RECYCLING USED OR OLD THINGS

A PROJECT REPORT

Submitted by

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in partial fulfillment of requirements for the award of the course

AGB1211 – DESIGN THINKING

in

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

DECEMBER, 2024

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K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (Autonomous)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **" RECYCLING USED OR OLD THINGS"** is the bonafide work of **AAFFRIN.A.R (2303811724322001) , ABINAYA.S (2303811724322006), AKSHAYA A.P (2303811724322010) , AKSHAYA PRIYA.T (2303811724322011)** who carried out this project during the academic year 2024-2025 under my supervision.

Signature   Signature

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Submitted for the viva-voce examination held on 5.12.24

INTERNAL EXAMINER   **EXTERNAL EXAMINER**

DECLARATION

I declare that the project report on "**RECYCLING USED OR OLD THINGS**" is the result of original work done by us and best of our knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF TECHNOLOGY**. This project report is submitted on the partial fulfillment of the requirement of the award of the **AGB1211 – DESIGN THINKING.**

<div align="right">

Signature

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ABINAYA.S

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AKSHAYA PRIYA.T

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Place: Samayapuram

Date: 5/12/2024

ACKNOWLEDGEMENT

VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a centre of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To excel in education, innovation and research in Artificial Intelligence and Data Science to fulfil industrial demands and societal expectations.

Mission 1: To educate future engineers with solid fundamentals, continually improving teaching methods using modern tools.

Mission 2: To collaborate with industry and offer top-notch facilities in a conductive learning environment.

Mission 3: To foster skilled engineers and ethical innovation in AI and Data Science for global recognition and impactful research.

Mission 4: To tackle the societal challenge of producing capable professionals by instilling employability skills and human values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Compete on a global scale for a professional career in Artificial Intelligence and Data Science.

PEO 2: Provide industry-specific solutions for the society with effective communication and ethics.

PEO 3: Hone their professional skills through research and lifelong learning initiatives.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- **PSO 1:** Capable of working on data-related methodologies and providing industry-focussed solutions.
- **PSO2:** Capable of analysing and providing a solution to a given real-world problem by designing an effective program.

ABSTRACT

This project aims to develop a mobile app that simplifies recycling by helping users identify recyclable items and locate nearby recycling centers. The app will use AI for item recognition, GPS for recycling center mapping, and a reward system to encourage participation. By providing easy access to recycling resources and promoting sustainable practices, the app seeks to raise awareness and make recycling more efficient and accessible, contributing to a cleaner and more sustainable environment. Additionally, the app will include educational content to inform users about proper recycling methods and environmental benefits. By fostering a community-driven approach, the app aspires to instill long-term behavioral change toward sustainable waste management.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The increasing volume of waste and improper disposal methods have become significant environmental concerns. Despite growing awareness, many individuals struggle with limited access to recycling facilities and a lack of knowledge about recycling practices. This project aims to develop a mobile application that simplifies the recycling process by helping users identify recyclable items through AI, locate nearby recycling centers via GPS, and schedule pickups for waste disposal. The app will also offer educational resources and rewards for active participation, promoting sustainable practices. By leveraging modern technologies, this app aims to make recycling more accessible, efficient, and engaging, ultimately contributing to a cleaner and more sustainable environment.

1.2 PROBLEM STATEMENT

The growing global waste crisis, coupled with insufficient recycling infrastructure and a lack of awareness, has led to a significant environmental impact, including overflowing landfills and pollution. Many individuals are unaware of how to properly recycle items or where to dispose of them, resulting in missed opportunities for recycling valuable materials. Current recycling systems are often inconvenient, with limited access to collection points and recycling centers. This project aims to address these challenges by creating a mobile app that simplifies the recycling process, educates users, and encourages more widespread participation, ultimately contributing to a sustainable solution for waste management.

1.3 OBJECTIVE

The primary objective of this project is to develop a mobile application that makes recycling more accessible, efficient, and engaging for users. The app will enable users to easily identify recyclable items using AI, locate nearby recycling centers through GPS, and schedule pickups for waste disposal. Additionally, the app will educate users on proper recycling practices and offer rewards for active participation to encourage sustainable behaviors. By integrating modern technologies, the app aims to simplify the recycling process, raise environmental awareness, and promote a more sustainable and circular economy.

