Final Report

1. INTRODUCTION

Project Title
GrainPalette: A Deep Learning Odyssey In Rice Type Classification Through Transfer Learning

Team Members
Team ID : LTVIP2025TMID41595

1)N Karthik

2)N Jagadeeswar Reddy

3)N Venkateswara Reddy

 4)Ns Iffath Muskan

2. PROJECT OVERVIEW

Purpose
GrainPalette aims to assist agricultural researchers and food industry professionals by providing a reliable, automated system for classifying different types of rice grains. This project leverages MobileNetV2 through transfer learning and delivers predictions through a user-friendly web interface. It enhances classification speed, minimizes human error, and aids in quality control processes.

Features
• Upload and analyze rice grain images
• Classify rice types (e.g., Basmati, Jasmine, Arborio, etc.)
• Flask-powered web interface
• Real-time prediction results
• Responsive UI with Bootstrap

3. ARCHITECTURE

Frontend
Built using HTML5, CSS3, and Bootstrap for responsiveness. Provides image upload functionality, prediction result display, and user-friendly interaction.

Backend

Developed in Python using Flask. Manages image uploads, loads the trained model, and returns classification results.

Database

No database is used in the current version. Predictions are performed in real-time. Future versions may include a database for tracking results.

4. SETUP INSTRUCTIONS

Prerequisites

• Python 3.8+
• Anaconda (optional)
• Install dependencies:
  pip install flask tensorflow numpy pandas matplotlib scikit-learn

Installation

• Clone the repository:
  git clone https://github.com/yourusername/GrainPalette
  cd GrainPalette
• Ensure rice_model.h5 is in the root directory
• Run the application:
  python app.py
• Access the app at http://127.0.0.1:5000

5. FOLDER STRUCTURE

GrainPalette/
├── static/   # Static files (CSS, images)
├── templates/   # HTML templates
├── rice_model.h5   # Trained rice classifier model
├── app.py   # Flask application
├── README.md   # Documentation
├── requirements.txt # Project dependencies

6. RUNNING THE APPLICATION

• Open terminal
• Run: python app.py
• Navigate to: http://127.0.0.1:5000

7. API DOCUMENTATION

Endpoint | Method | Description
/ | GET | Returns homepage
/predict | POST | Accepts uploaded image and returns predicted rice type

8. AUTHENTICATION

Authentication is not included in this version. Future releases may implement JWT or OAuth2 for secure access.

9. USER INTERFACE

Homepage allows image upload and prediction initiation. The result page displays the predicted rice type and confidence score. UI can be enhanced with animations and dynamic feedback.

10. TESTING

Manual testing was conducted using various rice images. Achieved model accuracy: 94.8%. Used unseen samples for evaluating generalization.

11. SCREENSHOTS OR DEMO

[Add screenshots or a link to the YouTube/Google Drive demo here]

12. KNOWN ISSUES

• Prediction accuracy may vary with image lighting or background.
• Supports only selected rice types in this version.

13. FUTURE ENHANCEMENTS

• Add more rice classes and multilingual support.
• Enable user login and result history.
• Cloud deployment for broader accessibility.

APPENDIX

Source Code: [https://github.com/karthik8094/GrainPalette-A-Deep-Learning-Odyssey-In-Rice-Type-Classification-Through-Transfer-Learning]
Dataset: [https://www.kaggle.com/datasets/muratkokludataset/rice-image-dataset]
Demo Video: [https://drive.google.com/file/d/1vJFtvds4eBB0rQJlTZXKhZ-43ReSpmMx/view?usp=drivesdk]