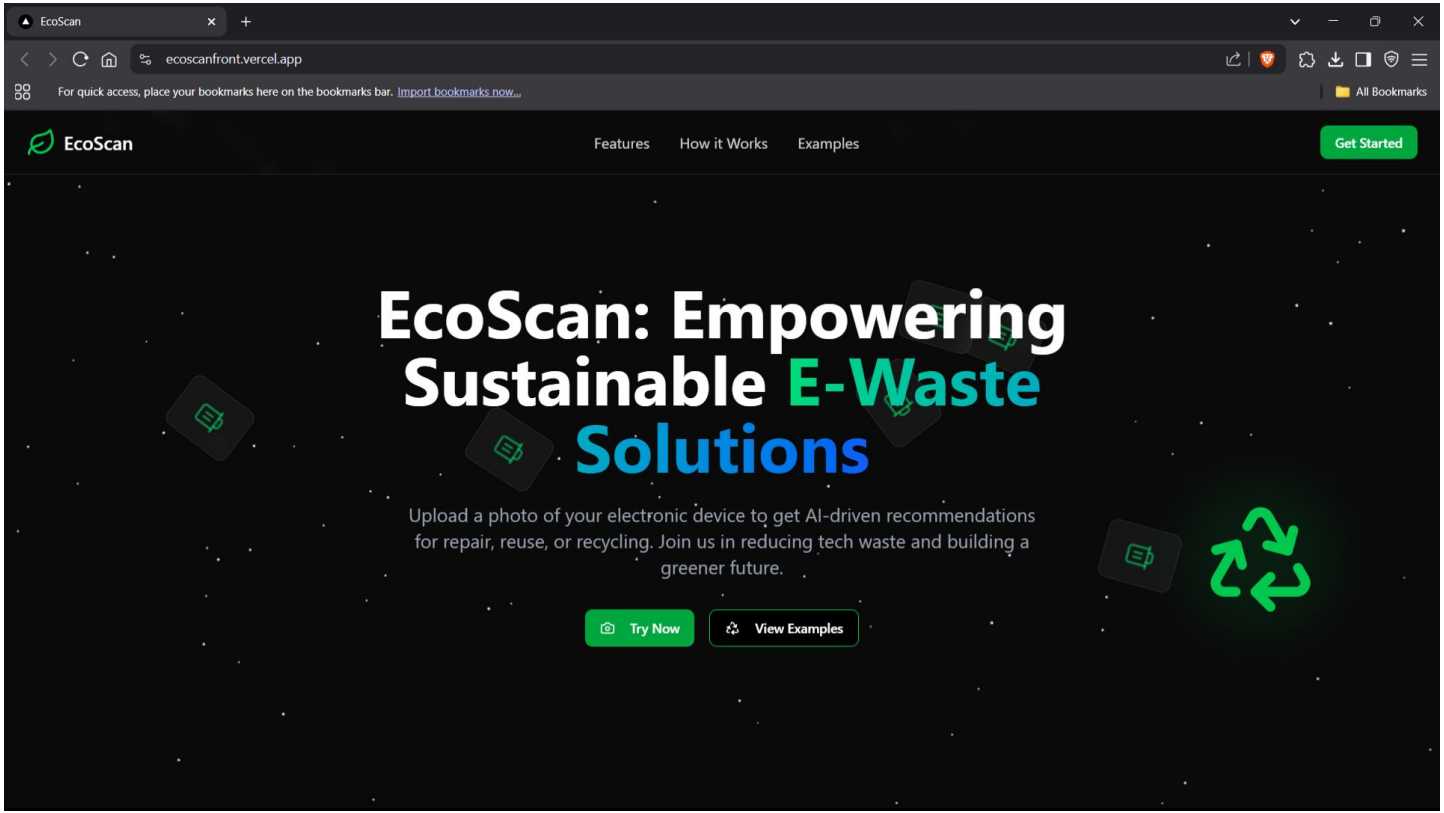
Estimated implementation cost:

💰 **Cost Breakdown:**

- **Google Gemini API** – Free access available; Pro models may require payment.
- **Cloud Storage** – Needed to store scanned images and history.
- **Hosting & Maintenance** – Charges vary based on the chosen cloud platform.

