Internship Project

report on

Wild Edibility Prediction using IBM Watson Studio

Submitted by:

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DAVANGERE -577004

ACADEMIC YEAR:2021-2022

CONTENTS

CHAPTERS

1. INTRODUCTION

1.1 Overview

The rural communities of developing countries depend on wild edible plants to meet their food requirements during periods of food shortage. Wild edible plants are mostly serving as supplementary foods in different parts of the world because they are nutritionally rich and can supplement especially vitamins and micronutrients. The main objective of this project is to build Convolutional neural networks are a deep model to detect and classify the edibility of the wild plant. The model also suggests the effects of non-edible wild plant produce.

We are creating a web application where the user selects the image which is to be classified. The image is fed into the model that is trained and the predicted class will be displayed on the webpage.

1.2 Purpose

The project aims at creating an application form where we will be analyzing if a wild plant found in the woods will be edible or not. When the picture of the plant will be scanned, we'll get results about the edibility. This helps people near forests to depend on wild plants for food. This can also help in fulfillment of food shortage.

2. LITERATURE SURVEY

2.1 Existing problem

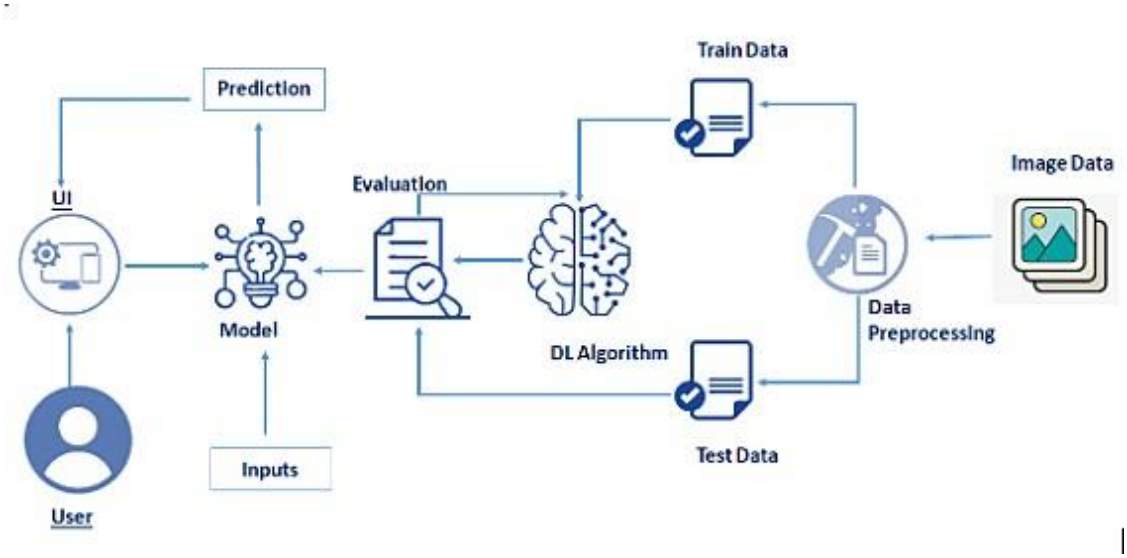
With the increase in population and food shortage, the prices of vegetables and plants have gone up. Throughout the world, and more especially in developing countries, wild plants make an important contribution to the life of local communities. They play a significant part in a wide range of agricultural systems as a source of wild foods and fuelwood, and they have an important socio-economic role through their use in medicines, dyes, poisons, shelter, fibers and religious and cultural ceremonies. Yet little systematic knowledge has been gathered on the uses of wild plants and they tend to be ignored in considerations of farming systems by extension workers, policy-makers and economists. There are a number of ground-level flowers that are poisonous enough to, at the least, cause a stomach upset or skin irritation or, at worst, prove fatal.

2.1 Proposed solution

The proposed system is the effective wild edible prediction system. The rural communities of developing countries depend on wild edible plants to meet their food requirements during periods of food shortage. Wild edible plants are mostly serving as supplementary foods in different parts of the world because they are nutritionally rich and can supplement especially vitamins and micronutrients. The main objective of this project is to build Convolutional neural networks are a deep model to detect and classify the edibility of the wild plant. The model also suggests the effects of non-edible wild plant produce.

