Smart Sorting: Transfer Learning for Identifying Rotten Fruits and Vegetables

Abstract

This project focuses on identifying fresh and rotten fruits and vegetables using Deep Learning and Transfer Learning techniques. A pre-trained Convolutional Neural Network (CNN) model is used to classify images efficiently and accurately.

Introduction

Quality control in agriculture and food industries is crucial. Manual inspection is time-consuming and error-prone. This system automates the process using image classification.

Objectives

To build an automated system to classify fruits and vegetables as fresh or rotten using machine learning.

System Architecture

The system consists of image input, preprocessing, data augmentation, transfer learning model, training, and prediction.

Software Requirements

Python, Flask, TensorFlow, Keras, NumPy, OpenCV, HTML, CSS.

Hardware Requirements

Processor: i3 or above, RAM: 4GB minimum, Storage: 10GB.

Dataset Description

Images of fresh and rotten fruits and vegetables collected from public datasets such as Kaggle.

Methodology

Images are preprocessed and augmented. Transfer Learning is applied using a pre-trained CNN model. The model is trained and evaluated to predict results.

Implementation

The application is developed using Flask. Users upload images, which are passed to the trained model for prediction.

Results

The system successfully classifies fruits and vegetables with high accuracy and fast response time.

Advantages

Automated, fast, accurate, reduces manual effort, scalable.

Applications

Agriculture industry, supermarkets, food processing units, cold storage.

Conclusion

The project demonstrates the effectiveness of transfer learning in food quality detection and automation.