

Mobile Application Development Report

on

Smart Waste Classifier

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Abstract

The Smart Waste Classifier is a mobile application that helps users manage and dispose of waste correctly using the power of Artificial Intelligence. This project was designed with the environment in mind, aiming to encourage better waste segregation and recycling practices through an easy-to-use app.

Built using React Native for the frontend and Flask for the backend, the app integrates a machine learning model hosted on Hugging Face to classify waste. Users can either click a picture or upload an image of any waste item through the app. This image is then sent to the backend server where the model processes it and categorizes it into three primary types – biodegradable, recyclable, or hazardous. Once classified, the app provides disposal suggestions based on the waste category.

The app uses Firebase Authentication to manage users and Firestore to store user data. Each user has access to a personalized Home screen that shows insights into their waste disposal habits, including a pie chart visualization of different waste types they have submitted. The Profile screen shows user details and information related to waste management practices. Users are also rewarded with an "Eco Score" that increases when they classify and dispose of waste responsibly, promoting positive environmental habits.

This project was chosen because of the increasing need to educate and assist people in proper waste segregation. Many individuals are unaware of how to dispose of waste items correctly, and this app provides them with a helpful tool that is both informative and easy to operate. The ultimate goal is to build awareness and encourage eco-friendly behavior in daily life.

Through this project, we hope to show how AI can play a role in solving real-world environmental issues and make a difference in promoting sustainability in communities around the world.

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1. Introduction

Overview of the Project

The Smart Waste Classifier app helps users sort waste correctly using artificial intelligence (AI) and a user-friendly mobile interface. The app guides individuals to make better waste disposal decisions, promoting proper segregation of materials like biodegradable, recyclable, and hazardous waste. By simplifying the process, it encourages eco-friendly habits in daily life.

Brief Summary

The goal of this project is to contribute to environmental protection by helping users recognize different types of waste through the power of AI. The idea for this project came from the growing need for accessible and simple tools that promote sustainable practices. Many people are unsure of how to separate their waste correctly, which leads to pollution and health issues. This app aims to bridge that gap by making waste classification quick, reliable, and easy to understand for everyone.

2. Problem Statement

Definition of the Problem

Improper waste segregation is a major issue that contributes to environmental pollution and low recycling efficiency. Many people dispose of waste without knowing whether it is recyclable, biodegradable, or hazardous, leading to health hazards and increased landfill waste. There is a clear need for a simple tool that can assist individuals in identifying and sorting their waste correctly.

Objectives

- To use AI technology to accurately recognize various waste types from images.
- To provide users with clear and actionable advice on how to dispose of different waste materials.
- To encourage sustainable waste practices through features like Eco Scores that track user behavior.

Outcomes

- A fully functional mobile app was developed using React Native.
- Integration with Firebase was implemented for authentication and database support.
- Image classification works through a Flask API using a ViT model hosted on Hugging Face.
- Users receive instant feedback after scanning an item, making the process quick and easy.

3. Background

Tools & Technologies Used

- React Native (Frontend)
- Flask (Backend)
- Hugging Face Transformer (Model)
- Firebase (Authentication & Firestore)
- GitHub (Version Control)