CHAPTER 2
PROJECT METHODOLOGY

2.1 BLOCK DIAGRAM

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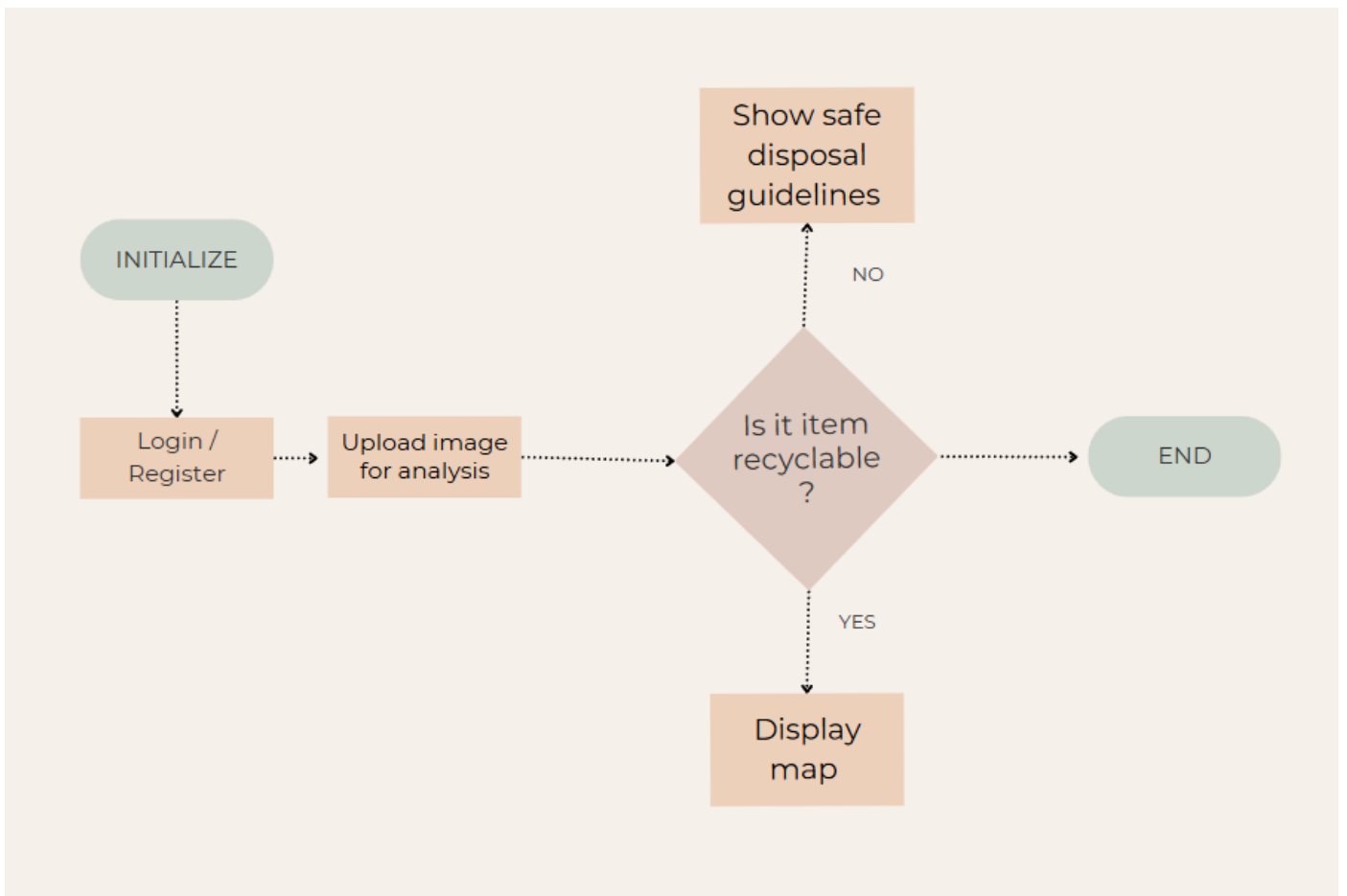
CHAPTER 3
KEY PHASES OF DESIGN THINKING

1. EMPATHIZE

The goal of this stage is to deeply understand your users and their challenges.

User Research:

Conducted surveys or gathered data about the most common problems people face regarding recycling (e.g., identifying recyclable items, locating recycling centers, or lack of guidance).

You might have explored environmental statistics showing the impact of improper waste disposal to validate the app's necessity.

