Maago – A Smart System for Mango Plantation Management

Project ID : 2023-309

IT20466008
Withanaarachchi S. P.

Specialization: Computer Systems and Network Engineering

Smart Watering System Enabled by IoT and Machine Learning

Introduction

Sri Lanka has a long and rich history of mango cultivation. The objective is to create a smart watering system based on IoT and Machine Learning to boost mango production and reduce water usage.

Research Question

- How to identify the water needs of the plantation provide water through a smart system using IoT and machine Learning technologies?

IT20280260
Aksham M.Z.M

Specialization: Information Technology

Introduction

- To implement a system to identify the disease on the mango leaves using the scanner
- Identifying disease on mango leaves is to facilitate early detection and
  control of plant diseases to increase the mango production

Research Question

- How to identify the mango disease and increase the production through a scanning system?

Methodology

- Machine learning-based image analysis:

  Method for spotting diseases of mango tree leaves is to analyze photographs of the leaves and look for patterns that correspond to various diseases. In order to construct a predictive model for disease identification, the system may need to be trained a large dataset of images of both healthy and diseased mango leaves.

Completed Implementations

- Collect Dataset.
- Train the Restnet50 ML model using 80% of the training data
- Adjusting and training the model to achieve high accuracy.
- Validate the model using the 20% of test data
- Identify the mango disease.

Future Implementations

- Add 3 more disease to train model and add to system.
- Suggest the prevention solution for the disease.
- Design and Develop the Mobile App.

IT20276928
Jayamanne B.D.N

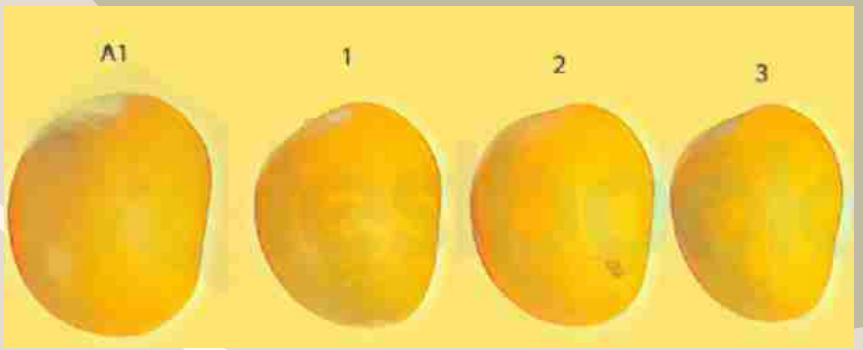
Specialization: Computer Systems and Network Engineering

IoT Based Mango Quality Grading System

Introduction

•Traditional mango grading methods are manual and subjective, with human experiences.
•In grading systems, mangoes are classified into different grades, such as “A, B, C” classes.

•The proposed system will aim to implement an IoT device and machine learning to develop an automated mango grading system.



