Project Design Phase Solution Architecture

Date: 25 June 2025

Team ID : LTVIP2025TMID34101

Project Name Clean Tech

Maximum Marks 4 Marks

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

* Find the best tech solution to solve existing business problems.
* Describe the structure, characteristics, behavior, and other aspects of the software toproject stakeholders.
* Define features, development phases, and solution requirements.
* Provide specifications according to which the solution is defined, managed, anddelivered.

Clean Tech leverages the power of transfer learning to revolutionize municipal waste management. By utilizing advanced deep learning models pre-trained on extensive datasets, Clean Tech enhances the accuracy and efficiency of waste classification processes. The system is designed to automatically identify and categorize different types of municipal waste from images, thereby enabling intelligent automation.

In Scenario 1, recycling centers benefit from automation in sorting mixed waste. Traditionally, workers manually separate recyclables from non-recyclables—a time-consuming and error-prone task. With Clean Tech, cameras installed along conveyor belts capture waste images. The system classifies and sorts recyclable materials in real-time using pre-trained image recognition models.

Scenario 2 addresses the challenges of waste segregation in smart cities. Public bins equipped with image-capturing cameras enable real-time classification of waste into categories like organic, recyclable, and general. This fosters efficient waste collection and source-level segregation.

Scenario 3 focuses on factories managing industrial waste. Cameras monitor disposal zones and classify materials such as metals, plastics, and hazardous waste. By applying transfer learning techniques, Clean Tech ensures compliance with environmental regulations and enhances recycling workflows, contributing to sustainable industrial operations.