3. THEORITICAL ANALYSIS

3.1 Block Diagram



3.2 Hardware / Software designing

Software Requirements

- Anaconda Navigator
- Tensorflow
- Keras
- Flask

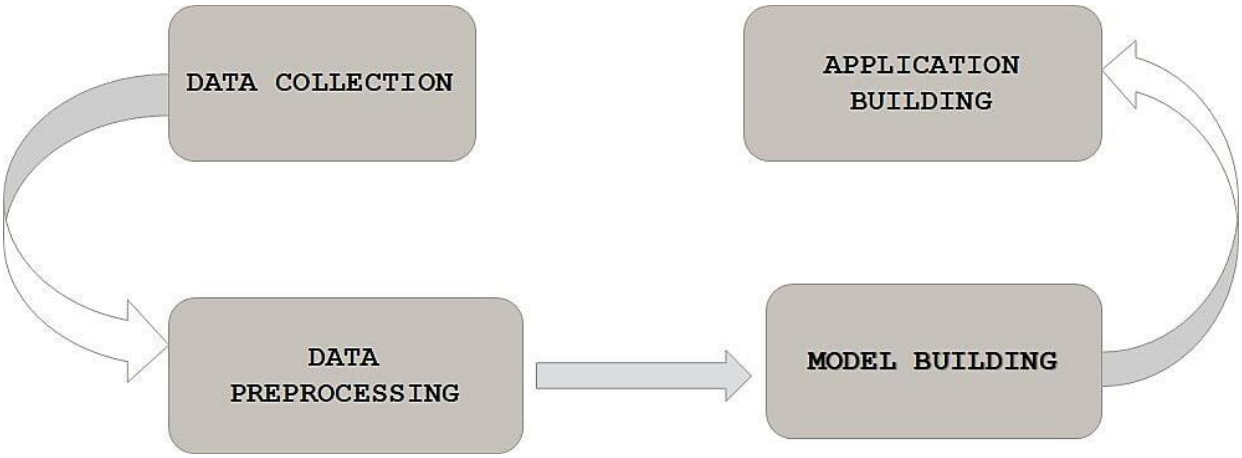
Hardware Requirements

- Processor : Intel Core i3
- Hard Disk Space : Min 100 GB
- Ram : 8 GB

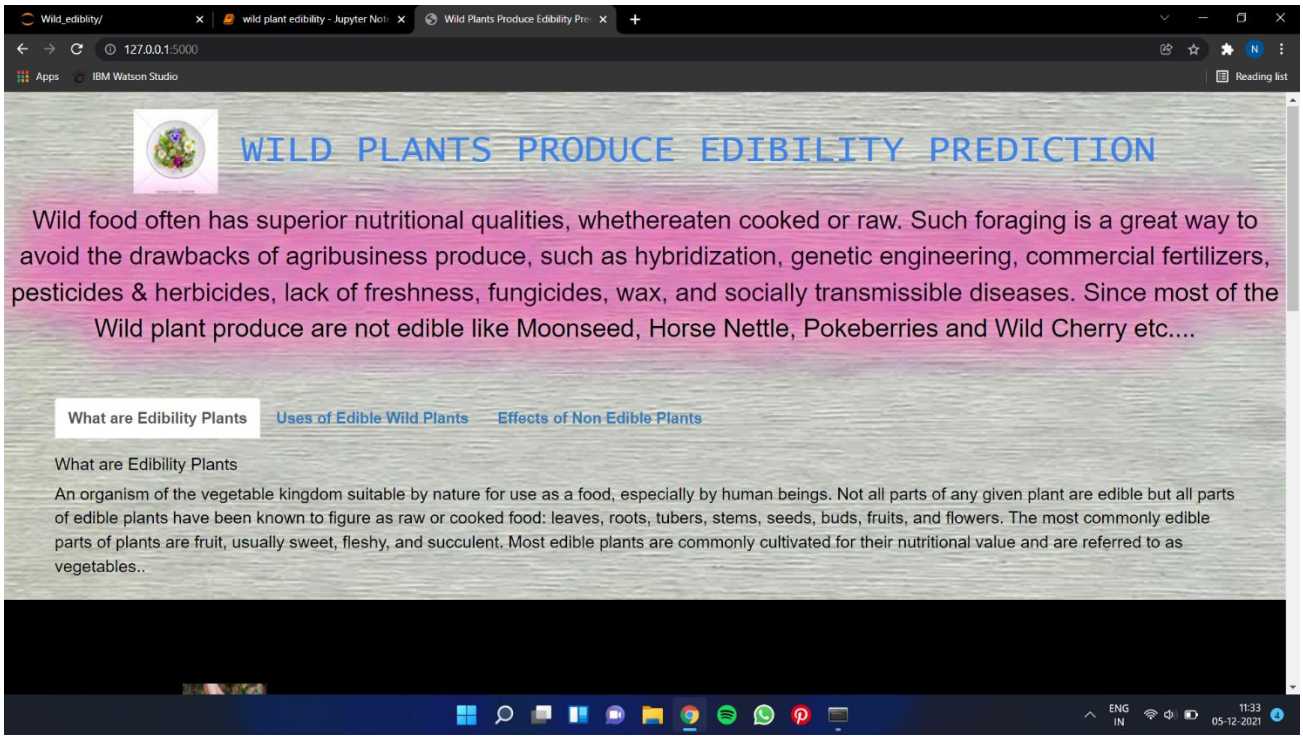
4. EXPERIMENTAL INVESTIGATIONS

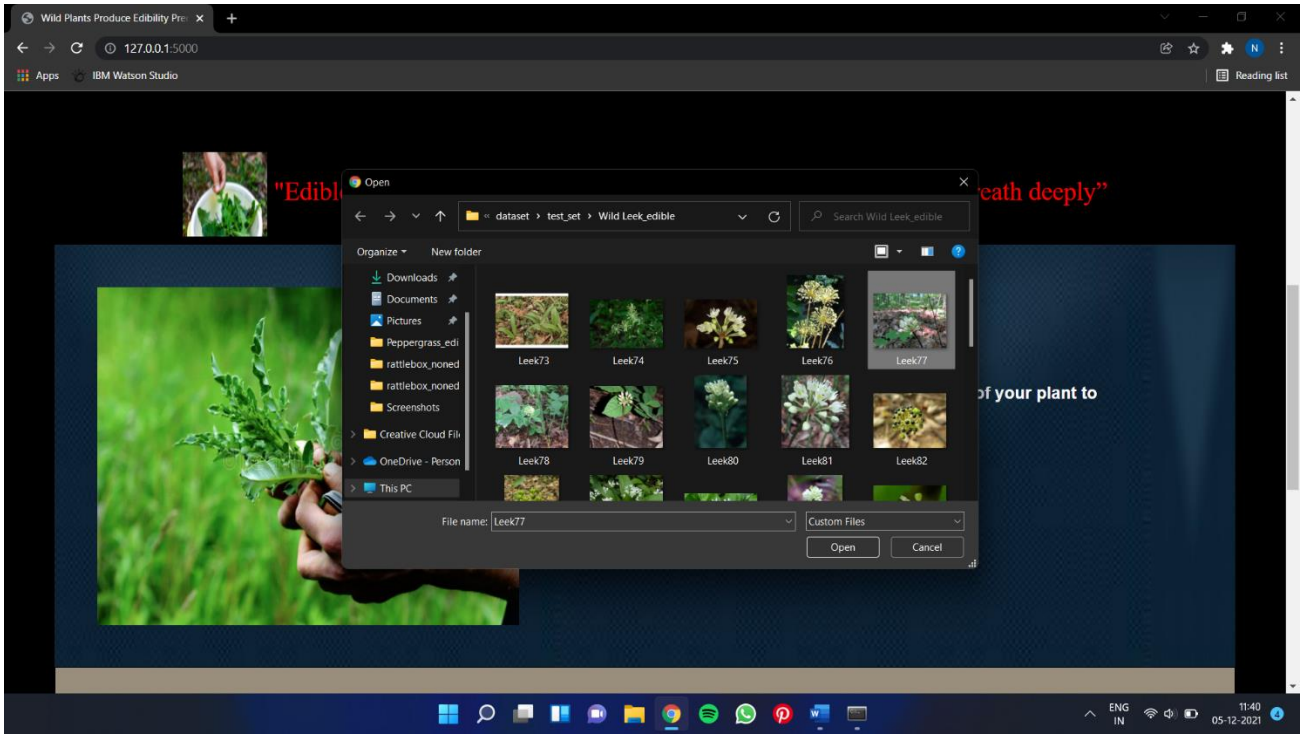
Wild edible plants are mostly serving as supplementary foods in different parts of the world because they are nutritionally rich and can supplement especially vitamins and micronutrient. Wild food often has superior nutritional qualities, whether eaten cooked or raw. Such foraging is a great way to avoid the drawbacks of agribusiness produce, such as hybridization, genetic engineering, commercial fertilizers, pesticides & herbicides, lack of freshness, fungicides, wax, and socially transmissible diseases. Since most of the Wild plant produce are not edible like Moonseed, Horse Nettle, Pokeberries and Wild Cherry etc.

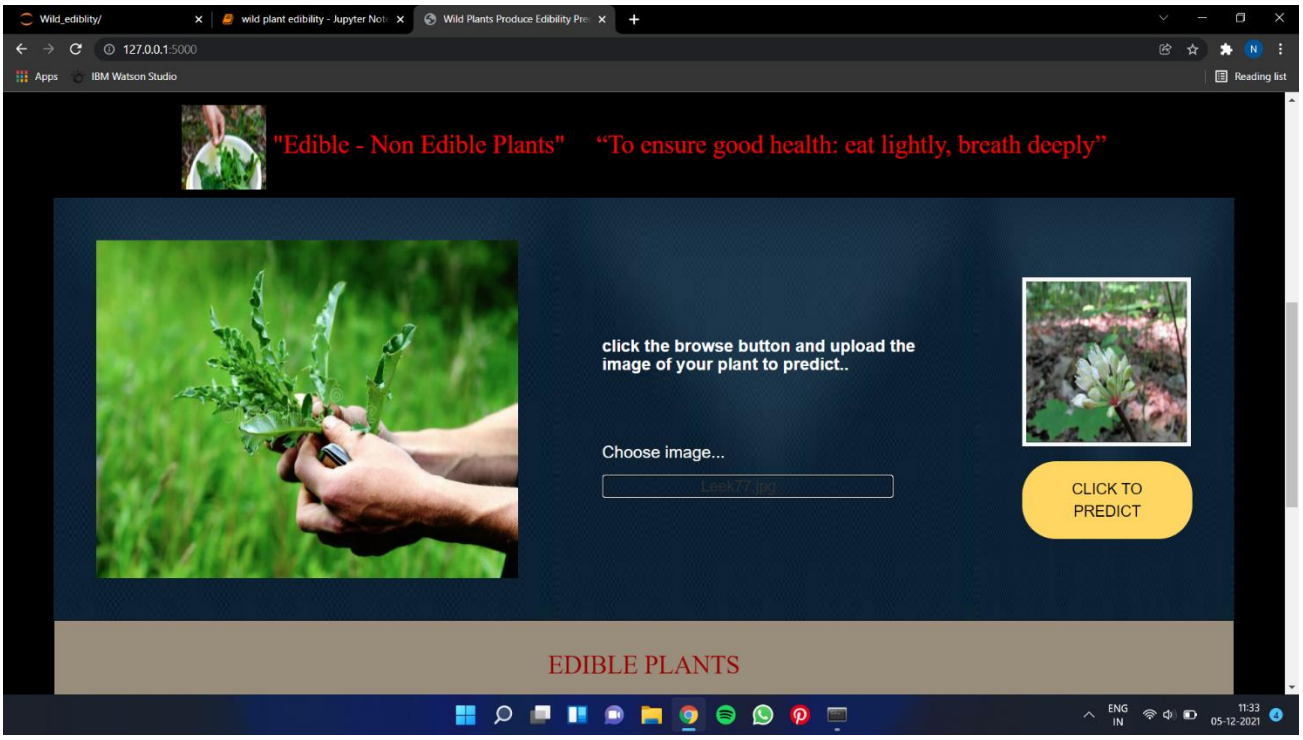
5. FLOWCHART



6. RESULT


Wild_ediblity/
wild plant edibility - Jupyter Not
Wild Plants Produce Edibility Pre
127.0.0.1:5000
Apps
IBM Watson Studio
Reading list
WILD PLANTS PRODUCE EDIBILITY PREDICTION
Wild food often has superior nutritional qualities, whethereaten cooked or raw. Such foraging is a great way to avoid the drawbacks of agribusiness produce, such as hybridization, genetic engineering, commercial fertilizers, pesticides & herbicides, lack of freshness, fungicides, wax, and socially transmissible diseases. Since most of the Wild plant produce are not edible like Moonseed, Horse Nettle, Pokeberries and Wild Cherry etc....
What are Edibility Plants
Uses of Edible Wild Plants
Effects of Non Edible Plants
What are Edibility Plants
An organism of the vegetable kingdom suitable by nature for use as a food, especially by human beings. Not all parts of any given plant are edible but all parts of edible plants have been known to figure as raw or cooked food: leaves, roots, tubers, stems, seeds, buds, fruits, and flowers. The most commonly edible parts of plants are fruit, usually sweet, fleshy, and succulent. Most edible plants are commonly cultivated for their nutritional value and are referred to as vegetables..
ENG
IN
11:33
05-12-2021


