Department of Computer Engineering & Applications

Institute of Engineering & Technology

GLA University
Mathura- 281406, INDIA
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PROJECT REPORT

On

"COTTON DISEASE PREDICTION"

Submitted by

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Declaration

We hereby declare that the work which is being presented in the Deep Learning Project "**Cotton Disease Prediction ",** in partial fulfillment of the requirements for Major Project viva voce, is an authentic record of our own work carried by the team members under the supervision of our mentor Mr. Ankush Agrawal.

Group Members: Shreya Gupta (191500783)

Vineet Kumar (201599031)

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Course: B.Tech (Computer Science and Engineering)

Year: 4rd

Semester: 7th

Supervised By:
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Certificate

This is to certify that the above statements made by the candidates are correct to the best of my/our knowledge and belief.

_____

Supervisor

Mr. Ankush Agrawal

Technical Trainer

Dept of CEA, GLA University

_____

Project Head

(Mr. Mayank Srivastava)

About the Project

Cotton is also called “White Gold” and “The King of Fibers. ” For growers, processors, exporters, and producing countries, cotton is the earnest point of supply. This work presents cotton plant disease detection using image processing technique for automated vision system used at agricultural field. In agriculture research of automatic plant disease detection is essential one in monitoring large fields of crops and thus automatically detects symptoms of disease as soon as they appear on plant leaves. It is very difficult for a farmer to identified various disease in plants. The estimated annual crop losses due to plant disease at the worldwide is $60 Billions. The traditional tools and techniques are not very useful since it takes lots of time and manual work.

Motivation: Being extremely interested in everything having a relation to web development, the independent project was a great occasion to give me the time to learn and confirm my interest in this field. The fact that we can make our daily life easy and and give the ability to learn us by themselves is both powerful and limitless in terms of application possibilities. We can use web development in Finance, Medicine, and almost everywhere. That’s why I decided to conduct my project around web development.

Requirements

a). Software Requirements:

a)Deep Learning – Renset 50, Python, TensorFlow

b)User Interface Design: HTML, CSS & BOOTSTRAP

c) Web Browser: Google Chrome

d) Google Collab

- GitHub: GitHub is a code hosting platform for version control and collaboration. It lets you and others work together on projects from anywhere. GitHub Repository: A GitHub repository can be used to store a development project. It can contain folders and any type of file. A GitHub repository should also include a license file and a README file about the project. A GitHub repository can also be used to store ideas or any resources that you want to share.

- VS Code Studio: Visual Studio Code is a code editor in layman's terms. Visual Studio Code is "a free-editor that helps the programmer write code, helps in debugging and corrects the code using the intelli-sense method ". In normal terms, it facilitates users to write the code in an easy manner. Many people say that it is half of an IDE and an editor, but the decision is up to to the coders. Any program/software that we see or use works on the code that runs in the background. Traditionally coding was used to do in the traditional editors or even in the basic editors like notepad! These editors used to provide basic support to the coders.

b). Hardware Requirements:

(1)Processor : Vostro
(2) RAM : Upto 8 GB
(3) Hardware devices : Mobile,Laptop
(4) Hardisk : 8 GB
(5) Display : 6 inch,14 inch

Acknowledgment

We thank the almighty for giving us the courage and perseverance in completing the project. This project itself is an acknowledgment of all those people who have given us their heartfelt cooperation in making this project a grand success. We extend our sincere thanks to Mr. Ankush Agarwal, Assistant Professor at "GLA University, Mathura" for providing her valuable guidance at every stage of this project work. We are profoundly grateful for the unmatched services rendered by him. And last but not least, we would like to express our deep sense of gratitude and earnest thanksgiving to our dear parents for their moral support and heartfelt cooperation in doing the main project.

Contents

Chapter 1

Introduction

In Ethiopia, agriculture is the basis for national economy from which 85% of livelihood and 90% of total foreign trade comes from this agricultural sector [1]. It is believed that Ethiopia is suitable for many farmable crops, and one among them is cotton. Cotton (Gossypiumspp) is also called "White Gold" and "The King of Fibers." For growers, processors, exporters, and producing countries, cotton is the earnest point of supply [2]. According to the data of African report, only 428,120 hectares are harvested with the total production value of about $596,000,000 in SNNPRS. Approximately, 18% of crop yield are lost due to different diseases and pests, which result in the loss of millions of dollars worldwide every year.