✅ **Overall, EcoScan is cost-effective, with expenses mainly for advanced AI access, storage, and hosting.**

Snapshots of the MVP



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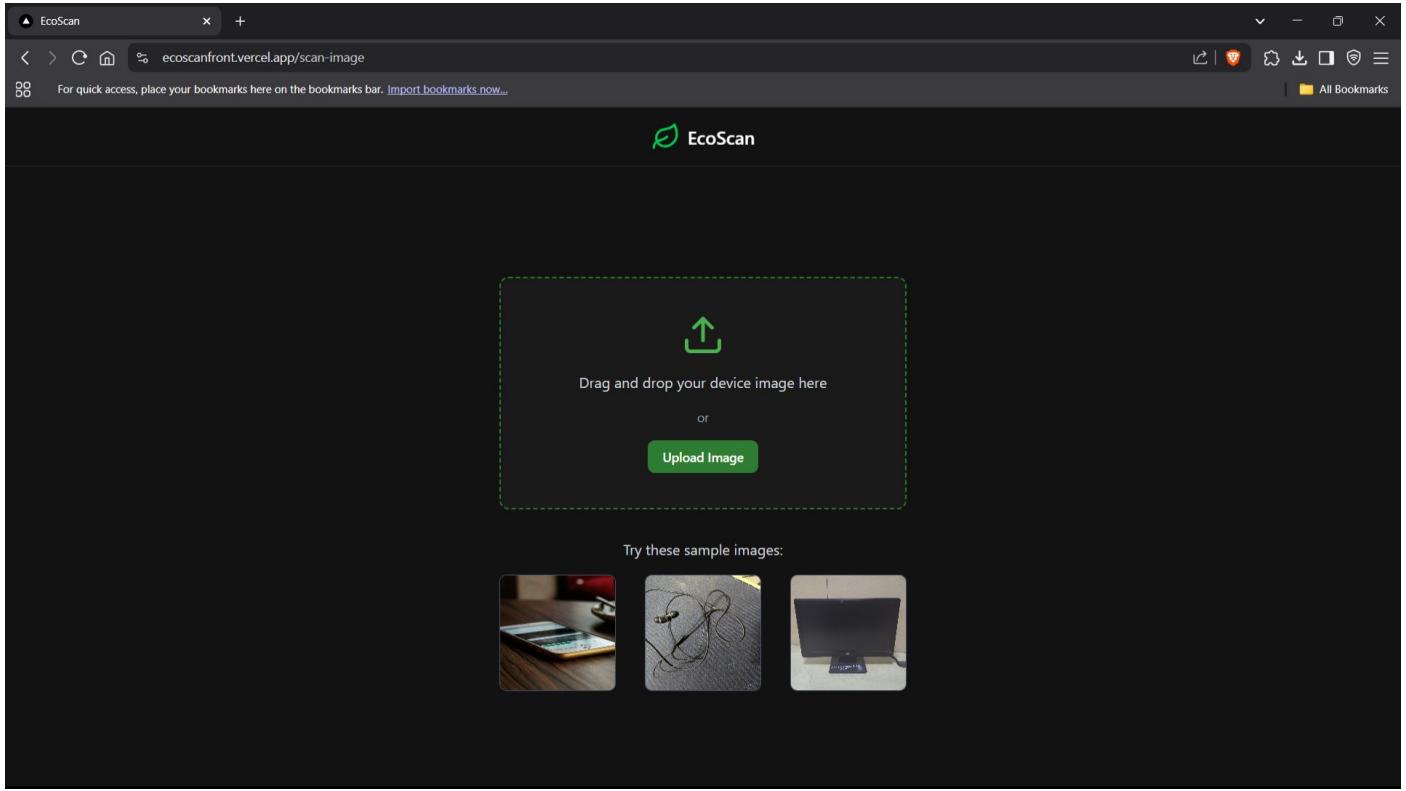

