   Waste classifier

Objective

The main goal or the reason of this project is to classify waste to know if it is trash, compostable, or recyclable.

Concept

The concept of the classifier is just to upload an image or describe it in text and classify it either if it is recyclable, trash or compostable. And also there is a guide to show how to follow the code of disposing trash in real life.

Platforms

Platforms used:- VS code, One compiler

AI  used – Base44,Loveable,ChatGPT,Copilot, Kilo code

Implementation

You have to insert an image or name the image exactly as it is or give a description about any item, and then it will classify it.

Challenges

The code would often recognize the image itself.

Improvisation

We added in a mobilenet and tensorflow which is an external database

Conclusion

This project helped us understand how technology can be used to solve real-world problems like waste management. By building a webpage that classifies waste based on uploaded images or file names, we learned how to connect user input with meaningful output. Although we faced challenges with image recognition, the process taught us how to think creatively and troubleshoot under pressure. We also realized the importance of eco-friendly habits and how small tools like this can help people make better decisions for the environment. Overall, this project was a great learning experience, and we’re excited to improve it further in the future.

**Code**

<!DOCTYPE html>

<html lang="en">

<head>

    <meta charset="UTF-8" />

    <meta name="viewport" content="width=device-width, initial-scale=1" />

    <title>Eco Disposal Classifier</title>

    <style>

        body {

            margin: 0;

            font-family: 'Segoe UI', Tahoma, Geneva, Verdana, sans-serif;

            background: #f0f4f3;

            display: flex;

            padding: 40px 20px;

            min-height: 100vh;

            background: url('https://images.unsplash.com/photo-1506744038136-46273834b3fb?auto=format&fit=crop&w=1950&q=80');

            flex-direction: column;

            align-items: center;

        }

        .container {

            background: #ffffff;

            padding: 30px;

            border-radius: 12px;

            box-shadow: 0 6px 12px rgba(0, 0, 0, 0.1);

            max-width: 650px;

            width: 100%;

            text-align: center;

        }

        h1 {

            color: #2e7d32;

            margin-bottom: 10px;

        }

        p {

            color: #555;

            margin-bottom: 20px;

        }

        input[type="file"] {

            display: none;

        }

        .custom-file-upload {

            display: inline-block;

            padding: 12px 24px;

            cursor: pointer;

            background-color: #388e3c;

            color: white;

            border-radius: 8px;

            transition: background 0.3s ease;

            font-size: 16px;

            margin-bottom: 20px;

        }

        .custom-file-upload:hover {

            background-color: #2e7d32;

        }

        #remove-image-btn {

            margin-top: 10px;

            background-color: #e53935;

            color: white;

            padding: 8px 20px;

            border: none;

            border-radius: 6px;

            cursor: pointer;

            font-size: 14px;

            transition: background 0.3s ease;

        }

        #remove-image-btn:hover {

            background-color: #c62828;

        }

        #image-preview {

            margin-top: 20px;

            max-width: 100%;

            border-radius: 8px;

            box-shadow: 0 2px 8px rgba(0, 0, 0, 0.15);

            display: none;

        }

        textarea {

            display: block;

            margin: 30px auto 0 auto;

            width: 100%;

            max-width: 100%;

            padding: 14px 16px;

            border: 2px solid #ddd;

            border-radius: 8px;

            font-size: 16px;

            resize: vertical;

            height: 100px;

            color: #333;

            background-color: #f9f9f9;

            outline: none;

            transition: border 0.3s ease;

            box-sizing: border-box;

        }

        textarea::placeholder {

            color: #aaa;

        }

        button {

            margin-top: 25px;

            background-color: #388e3c;

            color: white;

            padding: 12px 24px;

            font-size: 16px;

            border: none;

            border-radius: 8px;

            cursor: pointer;

            transition: background 0.3s;

            width: 100%;

        }

        button:hover {

            background-color: #2e7d32;

        }

        .result {

            margin-top: 30px;

            padding: 20px;

            border-radius: 10px;

            font-size: 18px;

            font-weight: 500;

        }

        .recyclable {

            background-color: #e8f5e9;

            color: #1b5e20;

        }

        .compostable {

            background-color: #f1f8e9;

            color: #33691e;

        }

        .trash {

            background-color: #fff3e0;

            color: #e65100;

        }

        .hazardous {

            background-color: #fce4ec;

            color: #ad1457;

        }

        .tip {

            margin-top: 15px;

            font-size: 16px;

            color: #444;

            line-height: 1.5;

        }

        header,

        footer {

            width: 100%;

            background-color: rgba(255, 255, 255, 0.85);

            padding: 1rem 2rem;

            font-weight: 600;

            font-size: 1.5rem;

            color: #2f6f4e;

            box-shadow: 0 2px 6px rgba(0, 0, 0, 0.1);

            text-align: center;

        }

        header{

            margin-bottom:100px;

        }

        footer{

            margin-top:100px;

