Project Planning Phase

Image Preprocessing

Date	12 October 2022
Team ID	PNT2022TMID35969
Project Name	AI-powered Nutrition Analyzer for Fitness Enthusiasts

Import ImageDataGenerator Library

```
pip install tensorflow
```

```
Using cached google_pasta-0.2.0-py3-none-any.whl (57 kB)
Requirement already satisfied: pyparsing>=2.0.2 in c:\02_application folders\08_anaconda\lib\site-packages (from packaging->tensorflow) (2.4.7)
Requirement already satisfied: wheel<0.26 in c:\02_application folders\08_anaconda\lib\site-packages (from tensorboard<2.11,>=2.10->tensorflow) (0.35.1)
Collecting tensorboard-plugin-wit>=1.6.0
  Downloading tensorboard_plugin_wit-1.8.1-py3-none-any.whl (781 kB)
     |                              | 781 kB ...
Collecting tensorboard-data-server<0.7.0,>=0.6.0
  Downloading tensorboard_data_server-0.6.1-py3-none-any.whl (2.4 kB)
Requirement already satisfied: werkzeug>=1.0.1 in c:\02_application folders\08_anaconda\lib\site-packages (from tensorboard<2.11,>=2.10->tensorflow) (1.0.1)
Collecting google-auth<3,>=1.6.3
  Downloading google_auth-2.14.1-py2.py3-none-any.whl (175 kB)
     |                              | 175 kB ...
Collecting google-auth-oauthlib<0.5,>=0.4.1
  Using cached google_auth_oauthlib-0.4.6-py2.py3-none-any.whl (18 kB)
Requirement already satisfied: requests<3,>=2.21.0 in c:\02_application folders\08_anaconda\lib\site-packages (from tensorboard<2.11,>=2.10->tensorflow) (2.24.0)
Collecting markdown>=2.6.8
  Downloading Markdown-3.4.1-py3-none-any.whl (93 kB)
     |                              | 93 kB 709 kB/s
Collecting rsa<5,>=3.1.4; python_version >= "3.6"
  Downloading rsa-4.9-py3-none-any.whl (34 kB)
Collecting pyasn1-modules>=0.2.1
  Using cached pyasn1_modules-0.2.8-py2.py3-none-any.whl (155 kB)
Collecting cachetools<6.0,>=2.0.0
  Downloading cachetools-5.2.0-py3-none-any.whl (9.3 kB)
Collecting requests-oauthlib>=0.7.0
  Using cached requests_oauthlib-1.3.1-py2.py3-none-any.whl (23 kB)
Requirement already satisfied: chardet<4,>=3.0.2 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (3.0.4)
Requirement already satisfied: certifi>=2017.4.17 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (2020.6.20)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (1.25.11)
Requirement already satisfied: idna<3,>=2.5 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (2.10)
Collecting importlib-metadata>=4.4; python_version < "3.10"
  Downloading importlib_metadata-5.0.0-py3-none-any.whl (21 kB)
Collecting pyasn1>=0.1.3
  Using cached pyasn1-0.4.8-py2.py3-none-any.whl (77 kB)
Collecting oauthlib>=3.0.0
  Downloading oauthlib-3.2.2-py3-none-any.whl (151 kB)
     |                              | 151 kB 6.4 MB/s
Requirement already satisfied: zipp>=0.5 in c:\02_application folders\08_anaconda\lib\site-packages (from importlib-metadata>=4.4; python_version < "3.10"->markdown>=2.6.8->tensorboard<2.11,>=2.10->tensorflow) (
3.4.0)
Installing collected packages: flatbuffers, tensorflow-io-gcs-filesystem, numpy, libclang, opt-einsum, tensorboard-plugin-wit, absl-py, tensorboard-data-server, protobuf, grpcio, pyasn1, rsa, pyasn1-modules, cac
hetools, google-auth, oauthlib, requests-oauthlib, google-auth-oauthlib, importlib-metadata, markdown, tensorboard, termcolor, tensorflow-estimator, keras-preprocessing, gast, astunparse, google-pasta, tensorflo
w
  Attempting uninstall: numpy
    Found existing installation: numpy 1.19.2
    Uninstalling numpy-1.19.2:
      Successfully uninstalled numpy-1.19.2
  Attempting uninstall: importlib-metadata
    Found existing installation: importlib-metadata 2.0.0
    Uninstalling importlib-metadata-2.0.0:
      Successfully uninstalled importlib-metadata-2.0.0
```

```
Collecting google-auth<3,>=1.6.3
  Downloading google_auth-2.14.1-py2.py3-none-any.whl (175 kB)
     |                              | 175 kB ...
Collecting google-auth-oauthlib<0.5,>=0.4.1
  Using cached google_auth_oauthlib-0.4.6-py2.py3-none-any.whl (18 kB)
Requirement already satisfied: requests<3,>=2.21.0 in c:\02_application folders\08_anaconda\lib\site-packages (from tensorboard<2.11,>=2.10->tensorflow) (2.24.0)
Collecting markdown>=2.6.8
  Downloading Markdown-3.4.1-py3-none-any.whl (93 kB)
     |                              | 93 kB 709 kB/s
Collecting rsa<5,>=3.1.4; python_version >= "3.6"
  Downloading rsa-4.9-py3-none-any.whl (34 kB)
Collecting pyasn1-modules>=0.2.1
  Using cached pyasn1_modules-0.2.8-py2.py3-none-any.whl (155 kB)
Collecting cachetools<6.0,>=2.0.0
  Downloading cachetools-5.2.0-py3-none-any.whl (9.3 kB)
Collecting requests-oauthlib>=0.7.0
  Using cached requests_oauthlib-1.3.1-py2.py3-none-any.whl (23 kB)
Requirement already satisfied: chardet<4,>=3.0.2 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (3.0.4)
Requirement already satisfied: certifi>=2017.4.17 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (2020.6.20)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (1.25.11)
Requirement already satisfied: idna<3,>=2.5 in c:\02_application folders\08_anaconda\lib\site-packages (from requests<3,>=2.21.0->tensorboard<2.11,>=2.10->tensorflow) (2.10)
Collecting importlib-metadata>=4.4; python_version < "3.10"
  Downloading importlib_metadata-5.0.0-py3-none-any.whl (21 kB)
Collecting pyasn1>=0.1.3
  Using cached pyasn1-0.4.8-py2.py3-none-any.whl (77 kB)
Collecting oauthlib>=3.0.0
  Downloading oauthlib-3.2.2-py3-none-any.whl (151 kB)
     |                              | 151 kB 6.4 MB/s
Requirement already satisfied: zipp>=0.5 in c:\02_application folders\08_anaconda\lib\site-packages (from importlib-metadata>=4.4; python_version < "3.10"->markdown>=2.6.8->tensorboard<2.11,>=2.10->tensorflow) (
3.4.0)
Installing collected packages: flatbuffers, tensorflow-io-gcs-filesystem, numpy, libclang, opt-einsum, tensorboard-plugin-wit, absl-py, tensorboard-data-server, protobuf, grpcio, pyasn1, rsa, pyasn1-modules, cac
hetools, google-auth, oauthlib, requests-oauthlib, google-auth-oauthlib, importlib-metadata, markdown, tensorboard, termcolor, tensorflow-estimator, keras-preprocessing, gast, astunparse, google-pasta, tensorflo
w
  Attempting uninstall: numpy
    Found existing installation: numpy 1.19.2
    Uninstalling numpy-1.19.2:
      Successfully uninstalled numpy-1.19.2
  Attempting uninstall: importlib-metadata
    Found existing installation: importlib-metadata 2.0.0
    Uninstalling importlib-metadata-2.0.0:
      Successfully uninstalled importlib-metadata-2.0.0
  Attempting uninstall: keras-preprocessing
    Found existing installation: Keras-Preprocessing 1.0.6
    Uninstalling Keras-Preprocessing-1.0.6:
      Successfully uninstalled Keras-Preprocessing-1.0.6
Successfully installed absl-py-1.3.0 astunparse-1.6.3 cachetools-5.2.0 flatbuffers-22.10.26 gast-0.4.0 google-auth-2.14.1 google-auth-oauthlib-0.4.6 google-pasta-0.2.0 grpcio-1.50.0 importlib-metadata-5.0.0 kera
s-preprocessing-1.1.2 libclang-14.0.6 markdown-3.4.1 numpy-1.23.4 oauthlib-3.2.2 opt-einsum-3.3.0 protobuf-3.19.6 pyasn1-0.4.8 pyasn1-modules-0.2.8 requests-oauthlib-1.3.1 rsa-4.9 tensorboard-2.10.1 tensorboard-
data-server-0.6.1 tensorboard-plugin-wit-1.8.1 tensorflow-2.10.0 tensorflow-estimator-2.10.0 tensorflow-io-gcs-filesystem-0.27.0 termcolor-2.1.0
(base) PS C:\Users\Deepshika>
```

```python
from keras.preprocessing.image import ImageDataGenerator
```

