High-Level Design (HLD) Document

1. Project Overview

The Mushroom Classification project aims to predict whether a mushroom is edible or poisonous using machine learning models. It includes data preprocessing, model training, API development, and a web-based UI for predictions.

2. System Architecture

The system follows a modular design consisting of the following components:

- Data Preprocessing: Clean and encode categorical features.
- Model Training: Train multiple ML models and select the best-performing model.
- Flask API: Deploy the trained model for real-time predictions.
- User Interface: A web-based UI allowing users to select a mushroom and get predictions.

3. Workflow

1. User selects a mushroom from the dropdown.
2. Flask API receives the request and processes the input.
3. Model makes a prediction (Edible or Poisonous).
4. The result is sent back to the user interface and displayed on the screen.

4. Technology Stack

- Programming Language: Python
- Machine Learning Libraries: Scikit-Learn, Pandas, Joblib
- Web Framework: Flask
- Frontend: HTML, CSS, JavaScript
- Deployment: Flask Local Server (Optional: Cloud)

5. Future Improvements

- Optimize model inference time.
- Deploy API on cloud platforms like AWS or GCP.
- Enhance UI with better visualization.