Wild Plants Produce Edibility Pre
127.0.0.1:5000
Apps
IBM Watson Studio
Reading list
"Edibl
eath deeply"
Open
dataset › test_set › Wild Leek_edible
Search Wild Leek_edible
Organize
New folder
Downloads
Documents
Pictures
Peppergrass_edi
rattlebox_noned
rattlebox_noned
Screenshots
Creative Cloud Fil
OneDrive - Person
This PC
Leek73
Leek74
Leek75
Leek76
Leek77
Leek78
Leek79
Leek80
Leek81
Leek82
File name: Leek77
Custom Files
Open
Cancel
f your plant to
ENG
IN
11:40
05-12-2021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Wild Plants Produce Edibility Pre
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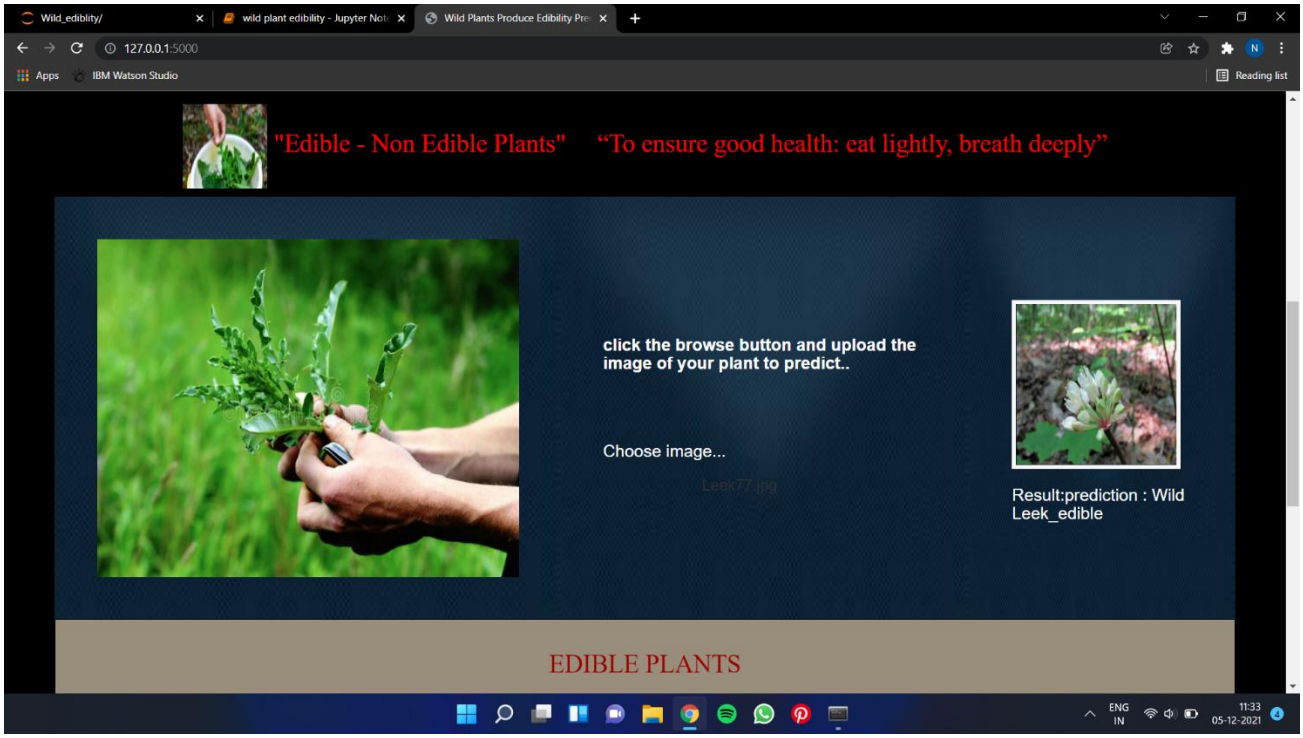
Apps
IBM Watson Studio
Reading list
"Edible - Non Edible Plants"
“To ensure good health: eat lightly, breath deeply”
click the browse button and upload the image of your plant to predict..
Choose image...
Leek77.jpg
CLICK TO PREDICT
EDIBLE PLANTS
ENG IN
11:33
05-12-2021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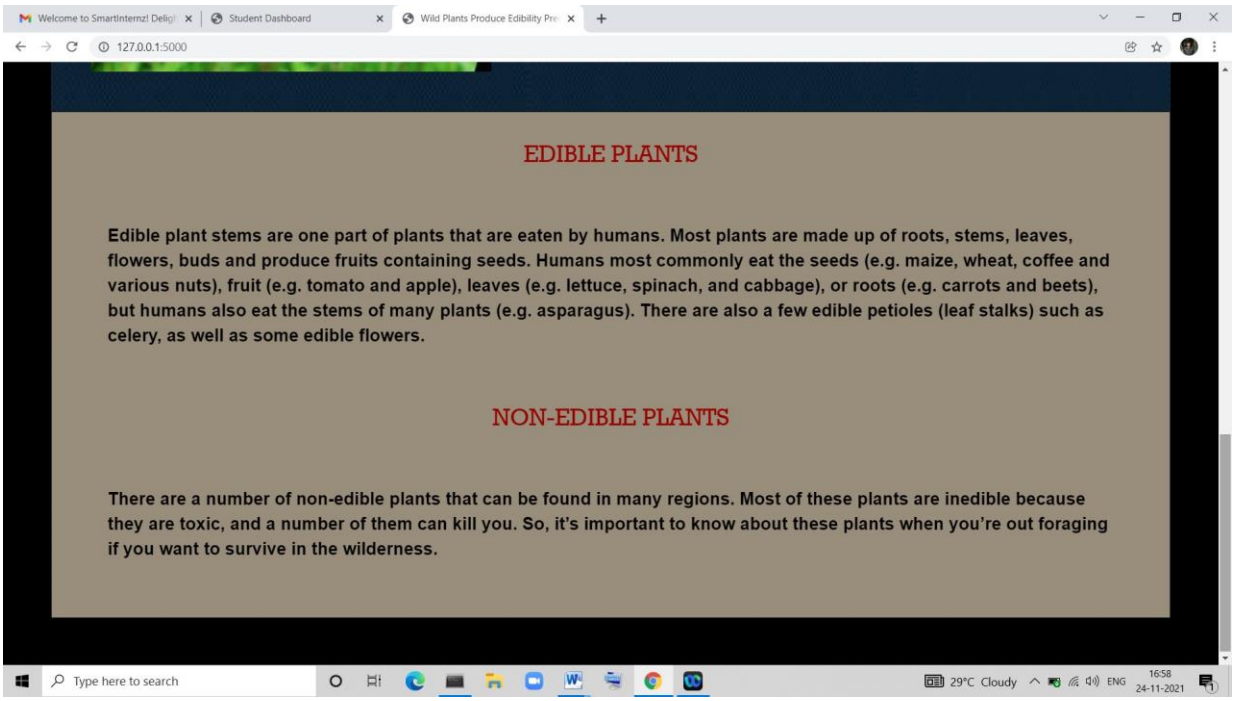
wild plant edibility - Jupyter Not
Wild Plants Produce Edibility Pre
127.0.0.1:5000
Apps
IBM Watson Studio
Reading list
"Edible - Non Edible Plants"
“To ensure good health: eat lightly, breath deeply”
click the browse button and upload the image of your plant to predict..
Choose image...
Leek77.jpg
Result:prediction : Wild Leek_edible
EDIBLE PLANTS
ENG IN
11:33
05-12-2021