User Personas:

Created hypothetical users to represent your audience.

Example Persona:

Name: Maya, a college student.

Challenge: Unsure how to recycle common household waste like shampoo bottles.

Goal: Wants an easy tool to determine recyclability and proper disposal methods.

Insights Gathered: Many users lack basic knowledge of recyclable vs. non-recyclable items.

Users need location-specific options to find recycling centers nearby.

2. DEFINE

This stage narrows the focus to a specific problem statement.

Problem Statement:

"Users face difficulty in determining whether an item is recyclable and lack accessible guidance for sustainable disposal practices."

How It Informs Design:

The app's key focus is a simple, intuitive process for determining recyclability with photo uploads.

The secondary feature is to provide actionable results (e.g., nearby centers or disposal instructions).

3. IDEATE

Brainstorming innovative solutions to solve the defined problem.

Idea Generation:

Developed multiple concepts:

Idea 1: A barcode scanner for recyclability info.

Idea 2: A photo-based recyclability detector (chosen for implementation due to simplicity and accessibility).

Idea 3: Recycling awareness content as a bonus feature.

Collaborative Feedback:

If peers or potential users tested early ideas, include feedback.

Example: Users preferred an option to upload photos rather than manually searching for materials

4. PROTOTYPE

Building a working model of the app for initial testing.

Tools Used:

Created the prototype using Adalo, leveraging its drag-and-drop UI features and conditional visibility options.

Features Developed:

- ➢ Login/Sign-Up Page: Personalized user experience.
- ➢ Photo Upload Screen: Allows users to submit images of items for analysis.
- ➢ Recyclability Result Screen: Provides immediate results, guiding users to recycling centers or disposal instructions.
- ➢ Map Integration: Displays nearby recycling centers (or a static map image as per your final solution).

Design Principles:

Simple navigation, minimal input required from users, and clear action items based on recyclability status.

5. TEST

Evaluating the app functionality:

Test the image scan feature with various items.

Validate the accuracy of recyclability identification.

Ensure recycling centers and disposal guidelines display correctly.

Gather user feedback for app improvement.

5. TEST

CHAPTER 4
MODULE DESCRIPTION

4.1 AUTHENTICATION MODULE

The Authentication Module handles user registration and login, ensuring secure access to the app. It allows new users to create an account through the sign-up page and existing users to log in with their credentials. This module ensures data privacy and creates a personalized experience for users.

4.2 IMAGE UPLOAD AND ANALYSIS MODULE

This module enables users to upload an image of an item they want to analyze. It acts as the starting point for the app's main functionality, where the uploaded image is processed to determine its recyclability. This feature is designed to be user-friendly and ensures seamless interaction.

4.3 RESULT AND DISPOSAL GUIDANCE MODULE

The results page displays whether the item is recyclable or not. If recyclable, it suggests recycling steps; if not, it provides safe disposal methods. This module guides users on eco-friendly actions based on the analysis.

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CHAPTER 5

CONCLUSION

The proposed recycling app addresses critical challenges in waste management by providing a user-friendly, technology-driven solution that simplifies and promotes recycling. By incorporating features like AI-powered item identification, GPS-enabled recycling center locators, and a reward system, the app encourages users to adopt sustainable practices. It also raises awareness about recycling's environmental benefits and facilitates community engagement in reducing waste. Through innovative use of modern technologies, this app has the potential to contribute significantly to a cleaner, greener, and more sustainable future, making recycling an accessible and rewarding habit for all.

REFERENCES:

➢ Ellen MacArthur Foundation. (2021). *The Circular Economy: A Transformative Agenda for Growth*.

➢ Environmental Protection Agency (EPA): https://www.epa.gov/recycle

➢ Kurzgesagt – In a Nutshell: Videos on sustainability and recycling.

APPENDIX A – SCREENSHOTS

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IMAGE

UPLOAD ITEMS TO BE RECYCLED

SUBMIT

RESULT

THE GIVEN ITEM IS

NOT RECYCLABLE

SAFE DISPOSAL

DISPOSABLE METHODS

Sort and Bag Properly Use sturdy, sealed bags to contain waste securely.

Follow Local Rules Check your area's waste disposal guidelines.

Use Designated BinsDispose of items in labeled bins (e.g., landfill, hazardous)

Avoid Burning or DumpingAlways dispose of waste through approved facilities.

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