Even though agriculture is the backbone of Ethiopia, so far no advanced technologies have been explored in the development of automation in agricultural science and also there are high problems in production and quality due to different diseases and pests. In recent times, the sophisticated emerging technology has attracted many researchers in the field of detection and classification of cotton leaf diseases and pests. In Ethiopia, there are several constraints which reduce the yield and quality of the product. Particularly, identification of potential diseases or pests on Ethiopian cotton is based on traditional ways. There is a wide area of farm suitable for cotton plantation, but only limited research attention is given to cotton crop production. Traditionally, experts detect and identify such plant diseases and pests on bared eyes. Bared eye determination is considered as a loss of low-level accuracy in order to detect any diseases. On high demand, different advanced technologies were aided for structuring the systems to assist nonautomatic recognition of the plant diseases and pests to increase the accuracy for any corrective measures. With the help of advanced technologies, the plant diseases were reduced, thus increasing the productivity which helped to raise the economy via boosting the production. For that reason, the implementation of information technology-based solutions in the sector of agriculture had high level of significance for Ethiopia's development in monetary, community, and eco-friendly developments by increased cotton crops' productions.

Among different diseases and pests occurred, about 80–90% were on the leaves of cotton [3]. In Ethiopia, it is observed that there might be a fiscal destruction around 16% because of plant syndromes. However, without control measures, it can cause 30%–50% of loss [4]. Cotton diseases and pests are difficult to identify through bared eyes

Chapter 2

The Project

The cotton plant is susceptible to several disorder (biotic and abiotic constraints) attacks due to temperature fluctuation, diseases, and pests. Indeed, the whole world produced nearly 576 kg per hectare of cotton crops, where only 10% of production loss occurred due to different cotton leaf diseases. The United States of America (USA) is a major exporter of cotton in the world and it obtained 5.1 billion US dollars in 2016, but there are well-known native pests which were the reason for the distraction of cotton farms [3]. And, India has 24 percent of cotton land of the world and got 4.6 billions of dollars in 2016, from which generally 18% of cotton crops' production was lost every year due to different diseases that attacked the cotton plants which had its impacts on losing almost nine hundred thousand of Indian rupees [5]. Presently, in Ethiopia, nearly 12–15% of cotton crop plants are infected due to different diseases [6]. In Ethiopia, performance evaluation of GTP-I showed that these diseases and pests are the main constraints of the world standards in cotton quality and quantity of production. This results in the downfall of the economy of both the farmer and the country [1].

Detecting these diseases with bare eyes increased the complexity of cotton crops productivity which decreased the accuracy in identification precision. Even an expert would fail to assess and diagnose the diseases with their bare eyes, and this inadequate technique leads to more wastage of cotton crops. Due to these mistaken conclusions, most of the time, certain unnecessary pesticides which badly affect healthy cotton are applied. Leaving the farm for even a short time interval without production will affect overall nation GDP [7].

The researchers forwarded the following research questions with consideration of the issues cited in the statement of problems:(1)What is the suitable technique used for diagnosing cotton disease and pests?(2)How to develop an automatic cotton disease and pests diagnosis system?(3)How to determine the acquisition of the model?

Deep learning incorporates image processing and data analysis as a path for more possible findings. As it has been a successful application, it has now entered the domain of agriculture. Today, several deep learning-based computer vision applications such as CNN (convolutional neural network), RNN (recurrent neural network), DBN (deep belief network), and DBM (deep Boltzmann Machine) are performing tasks with high accuracy. However, the most prominent application for this research work is CNN [7].

Nowadays, CNN techniques are used to detect different objects and to perform automatic drawings of instructions for analysis purposes [8]. K-fold cross-validation strategy recently

recommended dataset splitting and boosted generalization of the CNN model. Generally, the model developed at the end was from scratch rather than any transferred learning model or pertained model.