Welcome to SmartInternz! Deligl
Student Dashboard
Wild Plants Produce Edibility Pre
127.0.0.1:5000
EDIBLE PLANTS
Edible plant stems are one part of plants that are eaten by humans. Most plants are made up of roots, stems, leaves, flowers, buds and produce fruits containing seeds. Humans most commonly eat the seeds (e.g. maize, wheat, coffee and various nuts), fruit (e.g. tomato and apple), leaves (e.g. lettuce, spinach, and cabbage), or roots (e.g. carrots and beets), but humans also eat the stems of many plants (e.g. asparagus). There are also a few edible petioles (leaf stalks) such as celery, as well as some edible flowers.
NON-EDIBLE PLANTS
There are a number of non-edible plants that can be found in many regions. Most of these plants are inedible because they are toxic, and a number of them can kill you. So, it's important to know about these plants when you're out foraging if you want to survive in the wilderness.
Type here to search
29°C Cloudy
ENG
16:58
24-11-2021

7. ADVANTAGES & DISADVANTAGES

Advantages

Wild plants are nutritionally rich and can supplement especially vitamins and micronutrients. These show that wild edible plants are essential components of many African diets, especially in a period of seasonal food shortage.

Disadvantages

Effects of non- edible plants that contain substance that may exert toxic effect on skin, effect to lung, cardiovascular system, liver, kidney, bladder, blood, nervous system, bone and the endocrine and the reproductive systems.

8. APPLICATIONS

- Better Output wild edible plants are important in efficiently using it for eating.
- Web application where the user selects the image which is to be classified. The image is fed into the model that is trained and the predicted class will be displayed on the webpage.
- Efficient Predicting features of edible and non-edible images of plants can greatly help to consume it.

9. CONCLUSION

In this project, to build Convolutional neural networks are a deep model to detect and classify the edibility of the wild plant. The model also suggests the effects of non-edible wild plant produce. The rural communities of developing countries depend on wild edible plants to meet their food requirements during periods of food shortage. Wildedible plants are mostly serving as supplementary foods in different parts of the world because they are nutritionally rich and can supplementespecially vitamins and micronutrients.

10. FUTURE SCOPE

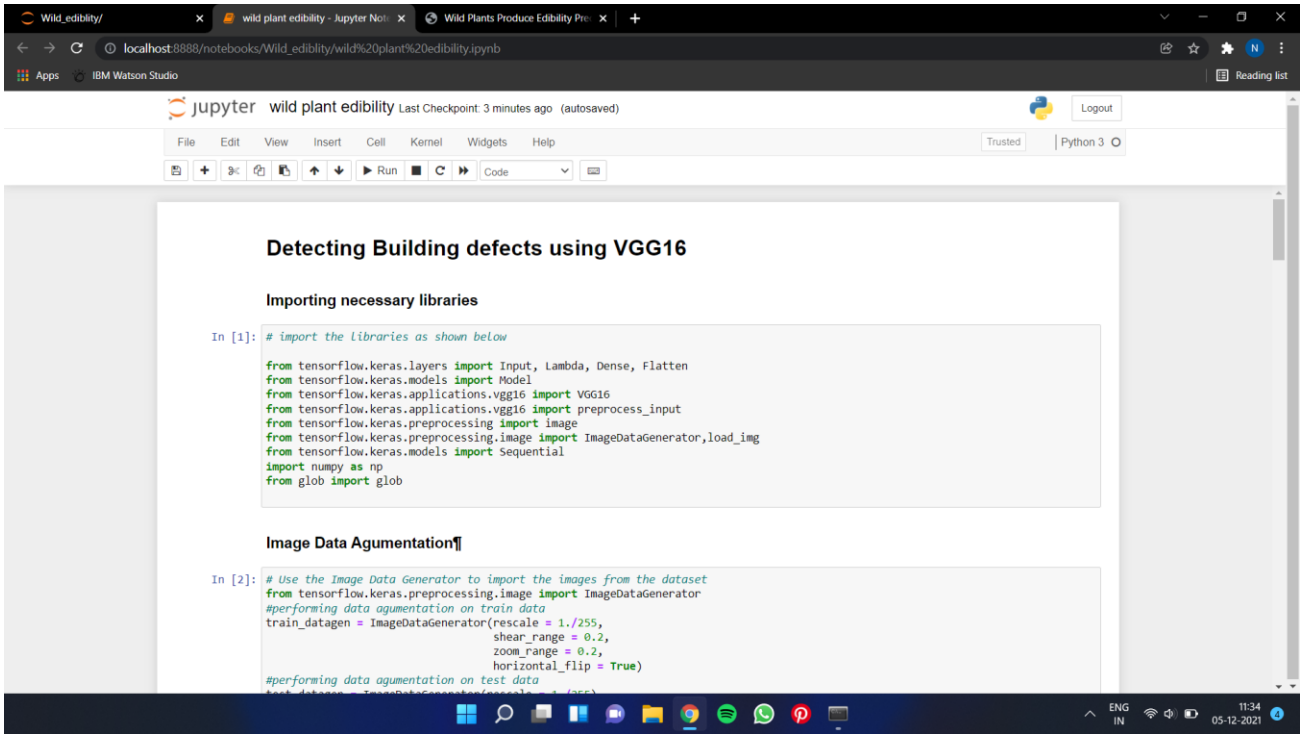
In future, our attempt would be to further improve the predictions using the system with more accuracy. Imparting more features like location, availability to our training set will enhance the predictions and will open up a new perspective on every wild edible prediction.

