

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

Date	12 May 2023
Team ID	NM2023TMID11143
Project Name	Intelligent Garbage Classification System Using Deep Learning

Technical Architecture:

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

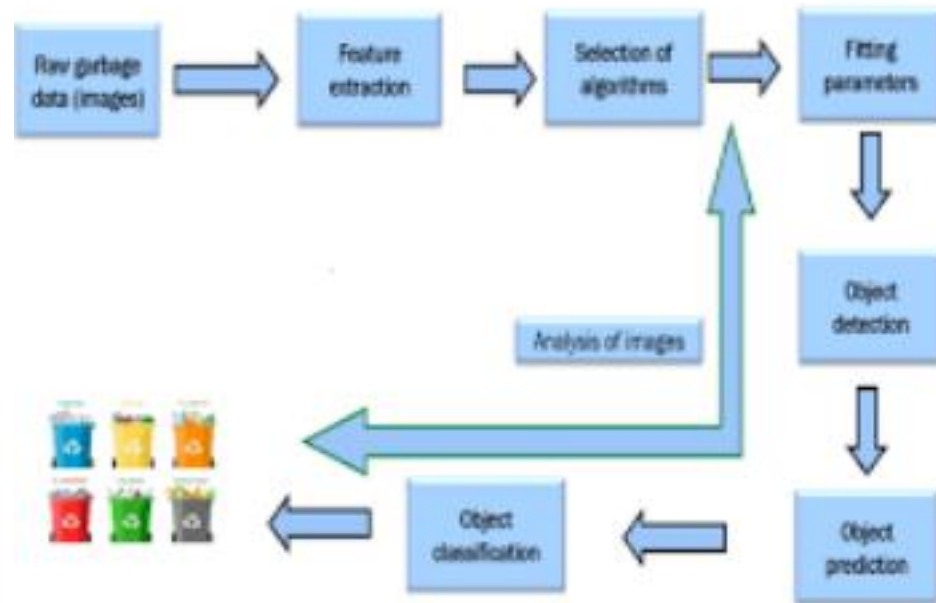
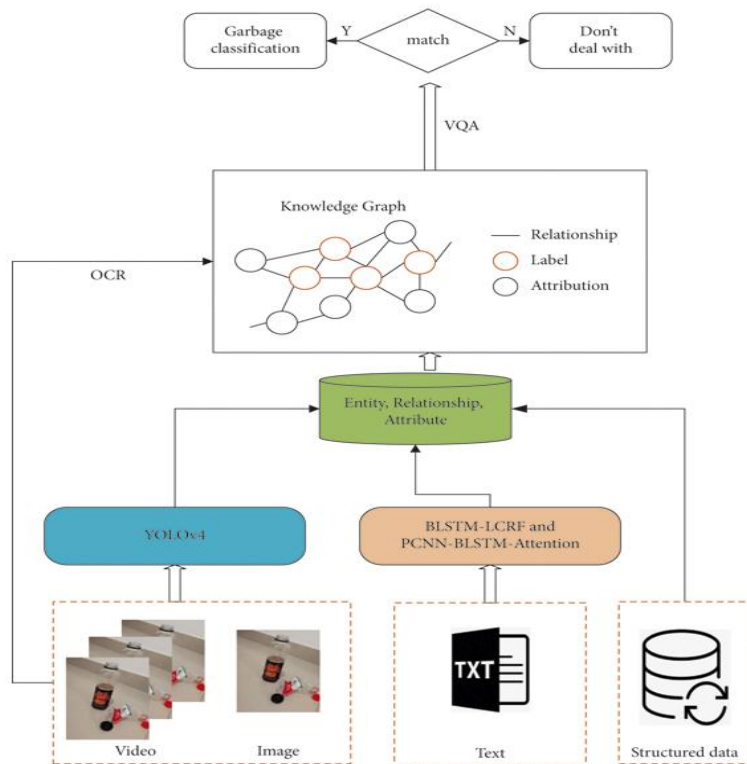


Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web UI, Mobile App, Chatbot etc.	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Handles the input from the user interface and passes it to the appropriate application logic module.	Python, Flask, Django
3.	Application Logic-2	Responsible for storing the input in the database and maintaining a record of the user's disposal history.	Python, Node.js, Java
4.	Application Logic-3	Uses: The first application logic captures the image of the garbage and preprocess it before sending it to the machine learning model. This includes re-sizing the image and adjusting brightness and contrast.	Python, Node.js, Java, Shell Scripts
5.	Database	This component stores information about the garbage disposal records. This information includes the type of garbage disposed of, the time and date of disposal, and the location of disposal.	MySQL, PostgreSQL, MongoDB
6.	Cloud Database	This database is used to store data on a cloud-based platform.	Amazon RDS, Google Cloud SQL, Microsoft Azure SQL

7.	File Storage	This component stores the images of the garbage for future reference.	IBM Block Storage or Other Storage Service or Local Filesystem, Amazon S3, Google Cloud Storage, Microsoft Azure Blob Storage
8.	External API-1	This component interacts with external systems, such as waste management systems, to provide information about the garbage disposal.	IBM Weather API,
9.	External API-2	This component can interact with other applications, such as weather applications, to assist in the garbage classification.	Aadhar API
10.	Machine Learning Model	This model is trained to classify the garbage accurately based on the input image.	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Infrastructure server configuration: TensorFlow, PyTorch, Keras, Scikit-learn Cloud Server Configuration: Amazon Web Services (AWS), Google Cloud Platform (GCP), Microsoft Azure, DigitalOcean

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks provides easy to use tools and libraries for implementing machine learning models	Technology of Open source framework,Tensor flow, Keras , Python.
2.	Security Implementations	As with any system that handles user data, security is paramount. The system should implement measures such as encryption, authentication, and role-based access control to ensure the safety of user data.	Encryption, Authentication,Role-based access control,etc.
3.	Scalable Architecture	The garbage classification system should be designed to handle a large number of users and accommodate for growth in the future. This could be achieved by deploying the system on cloud infrastructure	AWS , Google cloud
4.	Availability	The system should be highly available, with little to no downtime. This could be achieved through measures such as redundancy..	Redundancy, and regular backups.
5.	Performance	The garbage classification system should be optimized for fast inference times and accurate classification results	Deep learning models and GPUs.