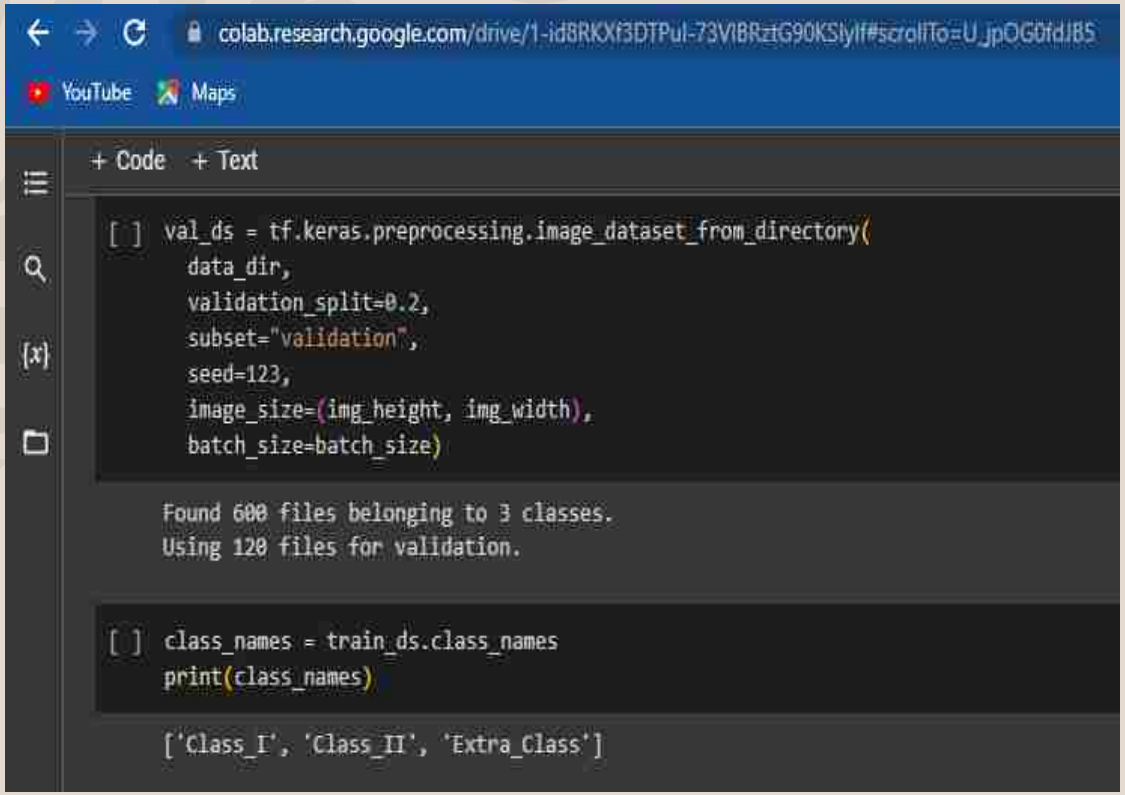
RESEARCH QUESTION

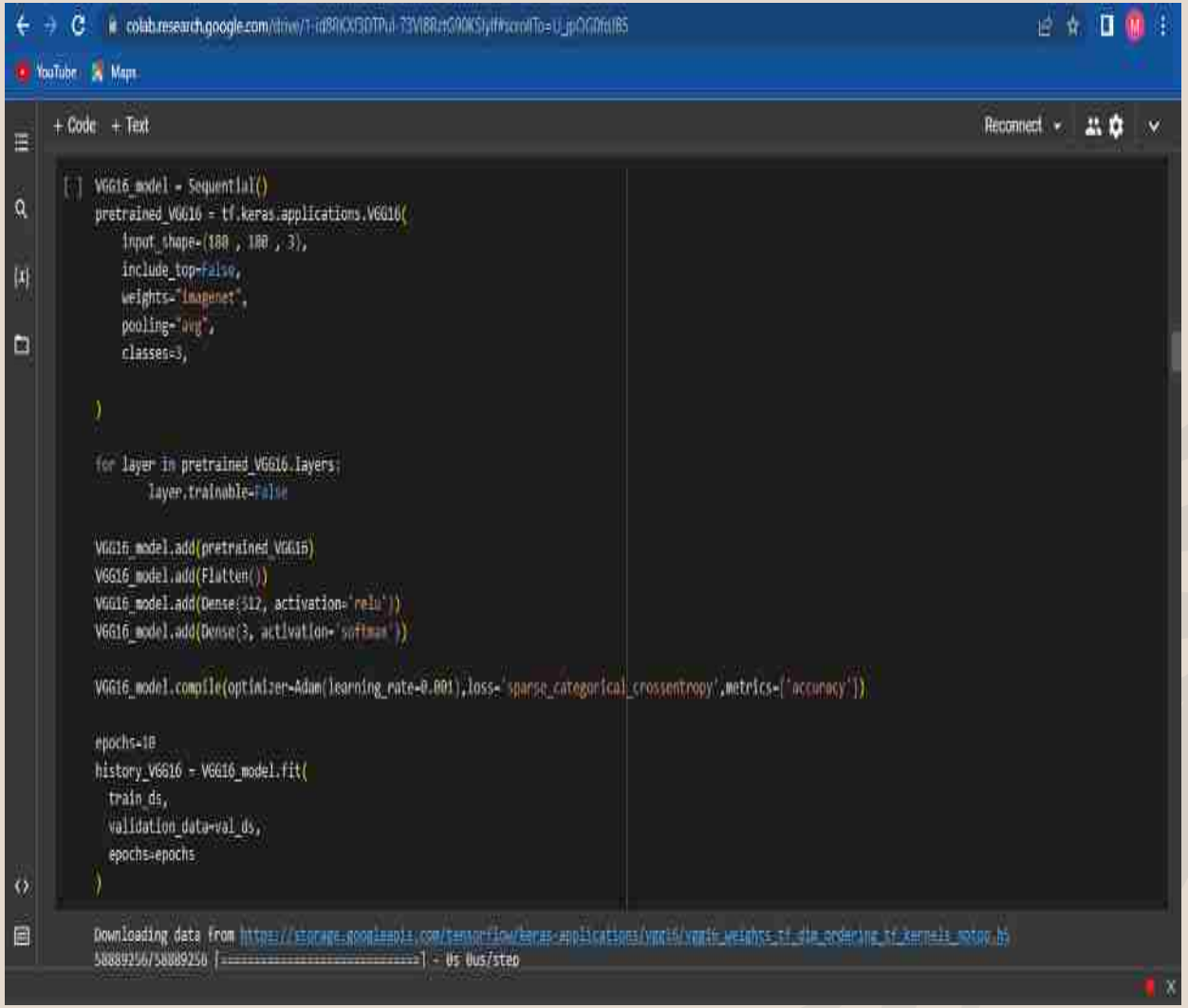
- ✓ **How mango farmers increase their cost of mango production ?**
- ✓ **How to increase accuracy of mango grading ?**
- ✓ **How farmers reduce time consuming and workforce?**