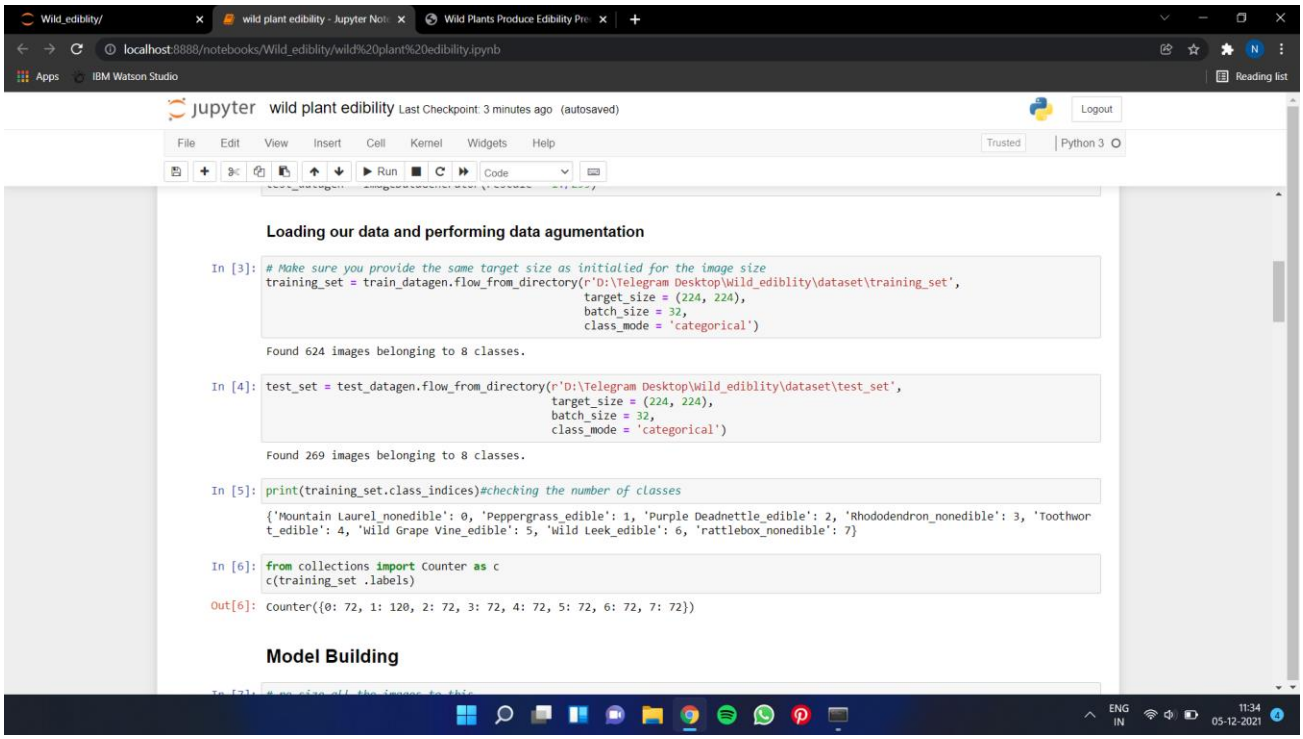
11. SOURCES

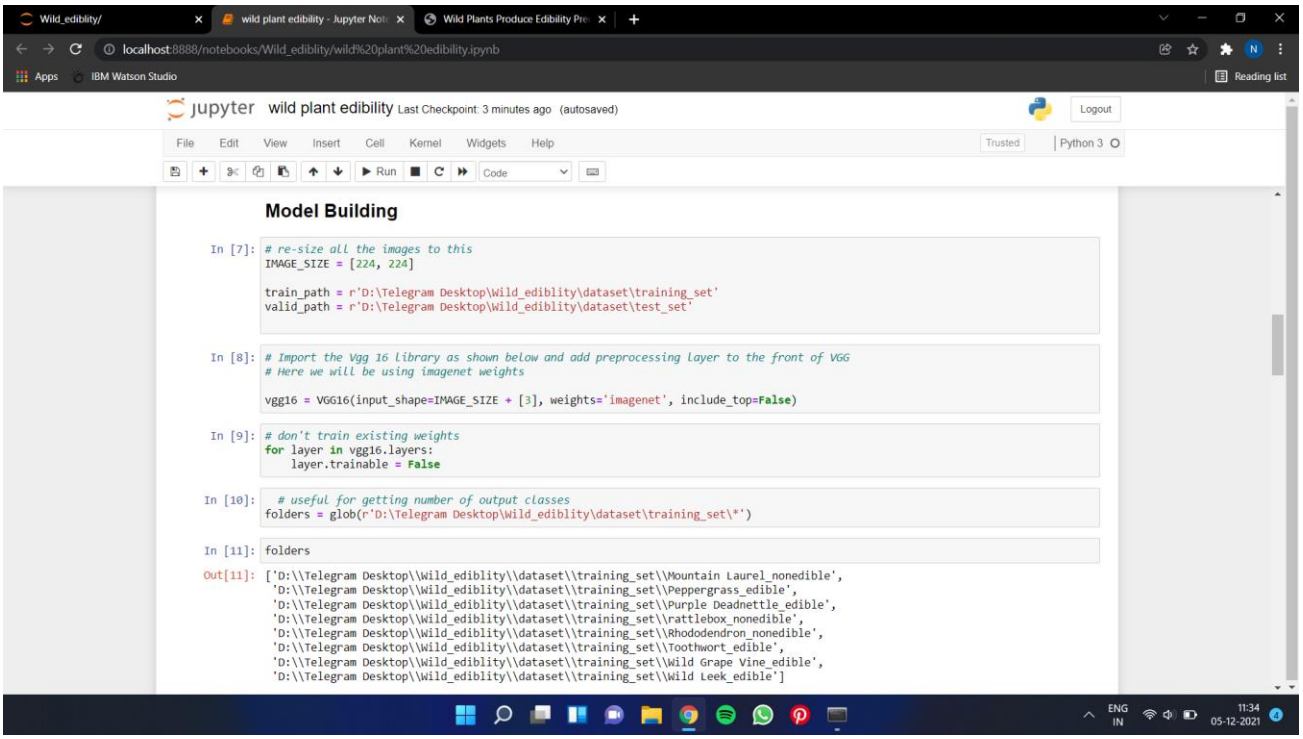
- https://www.kaggle.com/wild_edible
- https://keras.io/api/preprocessing/image
- https://victorzhou.com/blog/intro-to-cnns-part-1
- https://youtu.be/kE5QZ8G_78c