Deep learning draws an attention in order to maximize the performances to classify different tasks which help to promise the human intervention data [9]. In this real world, the usage of deep learning shows the major interest for decoding human brain activities [10]. The problem is faced between intertrial and intersubject variability in electro encephalography signals, an indigenous access for attention-based bidirectional long-short-term memory. Convolutional neural network was analyzed among different factors that are classified into four classes of electro encephalography motor imaginary functions. Here, the usages of bidirectional long-short-term memory with the attention model accomplished the extraction of different features from the raw electro encephalography signals. Advancement of the clinical translation of the electro encephalography motor imaginary-based brain computer interface technology is applicable for varied request, where this system supports the paralyzed patients. The unusual achievements include the maximum accuracy and time-resolved predictions [11].

. To make an efficient and effective interface system, the human plays an important role.Graph convolutional neural networks, a novel deep learning framework, addressed the issues in order to differentiate the four-class motor imaginary intentions by mutually agreeing through the similarity of electro encephalography electrodes. To find the motor imaginary, four tasks are preferred with the prediction of highest accuracy [12].

About the project: Mainly this project is focused on couples who face frustrating situation in looking for wedding products and services here and there, and vendors who have difficulties to expand their customer base. The Wedding Planning System designed to be a one-stop web-based platform used by couples and vendors. Each user has different perspective towards the system, depends on the needs in terms of their roles in the system. Couples use the system on their wedding design, plan and management. Vendors use the system to sell their services and products.

Aim: The aim of this project is to help wedding couples to specify their desires and needs of every aspect of the wedding such as themes, styles, locations, dates, vendor brands and more and vendors to expand their market.

Scope of the project: This research study focused on developing an identification model for cotton leaf diseases and pests using deep learning technique called convolutional neural networking. Three common types of disease and pests such as bacterial blight, leaf miner, and spider mite have been affecting cotton productivity and quality. Also, the model applied made a supervised learning technique on datasets with four prime feature extraction process and 2400 datasets. The datasets are limited to four different feature descriptors. Taking into consideration the time constraints and reach of the regions that grow cotton, the research focused in the southern part of Ethiopia such as Arba Minch, Shele, and Woyto. MelkaWorer agricultural research center was also proposed as a focus area because it is responsible for cotton farms in SNNPR. Deep learning techniques were used to perform the automatic feature eradication from the different input datasets.

4. Literature Review

According to Shuyue [13], they outlined the different formats of graph convolutional neural network. It was prepared to process the uniform electro encephalography data for the purpose of predicting the four classes of motor imaginaries to relate with electro encephalography electrode. They addressed their data with the transformation of 2D to 3D perspectives. The structure was processed through these dimensional units.

A study [14] stated that, in order to utilize the dynamic route of deep learning, they proposed short-term voltage stability. They managed the clustering algorithm to obtain short-term voltage stability to increase the reliability.

In [7], it is stated that deep learning technique was applied to identify the leaf diseases in different mango trees. The researchers used five different leaf diseases from various specimens of mango leafs, where they addressed nearly 1200 datasets. The CNN structure was trained with more than 600 images, where 80% are used for training and 20% are used for testing. Remaining 600 images were used to find the accuracy and to identify the mango leaf diseases which showed the feasibility of its usage in real-time applications. The classification accuracy can be further increased if more images in the dataset are provided by tuning the parameters of the CNN model.

The research study [6] states that the mechanism for the identification and classification of rice plant datasets are used to process the CNN model. For training, nearly 500 different images with diseases were collected for processing from the rice experimental field.

In [15], detection of cotton leafs were addressed with image processing. Here, K-means algorithms are used to segment the datasets.