Sub Objective

Implement of a machine learning model to identify the grade of mangos from the images.

An IoT device captures mango images and weighs them using a camera and weight sensor.


colab.research.google.com/drive/1-id8RKXf3DTPul-73VI8RztG90KSlylf#scrollTo=U_jpOG0fdJB5
YouTube
Maps
+ Code
+ Text
[ ] val_ds = tf.keras.preprocessing.image_dataset_from_directory(
data_dir,
validation_split=0.2,
subset="validation",
seed=123,
image_size=(img_height, img_width),
batch_size=batch_size)
Found 600 files belonging to 3 classes.
Using 120 files for validation.
[ ] class_names = train_ds.class_names
print(class_names)
['Class_I', 'Class_II', 'Extra_Class']


YouTube
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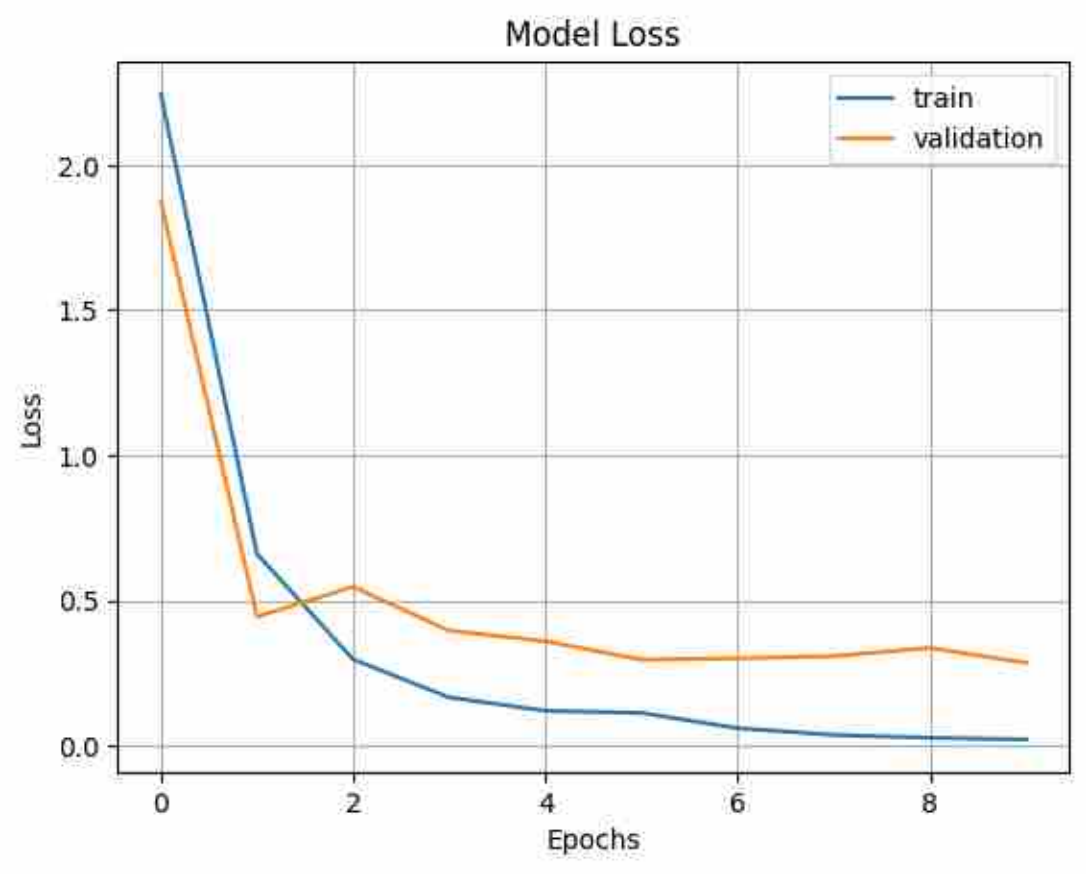
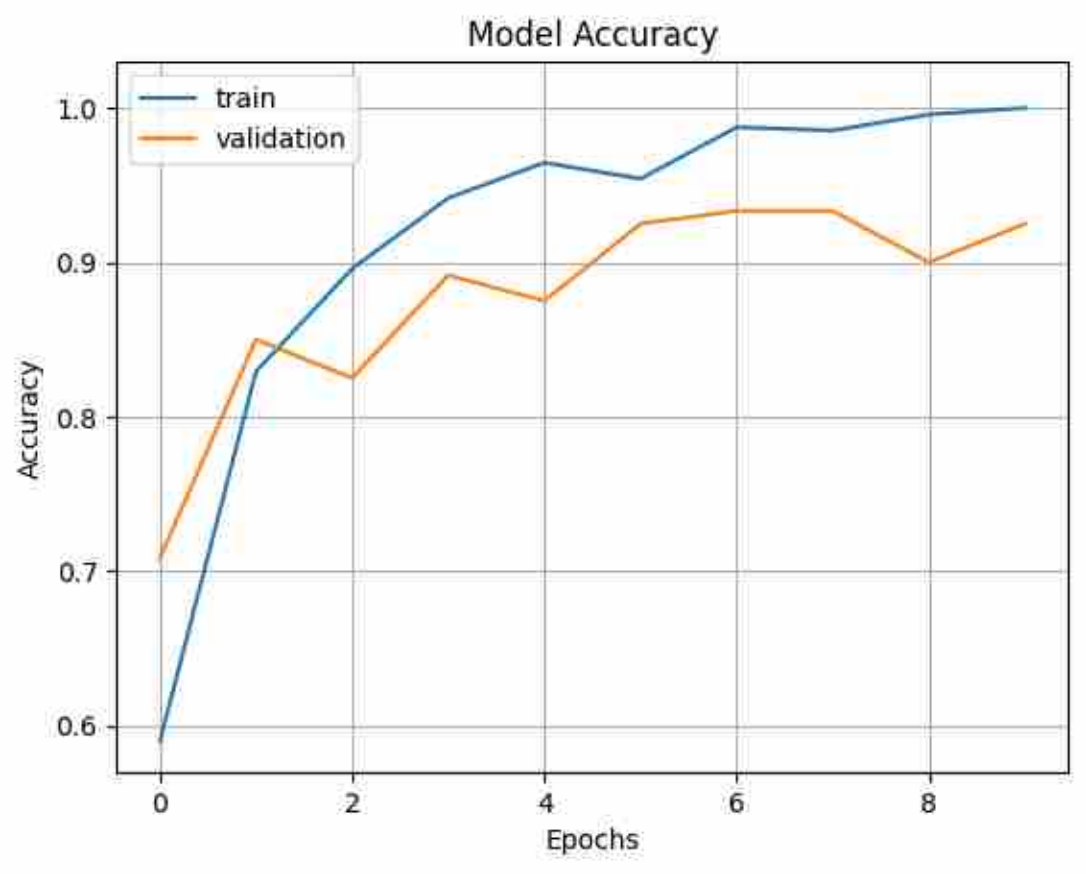
+ Text
Reconnect
[ ] VGG16_model = Sequential()
pretrained_VGG16 = tf.keras.applications.VGG16(
input_shape=(180 , 180 , 3),
include_top=False,
weights="imagenet",
pooling='avg',
classes=3,
)
for layer in pretrained_VGG16.layers:
layer.trainable=False
VGG16_model.add(pretrained_VGG16)
VGG16_model.add(Flatten())
VGG16_model.add(Dense(512, activation='relu'))
VGG16_model.add(Dense(3, activation='softmax'))
VGG16_model.compile(optimizer=Adam(learning_rate=0.001),loss='sparse_categorical_crossentropy',metrics=['accuracy'])
epochs=10
history_VGG16 = VGG16_model.fit(
train_ds,
validation_data=val_ds,
epochs=epochs
)
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/vgg16/vgg16_weights_tf_dim_ordering_tf_kernels_notop.h5
58889256/58889256 [==============================] - 0s 0us/step