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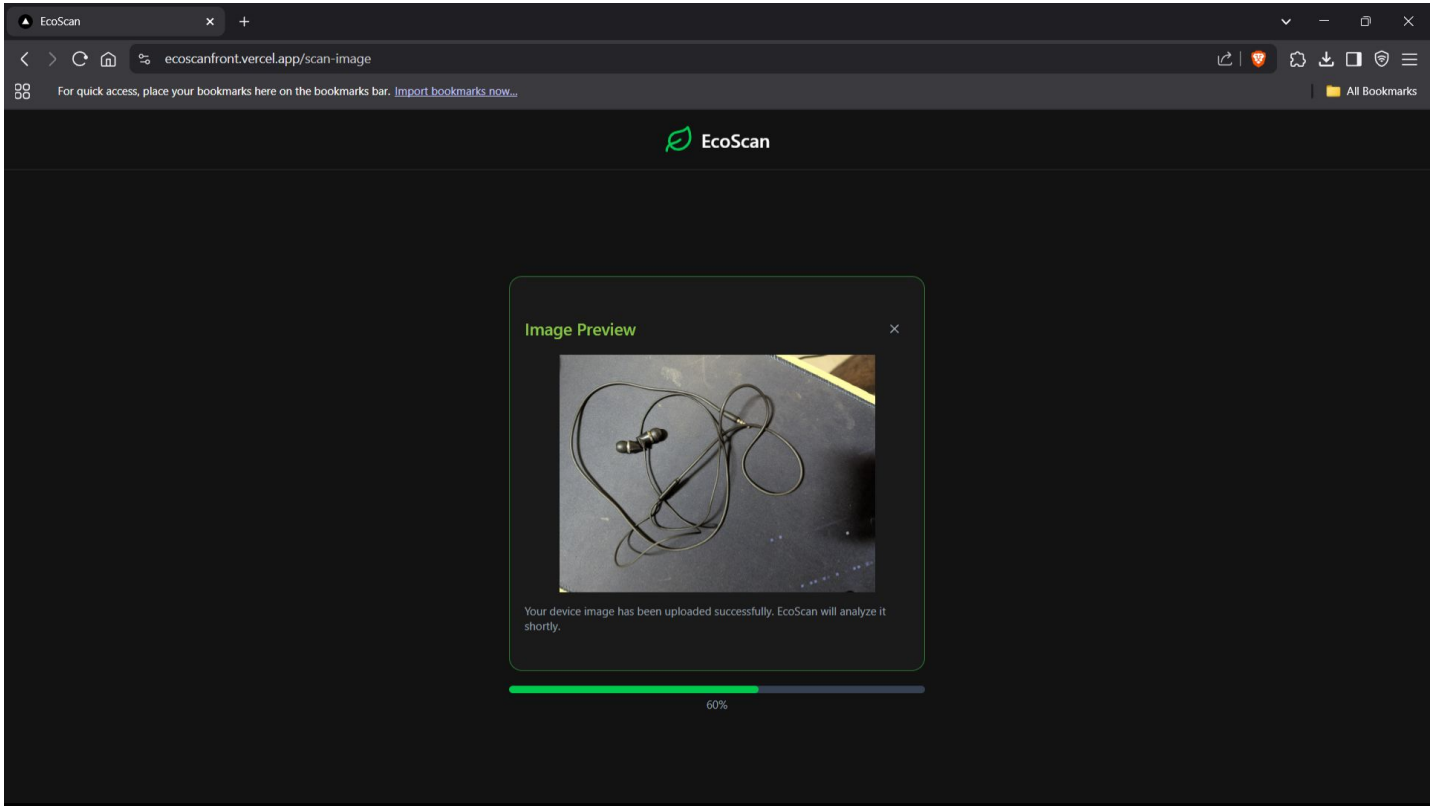