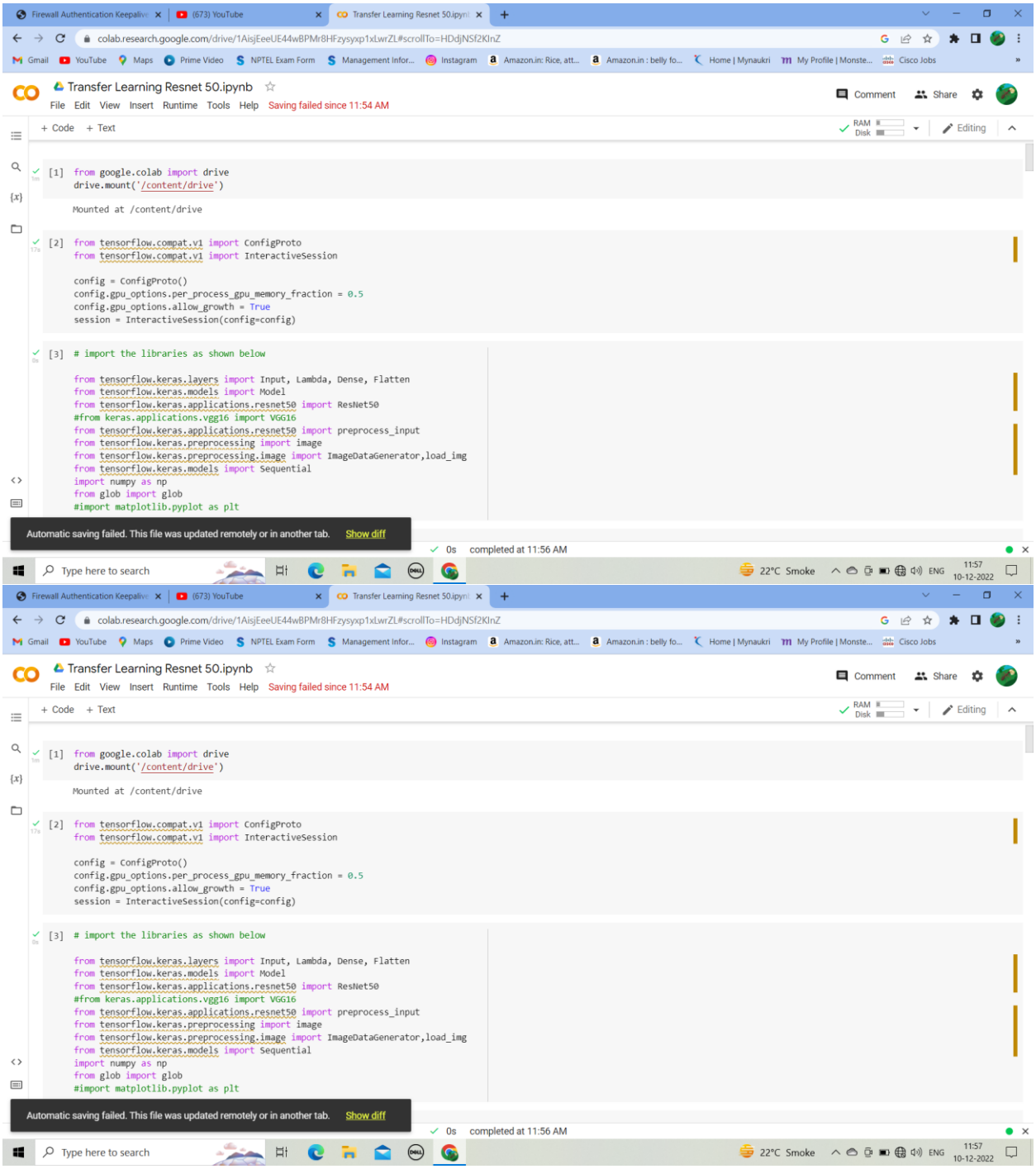
The research [16] showed the identification of diseases in banana plants which infect their leaf. In this research study, 3700 images were used for training, but there is no balanced dataset in each class. Researchers performed different experiments, for example, the training mode by using colored and grayscale image datasets and also by using different dataset splitting techniques. They obtained the best accuracy of 98.6% in colored image and 80% and 20% training to the validation dataset.

