Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	27 June 3035
Team ID	LTVIP2025TMID36584
Project Name	cleantech: transforming waste management with transfer learning
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: cleantech: transforming waste management with transfer learning

- **User Interface:** User interacts with the web application by uploading images.
- **Backend:** Flask backend receives and preprocesses the uploaded images.
- **Model Prediction:** The trained deep learning model (CNN based on MobileNetV2) classifies the image.
- **Result Display:** The classification result is returned to the frontend and displayed to the user.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI for uploading waste images and displaying results..	HTML, CSS
2.	Application Logic-1	Receives and preprocesses image, returns result to frontend.	Python, Flask

3.	Machine Learning Model	Classifies images into Biodegradable, Recyclable, and Trash.	TensorFlow, Keras, MobileNetV2
4.	Infrastructure (Server / Cloud)	Application deployment for web-based access.	Local, Cloud Foundry, Kubernetes (Future: Firebase + Google Cloud Run)
5.	Data Storage (Logs)	Stores prediction results.	Local Filesystem (for terminal logs).

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Libraries used for model development and application.	TensorFlow, Keras, Flask, OpenCV, NumPy
2.	Security Implementations	Measures to secure image handling and data.	To be implemented based on specific requirements, e.g., HTTPS for web communication
3.	Scalable Architecture	The web-based architecture allows for potential scaling.	Micro-services (Future consideration for deployment via Firebase + Google Cloud Run)
4.	Availability	The web application ensures accessibility for users.	Future consideration: Load balancers for distributed servers if deployed at scale
5.	Performance	Designed for fast image classification.	Prediction speed: -0.2 seconds/image on CPU.