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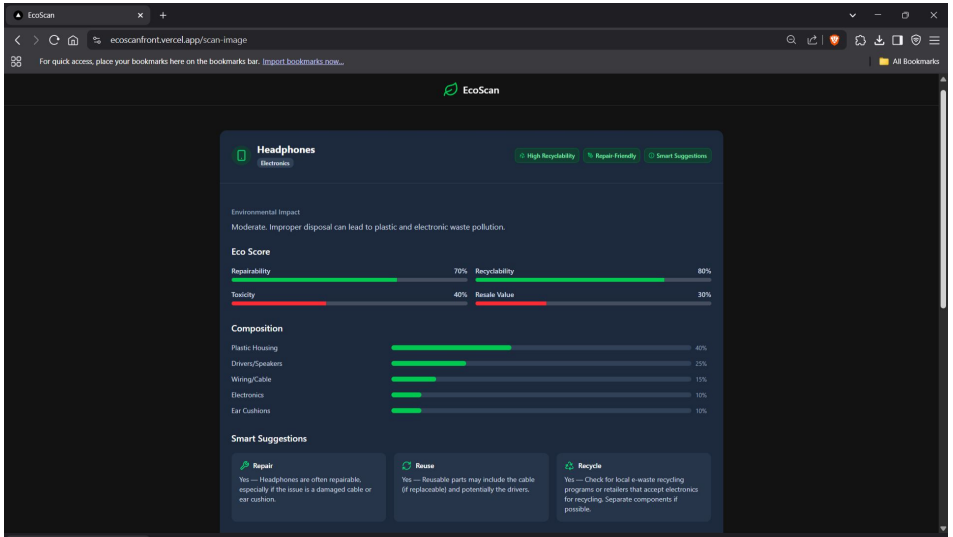
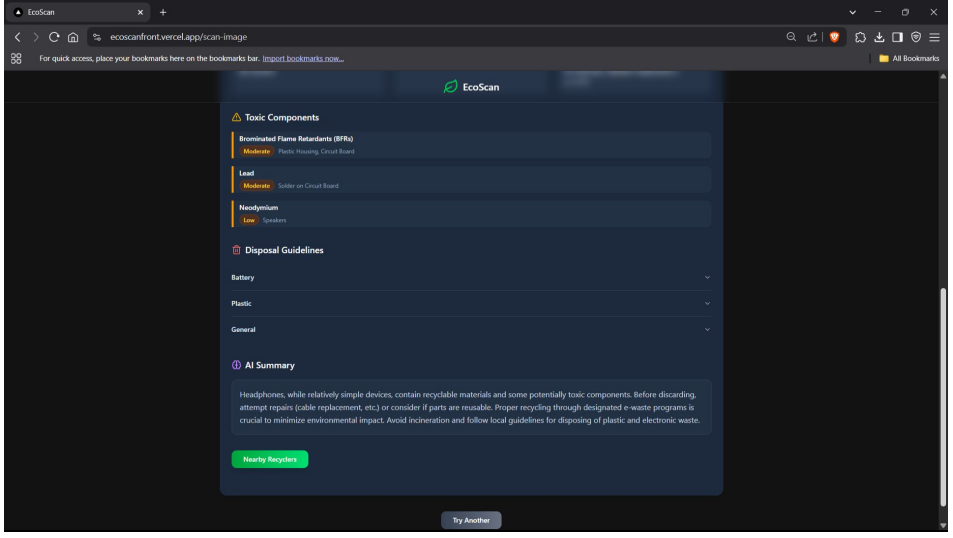
Snapshots of the MVP