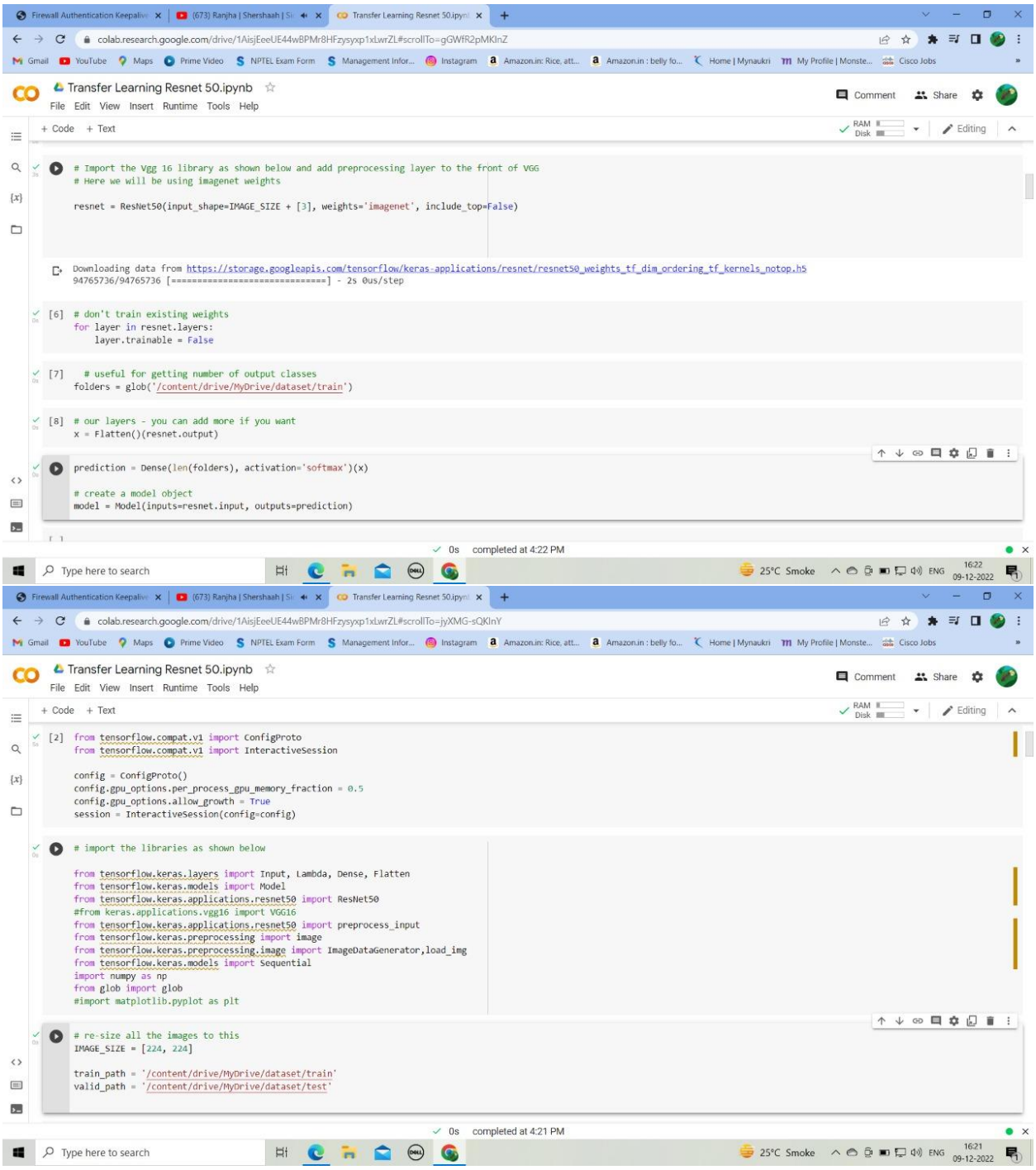
CHAPTER 3

THE CONCLUSION

Conclusion : This deep learning-based model was implemented using Python and Keras package, and Jupyter was used as a development environment. Different experiments have been undergone in this research study to get an efficient model by customizing various parameters such as dataset color, number of epochs, augmentation, and regularization methods. RGB-colored image dataset with augmentation provided 15% best performance for the model. The numbers of epoch and regularization methods are very significant to boost the model performance by 10% and 5.2%, respectively. The proposed prototype has achieved the highest efficiency of 96.4% for identifying each class of leaf disease and pests in cotton plants. Developments of such automated systems are used to assist the farmers and experts to identify cotton disease and pests by leaf visual symptoms. Obtained results evidence that the designed system for the farmers are much helpful in order to reduce the complexity, time, and cost of diagnosing the leaves from any diseases.