Software Requirements

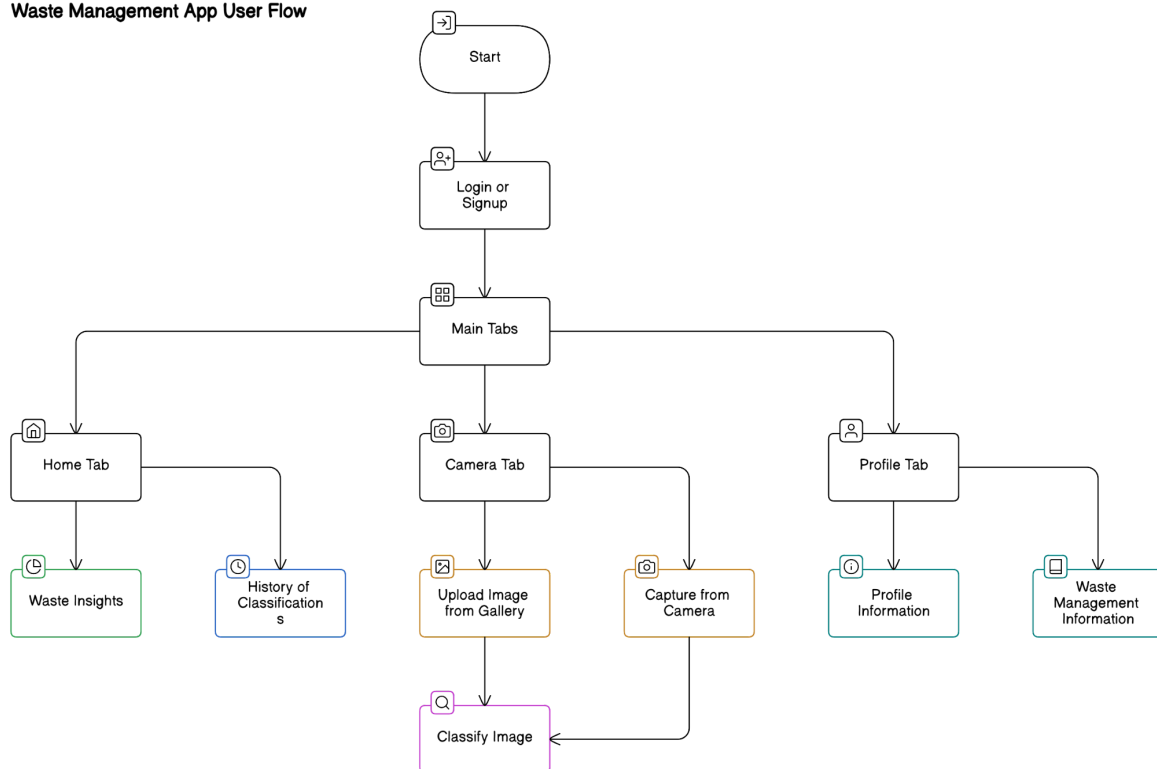
- Android Studio or VS Code
- Python 3.10+
- Node.js and npm

Hardware Requirements

- Android device or emulator
- 4GB+ RAM system

4. Figma (Architecture)

Waste Management App User Flow



5. Screenshot of the Project

[Include screenshots of Home Screen, Camera Interface, Classification Result, Profile Screen with Eco Score, etc.]

6. User Manual

1. Open the Smart Waste Classifier App.
 2. Login or Sign Up using your email.
 3. Go to the Camera tab and take or select a picture of waste.
 4. Wait for the app to show the waste type and disposal advice.
 5. Check your Home to see your Eco Score and waste history.
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7. Conclusion

Summary of Findings

This project showed that artificial intelligence can play a major role in simplifying and improving waste management. By allowing users to identify and sort waste with just a picture, the app makes it easier for everyone to follow environmentally friendly practices. The system is fast, accurate, and easy to use, even for people with little technical knowledge.

Recap

Through the development of this application, we found that AI can be integrated effectively into mobile platforms to encourage better waste disposal behavior. Simple digital tools like this app have the potential to raise awareness, change habits, and promote a cleaner environment. This project demonstrates how technology can be used to support sustainability in everyday life.

8. Link of the Project (GitHub)

GitHub Repository: <https://github.com/rasika2670/SmartWasteClassifier>

9. Appendices

- Final Presentation Slides (attached)
- AI & ML Course Certificate (attached)



Certificate

u6115948

We certify that **Rasika Mhaske**
has completed the following course on our learning platform:

Mobile App Development with React Native by CS50

21 hours 40 minutes - Completed on: 04/11/2025

Student Signature
Rasika Mhaske

Adrian Medeiros Dantas
Executive Director - Cursa



Point the camera to
verify authenticity

This certificate confirms that the student has attended the courses described in it through the Cursa application, which is available in the Google (Google Play) and Apple (App Store) application stores, confirming the authenticity of the respective viewing time of the video classes. If you have received this certificate and want to verify that it is authentic, scan the QR code with a cell phone camera or go to cursa.app/en/my-certificate and consult the code described in the lower right corner of this certificate. Responsible for the application: Medeiros Tecnologia LTDA. CNPJ 24.471.978/0001-08. E-mail: contato@cursa.app