        }

        .cards {

    display: flex;

    flex-wrap: wrap;

    justify-content: center;

    gap: 1rem;

    margin-top: 2rem;

  }

  .cards :hover {

    transform: translateY(-5px);

    box-shadow: 0 4px 12px rgba(0,0,0,0.2);

    transition: transform 0.3s ease, box-shadow 0.3s ease;

  }

  .card {

    background-color: #fefefe;

    border-radius: 8px;

    box-shadow: 0 0 10px rgba(0,0,0,0.1);

    width: 250px;

    padding: 1rem;

    text-align: center;

    color: #2f6f4e;

  }

  .card h3 {

    margin-top: 0;

    margin-bottom: 0.5rem;

  }

  .card p {

    font-size: 0.9rem;

  }

    </style>

</head>

<body>

    <header>Waste Classifier</header>

    <div class="container">

        <h1>Eco Disposal Classifier</h1>

        <p>Upload an image or describe the item to get eco-friendly disposal tips.</p>

        <label for="image-upload" class="custom-file-upload">Choose Image</label>

        <input type="file" id="image-upload" accept="image/\*" />

        <img id="image-preview" src="" alt="" />

        <button id="remove-image-btn" style="display:none;">Remove Image</button>

        <textarea id="description" placeholder="PLEASE ENTER TEXT HERE"></textarea>

        <button onclick="handleClassification()">Check Disposal Method</button>

        <div id="result" class="result" style="display: none;"></div>

        <div id="tip" class="tip" style="display: none;"></div>

    </div>

    <h1 style="background-color: #fffdfd;"> WASTE SEGREGATION GUIDE </h1>

    <section class="cards">

    <div class="card">

      <h3>Green bag</h3>

      <p>For compostable wet waste like food scraps and garden trimmings..</p>

    </div>

    <div class="card">

      <h3>Blue Bag</h3>

      <p>For dry recyclable items such as paper, plastic, glass, and metal.</p>

    </div>

    <div class="card">

      <h3>Black Bag</h3>

      <p>For general trash including dirty wrappers, tissues, and broken items.</p>

    </div>

    <div class="card">

      <h3>Yellow Bag</h3>

      <p>For biomedical waste like bandages, gloves, and sanitary products.</p>

    </div>

    <div class="card">

      <h3>Red Bag</h3>

      <p>For contaminated plastic waste such as used syringes and tubing..</p>

    </div>

  </section>

    <footer>2025 Waste Classifier Project</footer>

    <script [src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@4.5.0/dist/tf.min.js"></script](mailto:src=%22https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@4.5.0/dist/tf.min.js%22%3e%3c/script)>

    <script [src="https://cdn.jsdelivr.net/npm/@tensorflow-models/mobilenet@2.1.0/dist/mobilenet.min.js"></script](mailto:src=%22https://cdn.jsdelivr.net/npm/@tensorflow-models/mobilenet@2.1.0/dist/mobilenet.min.js%22%3e%3c/script)>

    <script>

        let net;

        const imageUpload = document.getElementById('image-upload');

        const imagePreview = document.getElementById('image-preview');

        const descriptionInput = document.getElementById('description');

        const resultEl = document.getElementById('result');

        const tipEl = document.getElementById('tip');

        const removeImageBtn = document.getElementById('remove-image-btn');

        async function loadModel() {

            net = await mobilenet.load();

            console.log('MobileNet model loaded');

        }

        loadModel();

        imageUpload.addEventListener('change', (e) => {

            const file = e.target.files[0];

            if (!file) return;

            const reader = new FileReader();

            reader.onload = function (event) {

                imagePreview.src = event.target.result;

                imagePreview.style.display = 'block';

                removeImageBtn.style.display = 'inline-block';

            }

            reader.readAsDataURL(file);

        });

        removeImageBtn.addEventListener('click', () => {

            imagePreview.src = '';

            imagePreview.style.display = 'none';

            imageUpload.value = '';

            removeImageBtn.style.display = 'none';

        });

        async function classifyImage(imgElement) {

            const predictions = await net.classify(imgElement);

            console.log('Predictions:', predictions);

            return predictions.map(p => p.className.toLowerCase());

        }

        function keywordMatches(label, keyword) {

            const cleanLabel = label.toLowerCase();

            const cleanKeyword = keyword.toLowerCase();

            if (cleanLabel.includes(cleanKeyword)) return true;

            if (cleanKeyword.endsWith('s') && cleanLabel.includes(cleanKeyword.slice(0, -1))) return true;

            if (!cleanKeyword.endsWith('s') && cleanLabel.includes(cleanKeyword + 's')) return true;

            return false;

        }

        const rules = [

            {

                keywords: [

                    "apple", "apples", "apple core", "banana", "bananas", "banana peel", "orange", "oranges", "orange peel", "lemon", "lemons", "lime", "limes",

