Project Design Phase Proposed Solution Template

|  |  |
| --- | --- |
| Date | 28 June 2025 |
| Team ID | LTVIP2025TMID32984 |
| Project Name | CleanTech: Transforming waste management with transfer learning |
| Maximum Marks | 2 Marks |

**Proposed Solution Template:**

Project team shall fill the following information in the proposed solution template.

|  |  |  |
| --- | --- | --- |
| **S.No.** | **Parameter** | **Description** |
| 1. | Problem Statement (Problem to be solved) | Waste management in urban areas faces significant challenges due to the **inefficient manual classification of solid waste**, leading to poor recycling rates, environmental pollution, and increased landfill usage. |
| 2. | Idea / Solution description | We propose **CleanTech**, an AI-powered system that leverages **transfer learning** to automate the classification of municipal solid waste. By using pre-trained convolutional neural networks (CNNs) like MobileNetV2, the system can **accurately identify waste types** (organic, recyclable, hazardous, etc.) from uploaded images in real-time. |
| 3. | Novelty / Uniqueness | Leverages **pre-trained deep learning models** (e.g., MobileNetV2) to adapt quickly to waste image classification with **high accuracy and minimal training data.** Integrates into a **user-friendly web platform**, enabling anyone from municipal staff to everyday citizens to classify waste instantly |
| 4. | Social Impact / Customer Satisfaction | **Increase recycling efficiency** and reduce landfill burden. **Minimize health risks** from improper disposal of hazardous waste. **Improve cleanliness** in cities through better waste monitoring. **Educate the public** on the importance of waste categorization using technology |
| 5. | Business Model (Revenue Model) | **CleanTech** follows a **B2G (Business to Government)** and **B2B (Business to Business)** model, offering AI-driven waste classification as a service to municipal corporations, smart city planners, environmental NGOs, and private waste management companies. |
| 6. | Scalability of the Solution | The **CleanTech** solution is highly scalable, both technically and operationally. Built using transfer learning models like MobileNetV2, it can be easily retrained with new datasets to adapt to different waste categories or regional variations. Its lightweight architecture allows for deployment on cloud platforms or edge devices like Raspberry Pi, making it suitable for integration with smart bins or municipal systems. |