

Artificial Intelligence & Machine Learning

Project Documentation format

1.Introduction :

- **Project Title:** Grainpalette - A Deep Learning Odyssey in Rice Type Classification Through Transfer Learning
- **Team Members:**
 - Ampabathina Sathish Kumar
 - D Hemanth
 - K Jyothirmayee
 - Ramineni Poojitha
 - Tamaka Jagjeevanram

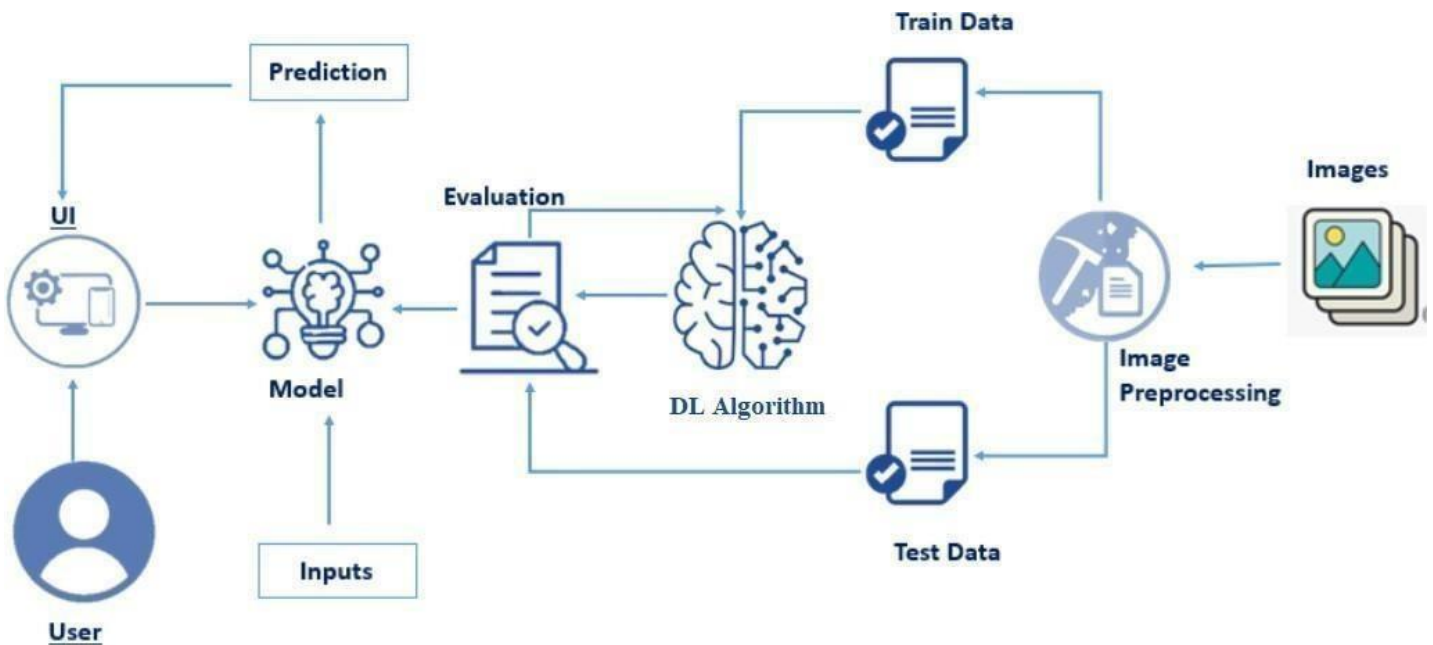
2.Project Overview :

- **Purpose:** This project aims to automatically classify rice grain types from images using deep learning. By leveraging transfer learning with MobileNetV2, the model efficiently distinguishes between rice varieties. The application helps in agricultural automation, quality control, and grain classification tasks.
- **Key Features:**
 - Upload rice grain images and get instant classification results
 - Lightweight, fast inference using MobileNetV2
 - Simple and intuitive user interface
 - Flask-based architecture for easy deployment

3.Architecture :

- **Frontend:**
 - Built using HTML templates in Flask
 - Allows image upload and displays predicted rice type
- **Backend:**
 - Handles uploaded images and prediction logic
 - Loads pre-trained MobileNetV2 model using TensorFlow- Processes image
- **Dataset and Tools Used:**
 - Dataset: Kaggle Rice Grain Image Dataset
 - Libraries: TensorFlow, OpenCV, NumPy, Pillow

4.System Architecture:



5. Installations:

- **Install Python (3.x)**

Download and install Python from the official website: <https://www.python.org/downloads/>

- **Create a Virtual Environment(Optional but recommended)**

-Open command prompt and run: `python -m venv rice_env`
 -`rice_env\Scripts\activate`(for Windows)

- **Install Required Packages**

- Make sure you're in the virtual environment
- run: `pip install tensorflow flask opencv-python`
`numpy pillow`

6. Download the Rice Classification Project Files

Ensure you have the following in your project folder:

- `app.py` (Flask backend)
- `rice_model.h5` (MobileNetV2 trained model)
- `static/` folder (for CSS/images)
- `templates/` folder (for HTML files)

7. How to Use:

1. Open your terminal or command prompt.

2. Navigate to the project folder:
cd path/to/project
3. Run the Flask application:
python app.py
4. open a web browser and go to: <http://127.0.0.1:5000>
5. Upload a rice grain image using the interface.
6. Click on Predict to see the classification result.

8.Future Enhancements:

- Improve accuracy with a larger and more diverse dataset
- Add support for more rice types
- Deploy the model on cloud for remote access
- Add user authentication and prediction history

9.Screenshots or Demo:

1. Welcome to Rice Type Detection



2. Choose Any image and click predict



3. Predicted Class is Basmati



4. Predicted Class is Jasmine



10. Goals:

- Automate the classification of different rice grain types from images
- Assist farmers, researchers, and industry in rice quality assessment
- Build a scalable and lightweight model for real-time applications
- Provide an easy-to-use interface for prediction and results display