APPENDIX

Source Code






Wild_ediblity/
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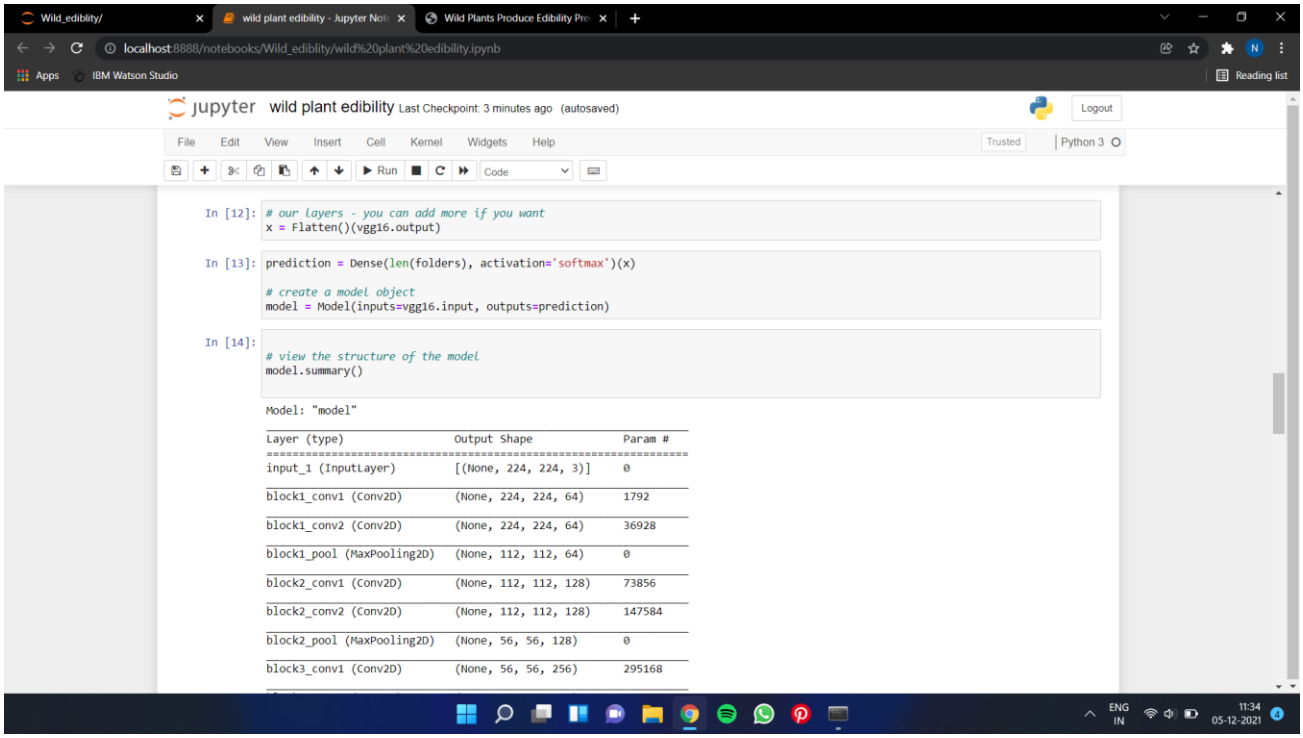
Apps
IBM Watson Studio
Reading list
jupyter wild plant edibility Last Checkpoint: 3 minutes ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
Model Building
In [7]:
# re-size all the images to this
IMAGE_SIZE = [224, 224]
train_path = r'D:\Telegram Desktop\Wild_ediblity\dataset\training_set'
valid_path = r'D:\Telegram Desktop\Wild_ediblity\dataset\test_set'
In [8]:
# Import the Vgg 16 library as shown below and add preprocessing layer to the front of VGG
# Here we will be using imagenet weights
vgg16 = VGG16(input_shape=IMAGE_SIZE + [3], weights='imagenet', include_top=False)
In [9]:
# don't train existing weights
for layer in vgg16.layers:
layer.trainable = False
In [10]:
# useful for getting number of output classes
folders = glob(r'D:\Telegram Desktop\Wild_ediblity\dataset\training_set*')
In [11]:
folders
Out[11]:
['D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Mountain Laurel_nonedible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Peppergrass_edible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Purple Deadnettle_edible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\rattlebox_nonedible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Rhododendron_nonedible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Toothwort_edible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Wild Grape Vine_edible',
'D:\\Telegram Desktop\\Wild_ediblity\\dataset\\training_set\\Wild Leek_edible']
ENG IN
11:34
05-12-2021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Reading list
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Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
In [12]:
# our layers - you can add more if you want
x = Flatten()(vgg16.output)
In [13]:
prediction = Dense(len(folders), activation='softmax')(x)
# create a model object
model = Model(inputs=vgg16.input, outputs=prediction)
In [14]:
# view the structure of the model
model.summary()
Model: "model"
Layer (type) Output Shape Param #
input_1 (InputLayer) [(None, 224, 224, 3)] 0
block1_conv1 (Conv2D) (None, 224, 224, 64) 1792
block1_conv2 (Conv2D) (None, 224, 224, 64) 36928
block1_pool (MaxPooling2D) (None, 112, 112, 64) 0
block2_conv1 (Conv2D) (None, 112, 112, 128) 73856
block2_conv2 (Conv2D) (None, 112, 112, 128) 147584
block2_pool (MaxPooling2D) (None, 56, 56, 128) 0
block3_conv1 (Conv2D) (None, 56, 56, 256) 295168
ENG IN
11:34
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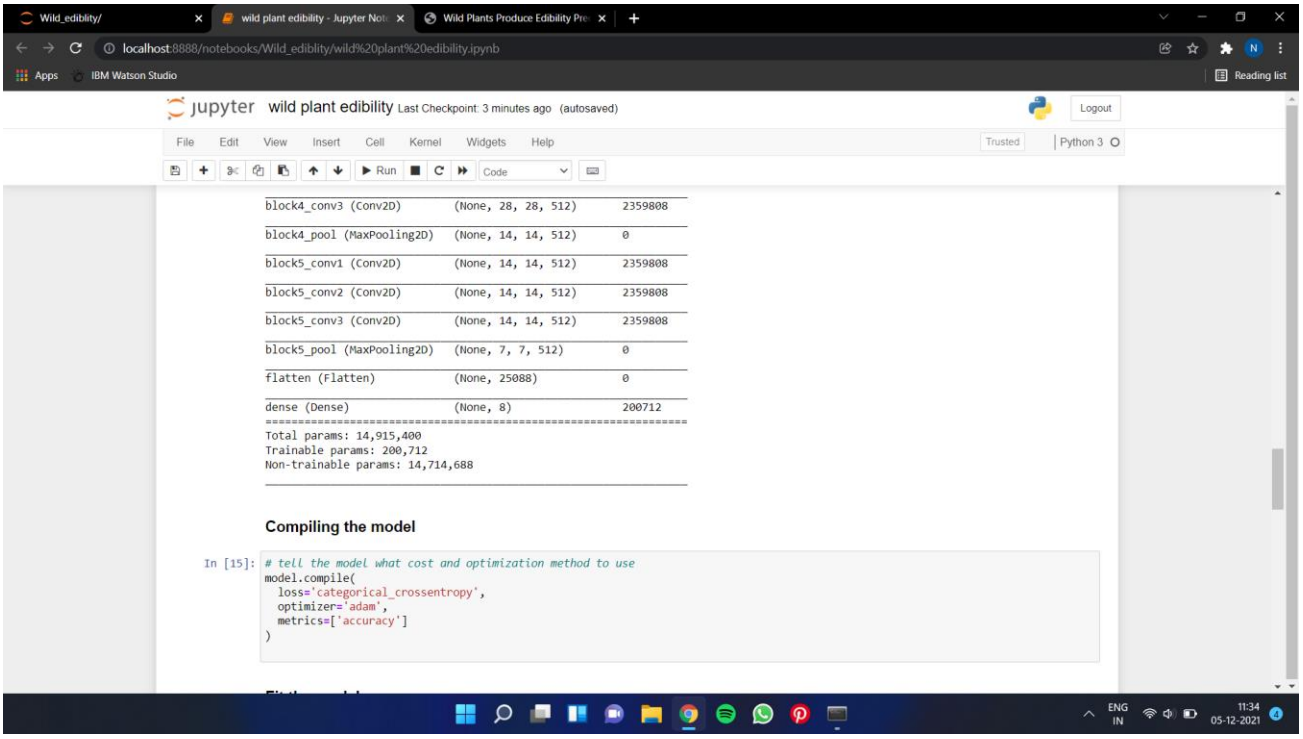
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Apps
IBM Watson Studio
Reading list
jupyter wild plant edibility Last Checkpoint: 3 minutes ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
block4_conv3 (Conv2D) (None, 28, 28, 512) 2359808
block4_pool (MaxPooling2D) (None, 14, 14, 512) 0
block5_conv1 (Conv2D) (None, 14, 14, 512) 2359808
block5_conv2 (Conv2D) (None, 14, 14, 512) 2359808
block5_conv3 (Conv2D) (None, 14, 14, 512) 2359808
block5_pool (MaxPooling2D) (None, 7, 7, 512) 0
flatten (Flatten) (None, 25088) 0