Deep Learning




Transfer Learning Resnet 50.ipynb
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# Import the Vgg 16 library as shown below and add preprocessing layer to the front of VGG
# Here we will be using imagenet weights
resnet = ResNet50(input_shape=IMAGE_SIZE + [3], weights='imagenet', include_top=False)
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/resnet/resnet50_weights_tf_dim_ordering_tf_kernels_notop.h5
94765736/94765736 [==========] - 2s 0us/step
[6] # don't train existing weights
for layer in resnet.layers:
layer.trainable = False
[7] # useful for getting number of output classes
folders = glob('/content/drive/MyDrive/dataset/train')
[8] # our layers - you can add more if you want
x = Flatten()(resnet.output)
prediction = Dense(len(folders), activation='softmax')(x)
# create a model object
model = Model(inputs=resnet.input, outputs=prediction)
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[2] from tensorflow.compat.v1 import ConfigProto
from tensorflow.compat.v1 import InteractiveSession
config = ConfigProto()
config.gpu_options.per_process_gpu_memory_fraction = 0.5
config.gpu_options.allow_growth = True
session = InteractiveSession(config=config)
# import the libraries as shown below
from tensorflow.keras.layers import Input, Lambda, Dense, Flatten
from tensorflow.keras.models import Model
from tensorflow.keras.applications.resnet50 import ResNet50
#from keras.applications.vgg16 import VGG16
from tensorflow.keras.applications.resnet50 import preprocess_input
from tensorflow.keras.preprocessing import image
from tensorflow.keras.preprocessing.image import ImageDataGenerator,load_img
from tensorflow.keras.models import Sequential
import numpy as np
from glob import glob
#import matplotlib.pyplot as plt
# re-size all the images to this
IMAGE_SIZE = [224, 224]
train_path = '/content/drive/MyDrive/dataset/train'
valid_path = '/content/drive/MyDrive/dataset/test'
