Sprint-1

Model Building

Date	02 November 2022
Team ID	PNT2022TMID37845
Project Name	AI-powered Nutrition Analyzer for FitnessEnthusiasts
Maximum Marks	

Dataset:

- ❿ In our dataset we have collected images of the five variety of fruits.
  - • Apple
  - • Orange
  - • Pineapple
  - • Watermelon
  - • Banana

Drive link : https://drive.google.com/file/d/1jzDjV7jYcIzlIieagaJdubMJ3YeLsry1/view?usp=share_link

Image Pre-processing:

- ❿ Import The ImageDataGenerator Library
- ❿ Configure ImageDataGenerator Class
- ❿ Apply Image DataGenerator Functionality To Trainset And Testset

Model Building:

- ❿ Importing The Model Building Libraries
- ❿ Initializing The Model
- ❿ Adding CNN Layers
- ❿ Adding Dense Layers
- ❿ Configure The Learning Process

Data Collection

Download the dataset here

```
# Unzipping the dataset
!unzip '/content/Dataset.zip'
```

```
inflating:
Dataset/TRAIN_SET/WATERMELON/r_288_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_289_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_28_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_290_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_307_100.jpg
```

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inflating:
Dataset/TRAIN_SET/WATERMELON/r_308_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_309_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_30_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_41_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_42_100.jpg
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Dataset/TRAIN_SET/WATERMELON/r_43_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_44_100.jpg
```

```
inflating:
Dataset/TRAIN_SET/WATERMELON/r_45_100.jpg

inflating:
Dataset/TRAIN_SET/WATERMELON/r_46_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_4_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_50_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_57_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_5_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_6_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_7_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_81_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_8_100.jpg
inflating:
Dataset/TRAIN_SET/WATERMELON/r_9_100.jpg
```

Image Preprocessing

```
#Importing The ImageDataGenerator Library
from keras.preprocessing.image import ImageDataGenerator
```

Image Data Augmentation

```
#Configure ImageDataGenerator Class
train_datagen =
ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizonta
test_datagen=ImageDataGenerator(rescale=1./255)
```

Applying Image DataGenerator Functionality To TrainsetAnd Testset

```
#Applying Image DataGenerator Functionality To Trainset
And Testsetx_train = train_datagen.flow_from_directory(
    r'/content/Dataset/TRAIN_SET',
    target_size=(64,
64),batch_size=5,color_mode='rgb',class_mode='sparse')#Applying
Image DataGenerator Functionality To Testset
x_test =
    test_datagen.flow_from_dire
    ctory(
    r'/content/Dataset/TEST_SET
    ',
    target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')

    Found 4118 images belonging to
    5 classes.Found 929 images
    belonging to 5 classes.


#checking the number
of classes
print(x_train.class_
indices)

    {'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}


#checking the number
of classes
print(x_test.class_i
ndices)

    {'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}


from collections import
Counter as cc(x_train
.labels)

    Counter({0: 995, 1: 1354, 2: 1019, 3: 275, 4: 475})
```

Model Building

- Importing The Model Building Libraries

```
import
numpy
as np
import
tensorf
low
from tensorflow.keras.models import
Sequentialfrom tensorflow.keras
import layers
from tensorflow.keras.layers import Dense,Flatten
from tensorflow.keras.layers import Conv2D,MaxPooling2D,Dropout
```

- Initializing The Model

```
model = Sequential()
```

- Adding CNN Layers

```
# Initializing the CNN
classifier = Sequential()

# First convolution layer and pooling
classifier.add(Conv2D(32, (3, 3), input_shape=(64, 64, 3), activation='relu'))
classifier.add(MaxPooling2D(pool_size=(2, 2)))

# Second convolution layer and pooling
classifier.add(Conv2D(32, (3, 3), activation='relu'))

# input_shape is going to be the pooled feature maps from the previous
convolution layerclassifier.add(MaxPooling2D(pool_size=(2, 2)))

# Flattening the layers
classifier.add(Flatten())
```

- Adding Dense Layers

```
classifier.add(Dense(units=128,
activation='relu'))
classifier.add(Dense(units=5,
activation='softmax'))

#summary
of our
model
classifier
.summary()
```

Model: "sequential_1"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 62, 62, 32)	896
max_pooling2d (MaxPooling2D)	(None, 31, 31, 32)	0
conv2d_1 (Conv2D)	(None, 29, 29, 32)	9248
max_pooling2d_1 (MaxPooling2D)	(None, 14, 14, 32)	0
flatten (Flatten)	(None, 6272)	0
dense (Dense)	(None, 128)	802944
dense_1 (Dense)	(None, 5)	645

```
Total params: 813,733
Trainable params: 813,733
Non-trainable params: 0
```

- Configure The Learning Process

```
# Compiling the CNN
# categorical_crossentropy for more than 2
classifier.compile(optimizer='adam', loss='sparse_categorical_crossentropy',
metrics=['acc
```