README

🍎 Fruit Freshness Detection

This project explores how computer vision and deep learning can be used to assess the freshness of fruits based on images. By analyzing visual features such as color, texture, and signs of spoilage, the model classifies fruits as fresh or rotten.

🌟 Project Summary

This is a real-world inspired project built to:

- Automate fruit quality detection
- Demonstrate practical use of transfer learning in image classification
- Explore visual explainability through confidence-based predictions

Using a dataset of labeled fruit images (apples, bananas, oranges — both fresh and rotten), I trained a convolutional neural network (CNN) based on VGG16 to identify freshness from image data.

🛠️ Technologies & Tools

- Python 🐍

- TensorFlow / Keras – Model architecture and training
- OpenCV – Image handling and preprocessing
- Matplotlib – Visualizing performance and predictions

📈 Results

- ✅ Achieved ~97% accuracy on the test set
- ✅ Created a clean workflow for data preprocessing, training, evaluation, and visualization
- ✅ Built visual prediction tools with confidence scores
- ✅ Overcame real debugging challenges (data order, class mismatch, etc.)

📁 Key Files

- `fruit-vision-classification-notebook.ipynb`: Full notebook with code, training, and insights
- `fruit_vision_model.h5`: Trained Keras model (available via Kaggle)

📂 Dataset & Model

- 🔗 Dataset: Fruits – Fresh and Rotten (Kaggle)
- 🔗 Trained Model (Kaggle)

✨ Reflections

This project taught me more than just how to build a model. It taught me how to:

- Debug deep learning models when things go wrong
- Stay consistent even when results aren’t what I expected
- Trust the process — and enjoy it too

Crafted with care and curiosity by Sarina 💛