                    "grapefruit", "grapefruits", "citrus peel", "berry", "berries", "grape", "grapes", "peach", "peaches", "pear", "pears", "plum", "plums", "mango", "mangoes",

                    "watermelon", "watermelons", "melon", "melons", "pineapple", "pineapples", "pineapple skin", "kiwi", "kiwis", "papaya", "papayas", "avocado", "avocados",

                    "fig", "figs", "cherry", "cherries", "coconut", "coconuts", "pomegranate", "pomegranates", "date", "dates", "raisin", "raisins", "fruit scraps", "overripe fruit",

                    "fruit peel", "fruit skin",

                    "carrot", "carrots", "carrot peel", "potato", "potatoes", "potato peel", "tomato", "tomatoes", "cucumber", "cucumbers", "onion", "onions", "onion skin",

                    "garlic", "garlic skin", "lettuce", "spinach", "kale", "cabbage", "broccoli", "cauliflower",

                    "pepper", "peppers", "zucchini", "squash", "eggplant", "green bean", "corn", "corn cob", "celery", "beet",

                    "radish", "turnip", "pumpkin", "asparagus", "vegetable scraps", "veggie peel",

                    "coffee grounds", "tea bag", "bread", "rice", "pasta", "egg shell", "eggshell", "oatmeal", "peanut shell",

                    "leaves", "grass", "twig", "twigs", "branch", "branches", "garden trimmings", "dead plants", "flower", "flowers",

                    "pine needle", "pine needles", "sawdust",

                    "paper towel", "napkin", "tissue", "shredded paper", "shredded newspaper",

                    "paper egg carton", "compostable plate", "compostable cup", "uncoated paper",

                    "cotton", "wool", "hair", "fur", "feathers", "wood shavings", "toothpick", "matchstick",

                    "nut shell", "natural cork"

                ],

                category: "compostable",

                tip: "These items can be composted at home or via green bins. Avoid mixing with plastic, meat, or dairy unless using industrial composting."

            },

            {

                keywords: [

                    "plastic bottle", "can", "aluminum", "glass", "paper", "cardboard", "magazine", "jar",

                    "tin", "foil", "newspaper", "brochure", "catalog", "flyer"

                ],

                category: "recyclable",

                tip: "Rinse and place in your recycling bin. Avoid contamination with food waste or grease."

            },

            {

                keywords: [

                    "pizza box", "styrofoam", "chip bag", "diaper", "candy wrapper", "plastic bag",

                    "foam container", "plastic utensils", "greasy paper", "foil-lined bag", "bubble wrap"

                ],

                category: "trash",

                tip: "These items usually cannot be recycled or composted. Dispose of in general waste."

            },

            {

                keywords: [

                    "battery", "used battery", "paint", "chemical", "light bulb", "mercury", "oil",

                    "cleaner", "pesticide", "nail polish", "aerosol", "spray can"

                ],

                category: "hazardous",

                tip: "Take to a local hazardous waste collection site. Do not dispose of in regular bins or drains."

            },

            {

                keywords: [

                    "electronics", "phone", "laptop", "charger", "printer", "keyboard", "tv", "monitor",

                    "tablet", "cable", "headphones"

                ],

                category: "hazardous",

                tip: "Recycle e-waste at a certified e-recycling center. Many retailers accept old electronics."

            },

            {

                keywords: [

                    "clothes", "fabric", "shirt", "jeans", "towel", "shoes", "socks", "sweater"

                ],

                category: "recyclable",

                tip: "Donate if in good condition. Otherwise, bring to a textile recycling facility."

            }

        ];

        function showResult(category, tip) {

            resultEl.style.display = "block";

            tipEl.style.display = "block";

            resultEl.className = "result " + category;

            resultEl.textContent = `🗑️ This item is: ${category.toUpperCase()}`;

            tipEl.textContent = `💡 Tip: ${tip}`;

        }

        async function handleClassification() {

            const description = descriptionInput.value.trim().toLowerCase();

            const file = imageUpload.files[0];

            if (file) {

                const img = new Image();

                img.src = URL.createObjectURL(file);

                img.onload = async () => {

                    const labels = await classifyImage(img);

                    classifyByLabels(labels);

                };

            } else if (description) {

                classifyByText(description);

            } else {

                alert("Please upload an image or enter a description.");

            }

        }

        function classifyByLabels(labels) {

            for (const rule of rules) {

                for (const keyword of rule.keywords) {

                    if (labels.some(label => keywordMatches(label, keyword))) {

                        showResult(rule.category, rule.tip);

                        return;

                    }

                }

            }

            showResult("trash", "Item not recognized. When in doubt, throw it out.");

        }

        function classifyByText(text) {

            for (const rule of rules) {

                for (const keyword of rule.keywords) {

                    if (keywordMatches(text, keyword)) {

                        showResult(rule.category, rule.tip);

                        return;

                    }

                }

            }

            showResult("trash", "Item not recognized. When in doubt, throw it out.");

        }

    </script>

</body>

</html>