dense (Dense) (None, 8) 200712
Total params: 14,915,400
Trainable params: 200,712
Non-trainable params: 14,714,688
Compiling the model
In [15]:
tell the model what cost and optimization method to use
model.compile(
loss='categorical_crossentropy',
optimizer='adam',
metrics=['accuracy']
)
ENG IN
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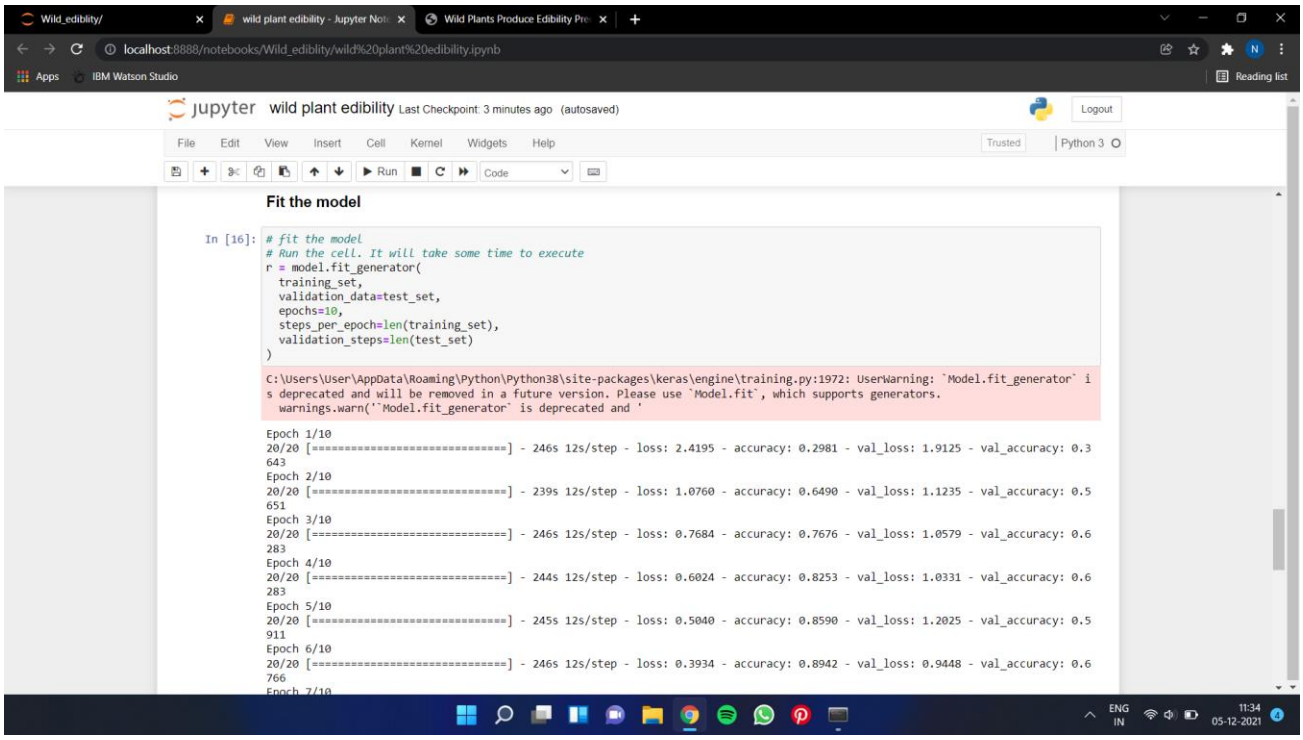
05-12-2021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localhost:8888/notebooks/Wild_ediblity/wild%20plant%20edibility.ipynb
Apps
IBM Watson Studio
Reading list
jupyter wild plant edibility Last Checkpoint: 3 minutes ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
Fit the model
In [16]:
# fit the model
# Run the cell. It will take some time to execute
r = model.fit_generator(
training_set,
validation_data=test_set,
epochs=10,
steps_per_epoch=len(training_set),
validation_steps=len(test_set)
)
C:\Users\User\AppData\Roaming\Python\Python38\site-packages\keras\engine\training.py:1972: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
warnings.warn('`Model.fit_generator` is deprecated and '
Epoch 1/10
20/20 [==========] - 246s 12s/step - loss: 2.4195 - accuracy: 0.2981 - val_loss: 1.9125 - val_accuracy: 0.3643
Epoch 2/10
20/20 [==========] - 239s 12s/step - loss: 1.0760 - accuracy: 0.6490 - val_loss: 1.1235 - val_accuracy: 0.5651
Epoch 3/10
20/20 [==========] - 246s 12s/step - loss: 0.7684 - accuracy: 0.7676 - val_loss: 1.0579 - val_accuracy: 0.6283
Epoch 4/10
20/20 [==========] - 244s 12s/step - loss: 0.6024 - accuracy: 0.8253 - val_loss: 1.0331 - val_accuracy: 0.6283
Epoch 5/10
20/20 [==========] - 245s 12s/step - loss: 0.5040 - accuracy: 0.8590 - val_loss: 1.2025 - val_accuracy: 0.5911
Epoch 6/10
20/20 [==========] - 246s 12s/step - loss: 0.3934 - accuracy: 0.8942 - val_loss: 0.9448 - val_accuracy: 0.6766
Epoch 7/10
ENG IN
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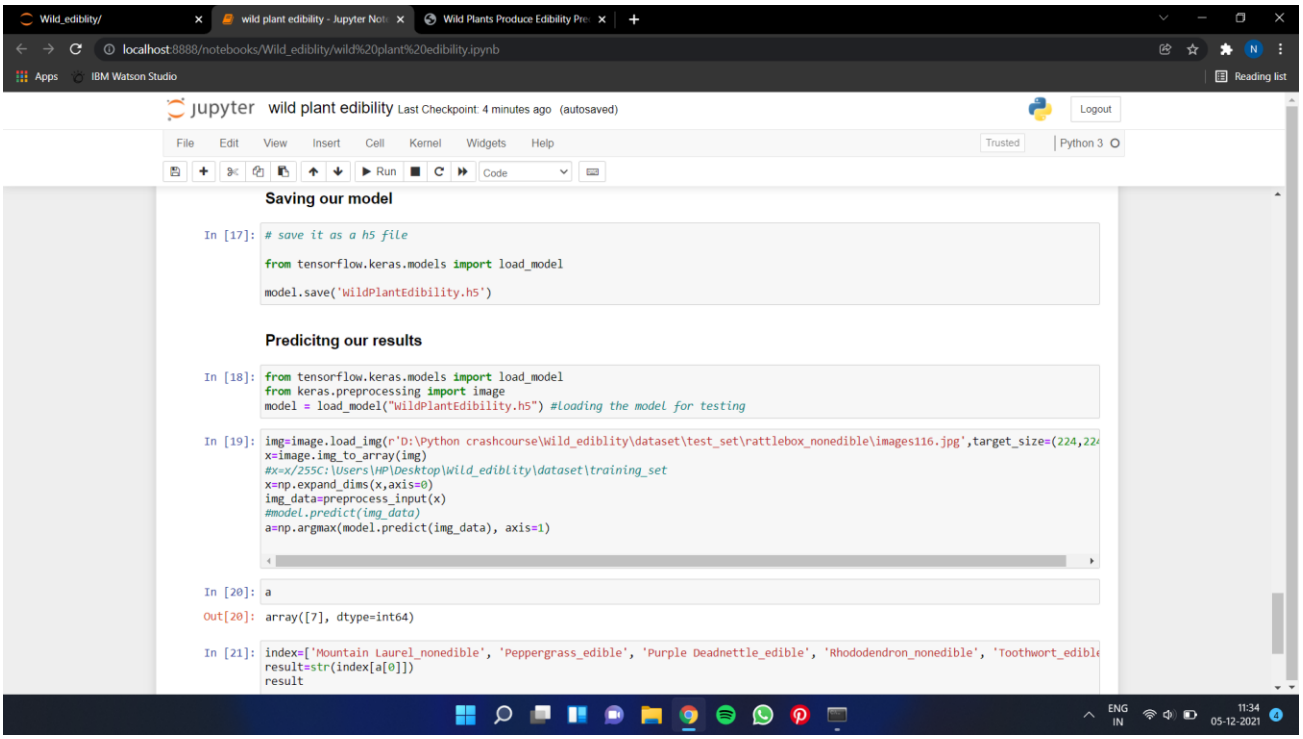
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Wild Plants Produce Edibility Pre
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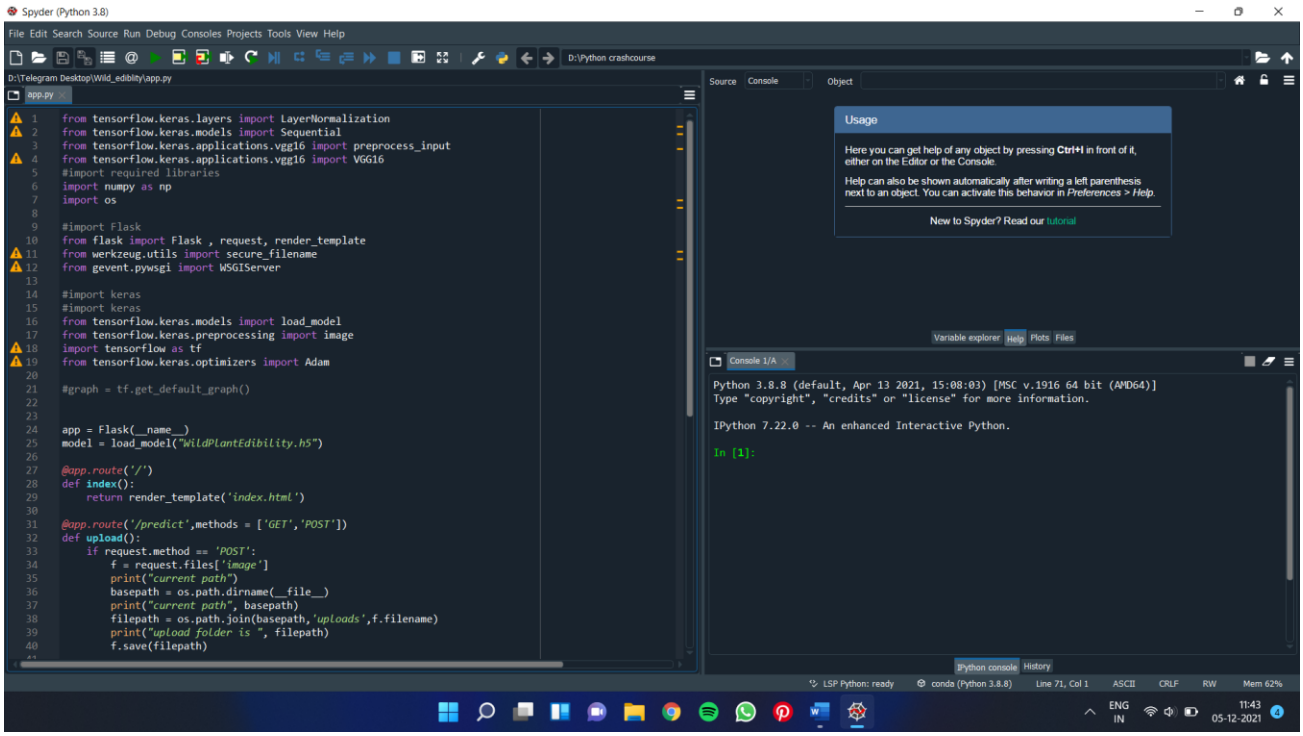
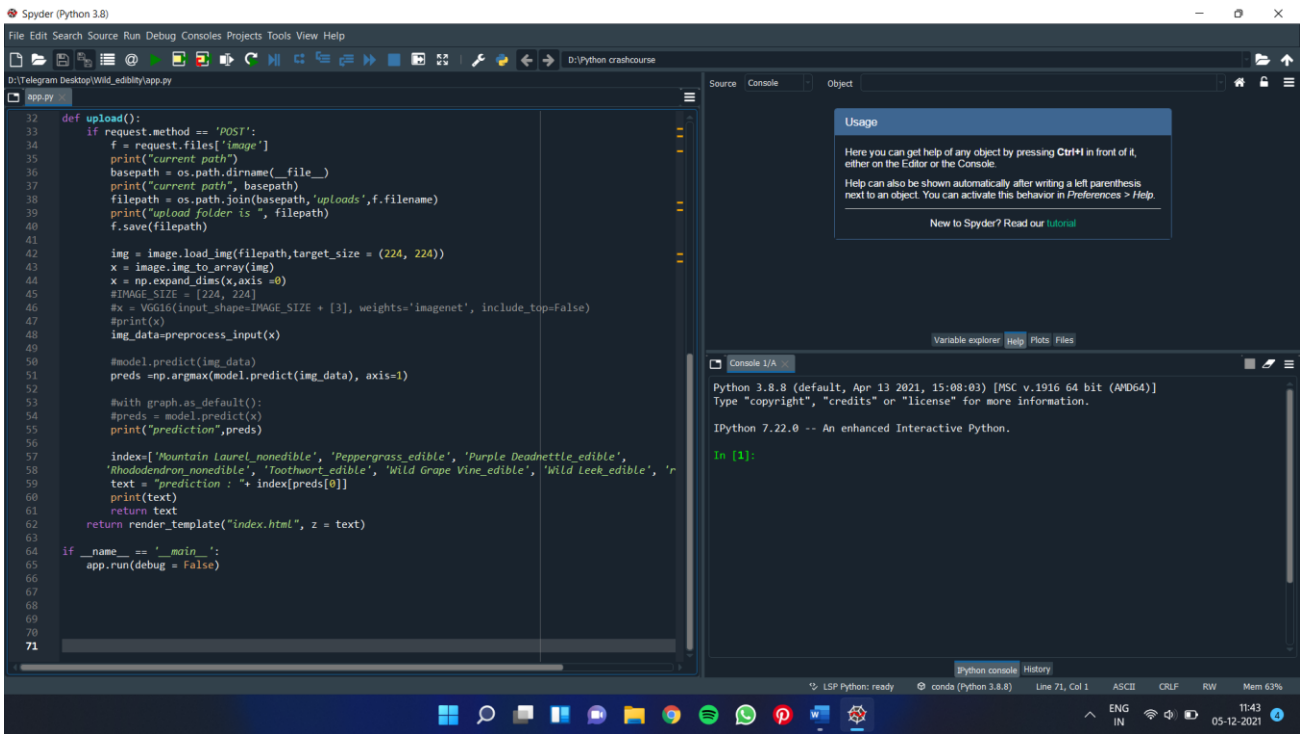
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
Saving our model
In [17]:
# save it as a h5 file
from tensorflow.keras.models import load_model
model.save('WildPlantEdibility.h5')
Predicitng our results
In [18]:
from tensorflow.keras.models import load_model
from keras.preprocessing import image
model = load_model("WildPlantEdibility.h5") #Loading the model for testing
In [19]:
img=image.load_img(r'D:\Python crashcourse\Wild_ediblity\dataset\test_set\rattlebox_nonedible\images116.jpg',target_size=(224,224
x=image.img_to_array(img)
#x=x/255C:\Users\HP\Desktop\Wild_ediblity\dataset\training_set
x=np.expand_dims(x,axis=0)
img_data=preprocess_input(x)
#model.predict(img_data)
a=np.argmax(model.predict(img_data), axis=1)
In [20]:
a
Out[20]:
array([7], dtype=int64)
In [21]:
index=['Mountain Laurel_nonedible', 'Peppergrass_edible', 'Purple Deadnettle_edible', 'Rhododendron_nonedible', 'Toothwort_edible
result=str(index[a[0]])
result
ENG
IN
11:34
05-12-2021


