MODEL BUILDIND

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PROJEET NAME	AI-powered Nutrition Analyzer for Fitness Enthusiasts
MARK	6

Model Building

- Importing The Model Building Libraries

```
import numpy as np
import tensorflow as tf
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
classifi
er.summa
ry()
```

```
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 (MaxPooling  (None, 14, 14, 32)        0
2D)
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
```

- Train The Model

```
#Fitting the model
classifier.fit_generator(generator=x_train,steps_per_epoch =
len(x_train),epochs=20, valid
```

```
Epoch 1/20
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:2:
UserWarning: `Model.
```

824/824 [==============================] Epoch 2/20	- 21s	16ms/step	- loss:	0.6172	- accuracy:
824/824 [==============================]	- 13s	15ms/step	- loss:	0.4115	- accuracy:
Epoch 3/20 824/824 [==============================]	- 13s	16ms/step	- loss:	0.3766	- accuracy:
Epoch 4/20 824/824 [==============================]	- 13s	16ms/step	- loss:	0.3484	- accuracy:
Epoch 5/20					

824/824 [==============================] Epoch 6/20	- 13s	16ms/step	- loss:	0.3243	- accuracy:
824/824 [==============================]	- 13s	16ms/step	- loss:	0.3240	- accuracy:
Epoch 7/20 824/824 [==============================]	- 13s	16ms/step	- loss:	0.2887	- accuracy:
Epoch 8/20 824/824 [==============================]	- 13s	16ms/step	- loss:	0.2728	- accuracy:
Epoch 9/20 824/824 [==============================]	- 13s	16ms/step	- loss:	0.2717	- accuracy:
Epoch 10/20					
824/824 [==============================]	- 14s	17ms/step	- loss:	0.2365	- accuracy:
Epoch 11/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.2301	- accuracy:
Epoch 12/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.2083	- accuracy:
Epoch 13/20					
824/824 [==============================]	- 13s	15ms/step	- loss:	0.2049	- accuracy:
Epoch 14/20					

824/824 [==============================]	- 12s	15ms/step	- loss:	0.1930	- accuracy:
Epoch 15/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.1807	- accuracy:
Epoch 16/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.1712	- accuracy:
Epoch 17/20					
824/824 [==============================]	- 13s	15ms/step	- loss:	0.1599	- accuracy:
Epoch 18/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.1619	- accuracy:
Epoch 19/20 824/824 [==============================]	- 13s	15ms/step	- loss:	0.1505	- accuracy:
Epoch 20/20					
824/824 [==============================]	- 12s	15ms/step	- loss:	0.1211	- accuracy:

```
<keras.callbacks.History at 0x7fd655833d90>
```

- Saving The Model

```
classifier.save('nutrition.h5')
```

- Testing The Model

```
#Predict the results
from tensorflow.keras.models
import load_modelfrom
keras.preprocessing import image
model = load_model("nutrition.h5")


from tensorflow.keras.utils import
img_to_array#loading of the image
img =
load_img(r'/content/Sample_Images/Test_Image1.jpg',grayscale=False,target_siz
e= (64,#image to array
x =
img_to_a
rray(img
)
```

```
#changin
g the
shape
x = np.expand_dims(x,axis = 0)

predict_x=model.predict(x)
classes_x=np.argmax(predi
ct_x,axis=-1)classes_x
```

```
1/1 [==============================] - 0s 18ms/step
array([0])
```

```
index=['APPLES', 'BANANA', 'ORANGE','PINEAPPLE','WATERMELON']
result=str(index[c
lasses_x[0]])
result
```

```
'APPLES'
```

Colab HYPERLINK "https://colab.research.google.com/signup?utm_source=footer&utm_medium=link&utm_campaign=footer_li

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