File   Edit   View   Insert   Cell   Kernel   Widgets   Help

```python
In [1]:  from keras.preprocessing.image import ImageDataGenerator
```

Configure ImageDataGenerator Class

```
In [2]: train_datagen = ImageDataGenerator(rescale=1./225, shear_range=0.2, zoom_range=0.2, horizontal_flip=True)

In [3]: test_datagen = ImageDataGenerator(rescale=1./225)
```

Apply ImageDataGenerator Functionality to Train Set and Test Set

1. Performing Data Augmentation

```
# Data Augmentation of Train Set
x_train = train_datagen.flow_from_directory
(r'C:\Users\Deepshika\TRAIN_SET',target_size=(64,64),batch_size=5,color
_mode='rgb',class_mode='sparse')

# Data Augmentation of Test Set
x_test = train_datagen.flow_from_directory
(r'C:\Users\Deepshika\TEST_SET',target_size=(64,64),batch_size=5,color_
mode='rgb',class_mode='sparse')
```

Performing Data Augmentation

```
# Data Augmentation of Train Set
x_train = train_datagen.flow_from_directory (r'C:\Users\Deepshika\TRAIN_SET',target_size=(64,64),batch_size=5,color_mode='rgb',cl

Found 2626 images belonging to 5 classes.

# Data Augmentation of Test Set
x_test = train_datagen.flow_from_directory (r'C:\Users\Deepshika\TEST_SET',target_size=(64,64),batch_size=5,color_mode='rgb',clas

Found 1055 images belonging to 5 classes.
```

2. Check Number of Classes in Datasets

```
# Train Set
print(x_train.class_indices)

# Test Set
print(x_test.class_indices)
```

Check Number of Classes

```
# Train Set
print(x_train.class_indices)
```

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

```
# Test Set
print(x_test.class_indices)
```

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

3. Number of Images in Each Class

```
from collections import Counter as c
# Train Set
c(x_train.labels)

# Test Set
c(x_test.labels)
```

Number of Images in Each Class

```
from collections import Counter as c
# Train Set
c(x_train.labels)
```

```
Counter({0: 606, 1: 445, 2: 479, 3: 621, 4: 475})
```

```
# Test Set
c(x_test.labels)
```

```
Counter({0: 157, 1: 287, 2: 160, 3: 294, 4: 157})
```