**Phase-2: Requirement Analysis**

**Objective:**

* Define technical and functional requirements

**Key Points:**

**1.Technical Requirements:**

**💻 Programming Languages**

* Python – for model training, preprocessing, and backend
* HTML– for building the front-end web interface.

🧠 **Frameworks & Libraries**

Data Handling:

* NumPy, Pandas

Image Processing:

* OpenCV

**🧪 Model Training & Testing Tools**

* **Google Colab** – for training and experimenting
* **Kaggle** – for accessing and exploring the dataset

**🌐To run the application:**

Anaconda command prompt

**2.Functional Requirements:**

**🖼️ Image Upload Feature**

* Users should be able to upload images of waste through the web interface.

**🤖 Waste Classification**

* The system should analyze the uploaded image and classify it as:
  + ♻️ **Recyclable**
  + 🚯 **Non-Recyclable**

**🧠 ML Model Integration**

* A trained machine learning model must process the image and return accurate predictions.

**🖥️ User Interface (UI)**

* A clean, simple HTML-based webpage to allow:
  + Uploading images
  + Viewing results
  + Displaying status or messages

**3.Constraints&Challenges:**

**📦 1. Dataset Limitations**

* Limited variety of waste types in the Kaggle dataset
* Imbalanced data between recyclable and non-recyclable categories

Difficult to generalize to real-world scenarios (e.g., mixed waste**)**