Rotten vs Fresh Fruit Classification

Supermarkets

A shopper's frustration with spoiled produce is a symptom of a larger issue. When a customer purchases rotten food can have long-term negative effects on the business.

Regulatory Compliance:	Selling rotten or spoiled food can lead to hefty fines, lawsuits.
Reducing Waste:	By identifying and removing rotten food quickly, stores can manage their inventories more effectively, reduce waste.
Labor Cost Reduction:	Checking the freshness of fruits and other perishables is done manually, which is labor-intensive.
Minimizing Waste:	Supermarket can identify a product that is going bad marking it down for quick sale.By ensuring the freshness of their produce, supermarkets can maintain customer satisfaction.
Preventing Loss of Sales:	Customers dissatisfied with the quality of produce may choose to shop elsewhere.
What to do ?	The implementation of Deep Learning models for identifying rotten fruits.

It's a scenario that many of us have unfortunately encountered - bringing home a fresh piece of fruit from the supermarket, only to cut into it and find it's already rotten

Let's begin!

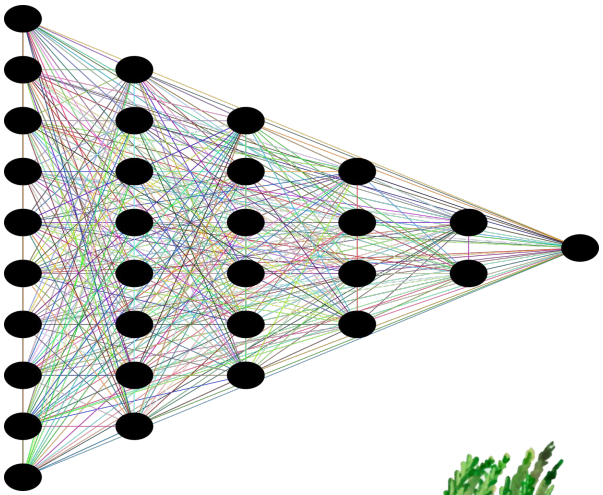
Accurate classification of fresh and rotten food is key for supermarkets.

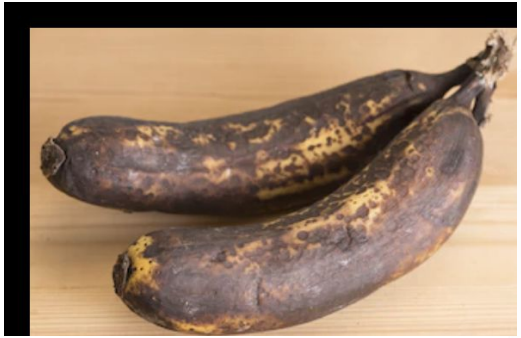
Leverage AI and machine learning to automate this classification process.

Ideas

Convolutional Neural Network

CNN can play a crucial role in addressing these problems.





We are utilizing Fruit fresh_rotten Dataset

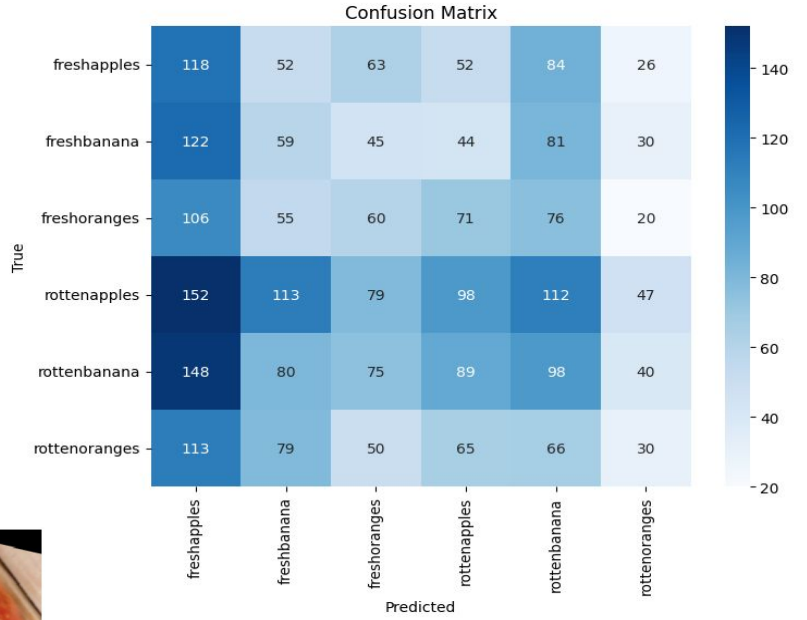
Collection of 13.600 .png images.

Dataset has been organized into two primary folders Train Test.