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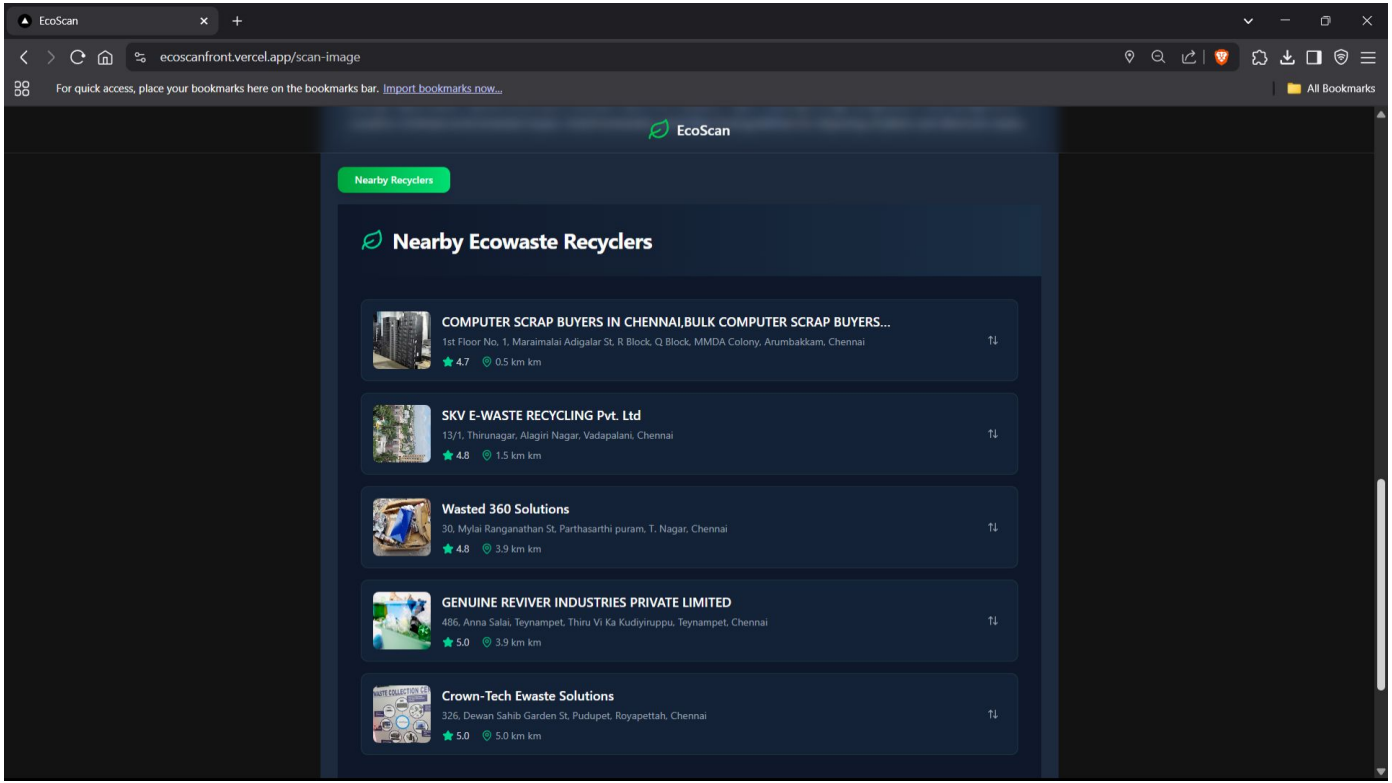

Additional Details/Future Development :

🚀 **Planned Features:**

🔹 **User Input for Better Accuracy** – Users will have an option to provide additional details about the scanned e-waste, such as brand, model, and condition. This will enhance the AI's ability to offer personalized recommendations.

🔹 **Cost Estimation for Repair & Recycling** – Users will get an estimated cost of repairing, reusing, or recycling the scanned item. This will help them understand the potential value and financial benefits of responsible e-waste management.

🔹 **Multi-Language Support** – Expanding accessibility by including multiple regional and global languages, ensuring that more users can benefit from the platform.

🔹 **Incentive-Based Recycling** – Partnering with authorized recyclers to introduce reward programs, where users can earn points, discounts, or cashback for recycling e-waste through verified centers. A separate Window for Rewards Program will be dedicated.

Provide links to your:

1. GitHub Public Repository: https://github.com/RamprakashRP/EcoScan
2. Demo Video Link (3 Minutes) : https://youtu.be/XkmntpHhs0A
3. MVP Link: https://ecoscanfront.vercel.app/

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Thank you