Spyder (Python 3.8)
File Edit Search Source Run Debug Consoles Projects Tools View Help
D:\Python crashcourse
D:\Telegram Desktop\Wild_edibliity\app.py
app.py
from tensorflow.keras.layers import LayerNormalization
from tensorflow.keras.models import Sequential
from tensorflow.keras.applications.vgg16 import preprocess_input
from tensorflow.keras.applications.vgg16 import VGG16
#import required libraries
import numpy as np
import os
#import Flask
from flask import Flask , request, render_template
from werkzeug.utils import secure_filename
from gevent.pywsgi import WSGIServer
#import keras
#import keras
from tensorflow.keras.models import load_model
from tensorflow.keras.preprocessing import image
import tensorflow as tf
from tensorflow.keras.optimizers import Adam
#graph = tf.get_default_graph()
app = Flask(__name__)
model = load_model("WildPlantEdibility.h5")
@app.route('/')
def index():
return render_template('index.html')
@app.route('/predict',methods = ['GET','POST'])
def upload():
if request.method == 'POST':
f = request.files['image']
print("current path")
basepath = os.path.dirname(__file__)
print("current path", basepath)
filepath = os.path.join(basepath,'uploads',f.filename)
print("upload folder is ", filepath)
f.save(filepath)
Source Console Object
Usage
Here you can get help of any object by pressing Ctrl+I in front of it, either on the Editor or the Console.
Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in Preferences > Help.
New to Spyder? Read our tutorial
Variable explorer Help Plots Files
Console 1/A
Python 3.8.8 (default, Apr 13 2021, 15:08:03) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.
IPython 7.22.0 -- An enhanced Interactive Python.
In [1]:
IPython console History
LSP Python: ready
conda (Python 3.8.8)
Line 71, Col 1
ASCII
CRLF
RW
Mem 62%
ENG
IN
11:43
05-12-2021


Spyder (Python 3.8)
File Edit Search Source Run Debug Consoles Projects Tools View Help
D:\Python crashcourse
D:\Telegram Desktop\Wild_edibliity\app.py
app.py
def upload():
if request.method == 'POST':
f = request.files['image']
print("current path")
basepath = os.path.dirname(__file__)
print("current path", basepath)
filepath = os.path.join(basepath,'uploads',f.filename)
print("upload folder is ", filepath)
f.save(filepath)
img = image.load_img(filepath,target_size = (224, 224))
x = image.img_to_array(img)
x = np.expand_dims(x,axis =0)
#IMAGE_SIZE = [224, 224]
#x = VGG16(input_shape=IMAGE_SIZE + [3], weights='imagenet', include_top=False)
#print(x)
img_data=preprocess_input(x)
#model.predict(img_data)
preds =np.argmax(model.predict(img_data), axis=1)
#with graph.as_default():
#preds = model.predict(x)
print("prediction",preds)
index=['Mountain Laurel_nonedible', 'Peppergrass_edible', 'Purple Deadnettle_edible',
'Rhododendron_nonedible', 'Toothwort_edible', 'Wild Grape Vine_edible', 'Wild Leek_edible', 'r
text = "prediction : "+ index[preds[0]]
print(text)
return text
return render_template("index.html", z = text)
if __name__ == '__main__':
app.run(debug = False)
Source Console Object
Usage
Here you can get help of any object by pressing Ctrl+I in front of it, either on the Editor or the Console.
Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in Preferences > Help.
New to Spyder? Read our tutorial
Variable explorer Help Plots Files
Console 1/A
Python 3.8.8 (default, Apr 13 2021, 15:08:03) [MSC v.1916 64 bit (AMD64)]
Type "copyright", "credits" or "license" for more information.
IPython 7.22.0 -- An enhanced Interactive Python.
In [1]:
IPython console History
LSP Python: ready
conda (Python 3.8.8)
Line 71, Col 1
ASCII
CRLF
RW
Mem 63%
ENG
IN
11:43
05-12-2021