Train is used to train our model 10.451 .png images
Test 2698 .png images

Baseline Model

	precision	recall	f1-score	support
freshapples	0.16	0.30	0.20	395
freshbanana	0.13	0.15	0.14	381
freshoranges	0.16	0.15	0.16	388
rottenapples	0.23	0.16	0.19	601
rottenbanana	0.19	0.18	0.19	530
rottenoranges	0.16	0.07	0.10	403
accuracy			0.17	2698
macro avg	0.17	0.17	0.16	2698
weighted avg	0.18	0.17	0.17	2698



The final model is Convolutional Neural Network

Conv2D

Batch Normalization

MaxPooling2D

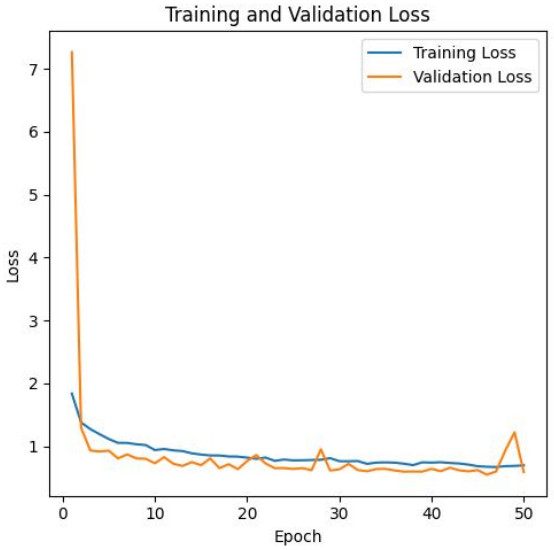
Flatten

Dense

Dropout

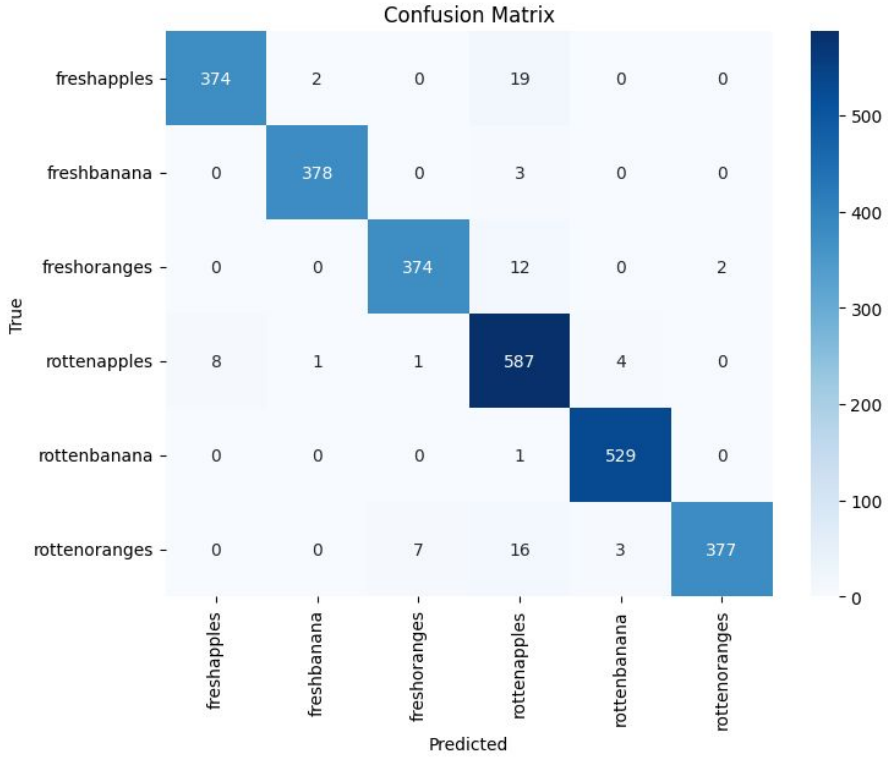
Dense

Test Accuracy 97%


Training and Validation Loss
Training Loss
Validation Loss
Loss
Epoch
0
10
20
30
40
50
1
2
3
4
5
6
7


Training and Validation Accuracy
Training Accuracy
Validation Accuracy
Accuracy
Epoch
0
10
20
30
40
50
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0

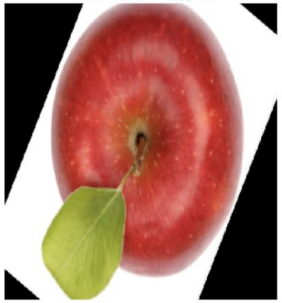
Final Model



2698 images

	precision	recall	f1-score	support
freshapples	0.98	0.95	0.96	395
freshbanana	0.99	0.99	0.99	381
freshoranges	0.98	0.96	0.97	388
rottenapples	0.92	0.98	0.95	601
rottenbanana	0.99	1.00	0.99	530
rottenoranges	0.99	0.94	0.96	403
accuracy			0.97	2698
macro avg	0.98	0.97	0.97	2698
weighted avg	0.97	0.97	0.97	2698

Random batch from test data
Random images from chosen batch



Ideas

Data analysis could help to identify which type of produce are most often classified as rotten. Test ethylene-absorbent strip for specific fruits.

Improve model to predict slightly imperfect yet still edible fruits and offer produce at a discount.

Thanks!

Do you have any questions?