GrainPalette - A Deep Learning Odyssey in Rice Type Classification

Domain

Artificial Intelligence

Tech Stack

Python, TensorFlow, Keras, NumPy, Matplotlib

Overview

GrainPalette is a deep learning-based project that focuses on the classification of different rice grain types using transfer learning. The model leverages MobileNetV2, a lightweight CNN model, to efficiently and accurately classify rice images into predefined categories. This project aims to assist farmers, food industries, and quality control units in automating rice type identification.

Problem Statement

Manual rice classification is time-consuming and error-prone. This project aims to develop a system that classifies rice grain images into five distinct types:

Arborio

Basmati

Ipsala

Jasmine

Karacadag

Objectives

- Apply Transfer Learning using MobileNetV2
- Achieve high accuracy in rice classification
- Build an efficient model that works on low-resource devices
- Visualize training/validation accuracy and loss

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Model Architecture

Base Model: MobileNetV2 (with ImageNet weights, include_top=False)

Custom Head:

- Global Average Pooling
- Dense Layer with Dropout
- Final Softmax layer for 5 classes

Results

- Accuracy: Achieved over 95% accuracy on validation data
- Loss Graphs: Plotted using Matplotlib
- Prediction: Works on unseen rice images

Steps Involved

- Data Preprocessing
- Data Augmentation
- Model Creation
- Model Training & Validation
- Evaluation & Accuracy Plotting

Folder Structure

GrainPalette/

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+?? Rice_Image_Dataset/

| +?? Arborio/

| +?? Basmati/

| +?? Ipsala/

| +?? Jasmine/

| +?? Karacadag/

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GrainPalette - A Deep Learning Odyssey in Rice Type Classification

+?? rice_classifier_model.h5

+?? train_model.py

+?? predict_image.py

+?? README.pdf

Contributors

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