Accuracy And Loss





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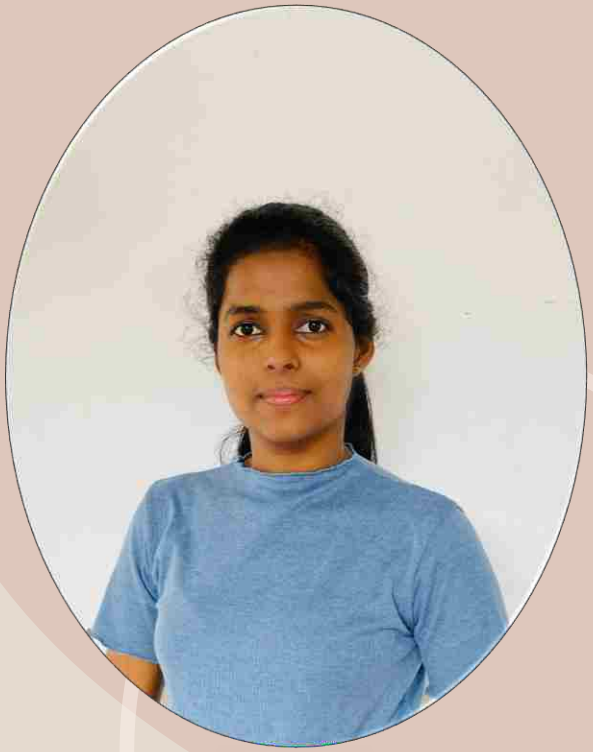
Niroshani A.



Specialization: Information Technology

Smart Mango Yield Prediction System

Introduction

- Mango is a highly valued fruit crop globally.
- The ability to predict mango yield in advance helps farmers to make informed decisions regarding resource allocation, harvest planning, and marketing strategies.
- In this research, we aim to develop a Regression model for predicting the yield of mango based on some important key factors.

Tools and Technologies

Python

Google colab

Pandas

NumPy

Thank you