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

Date	6 June 2025
Team ID	LTVIP2025TMID38840
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 Components & Technologies & Application Characteristics

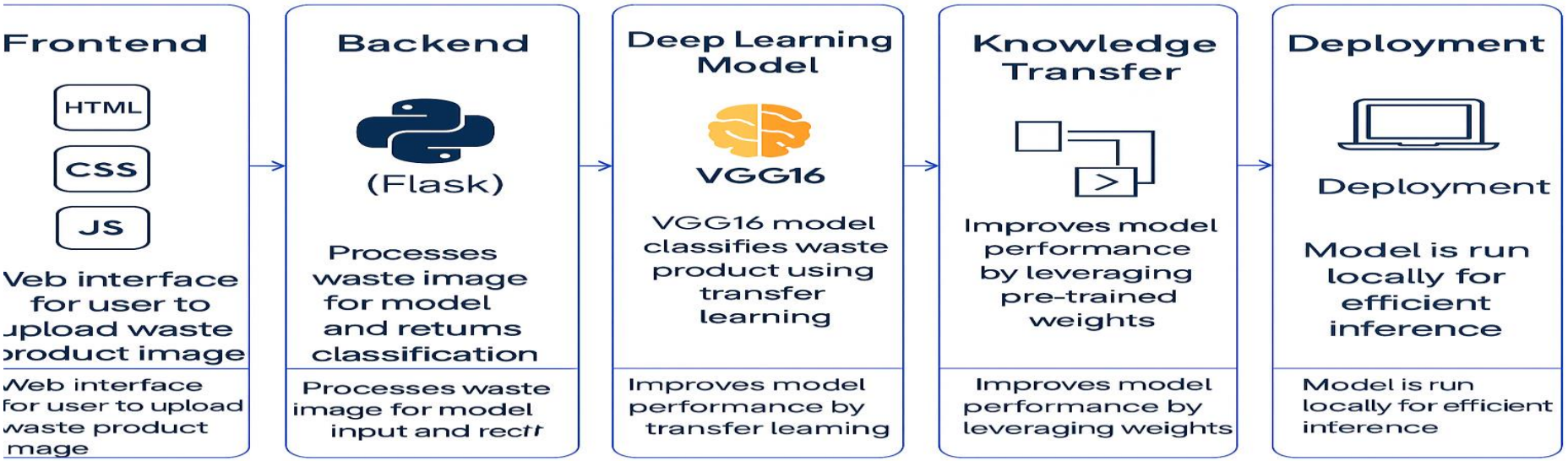

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web interface for clinicians to input data and view predictions	HTML, CSS, JavaScript
2.	Application Logic-1	Image preprocessing and resizing for deep learning model input	Python (OpenCV, NumPy)
3.	Application Logic-2	Model loading, prediction, and result formatting	Python (TensorFlow/Keras)
4.	Application Logic-3	Flask-based integration to link frontend and backend	Python (Flask)
5.	File Storage	Stores pre-trained models and temporary image uploads	Local Filesystem
6.	Deep Learning Model	Classifies waste type using VGG16 and transfer learning	VGG16 (Transfer Learning – Keras)
7.	Infrastructure (Server / Cloud)	Application runs locally using Flask; can be extended to cloud	Local (Flask server)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Utilizes open-source tools for deep learning and web development	Flask, TensorFlow/Keras, OpenCV
2.	Security Implementations	Application runs locally; user data and images are processed offline	Local-only use; no cloud auth
3.	Scalable Architecture	Can be modularized for future deployment on cloud or microservices	Flask + Modular Python files
4.	Performance	Fast predictions with preloaded VGG16 model and efficient preprocessing	Flask, NumPy, Keras