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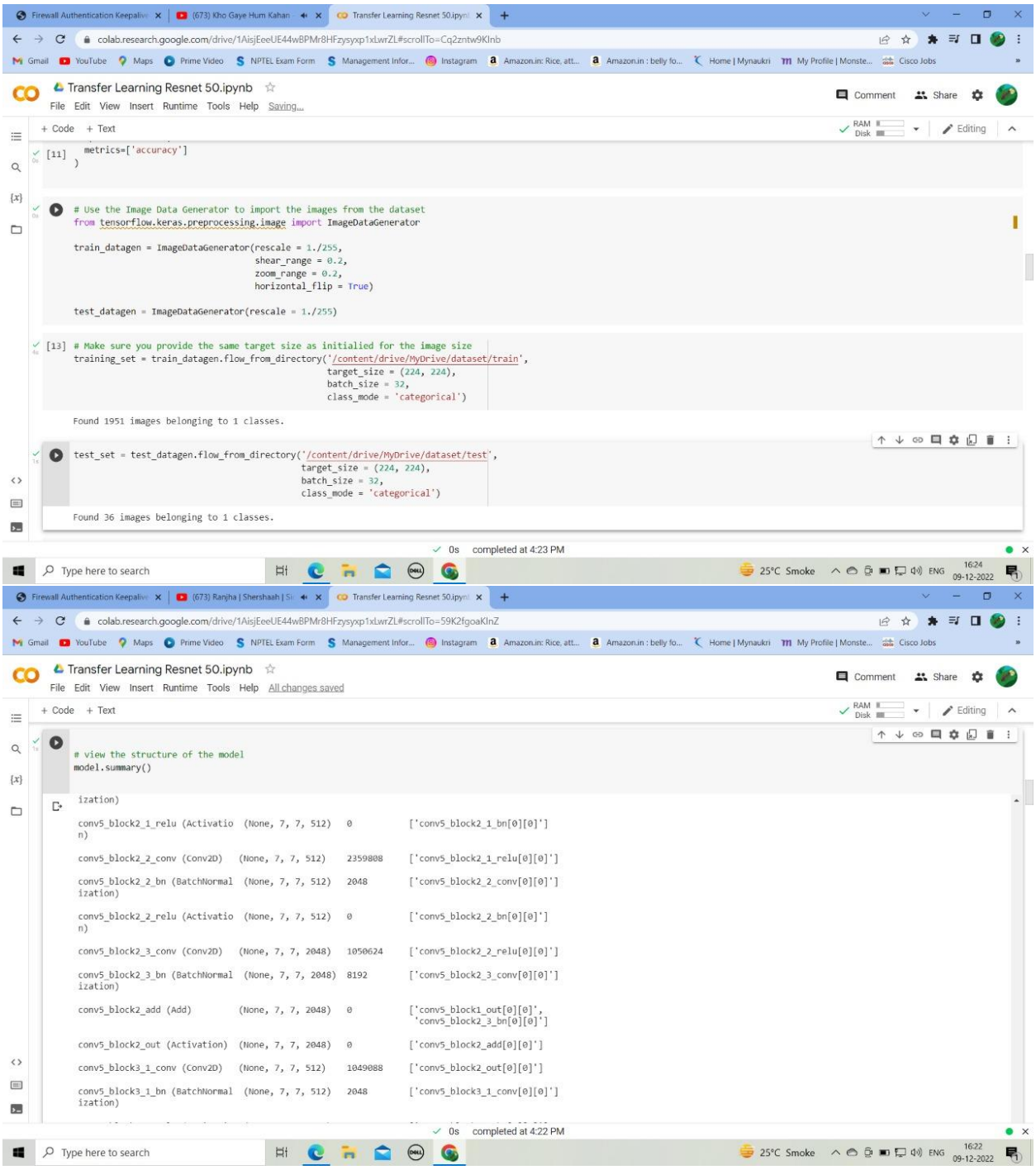
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[11] metrics=['accuracy']
)
# Use the Image Data Generator to import the images from the dataset
from tensorflow.keras.preprocessing.image import ImageDataGenerator
train_datagen = ImageDataGenerator(rescale = 1./255,
shear_range = 0.2,
zoom_range = 0.2,
horizontal_flip = True)
test_datagen = ImageDataGenerator(rescale = 1./255)
[13] # Make sure you provide the same target size as initialied for the image size
training_set = train_datagen.flow_from_directory('/content/drive/MyDrive/dataset/train',
target_size = (224, 224),
batch_size = 32,
class_mode = 'categorical')
Found 1951 images belonging to 1 classes.
test_set = test_datagen.flow_from_directory('/content/drive/MyDrive/dataset/test',
target_size = (224, 224),
batch_size = 32,
class_mode = 'categorical')
Found 36 images belonging to 1 classes.
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# view the structure of the model
model.summary()
ization)
conv5_block2_1_relu (Activatio (None, 7, 7, 512) 0 ['conv5_block2_1_bn[0][0]']
n)
conv5_block2_2_conv (Conv2D) (None, 7, 7, 512) 2359808 ['conv5_block2_1_relu[0][0]']
conv5_block2_2_bn (BatchNormal (None, 7, 7, 512) 2048 ['conv5_block2_2_conv[0][0]']
ization)
conv5_block2_2_relu (Activatio (None, 7, 7, 512) 0 ['conv5_block2_2_bn[0][0]']
n)
conv5_block2_3_conv (Conv2D) (None, 7, 7, 2048) 1050624 ['conv5_block2_2_relu[0][0]']
conv5_block2_3_bn (BatchNormal (None, 7, 7, 2048) 8192 ['conv5_block2_3_conv[0][0]']
ization)
conv5_block2_add (Add) (None, 7, 7, 2048) 0 ['conv5_block1_out[0][0]',
'conv5_block2_3_bn[0][0]']
conv5_block2_out (Activation) (None, 7, 7, 2048) 0 ['conv5_block2_add[0][0]']
conv5_block3_1_conv (Conv2D) (None, 7, 7, 512) 1049088 ['conv5_block2_out[0][0]']
conv5_block3_1_bn (BatchNormal (None, 7, 7, 512) 2048 ['conv5_block3_1_conv[0][0]']
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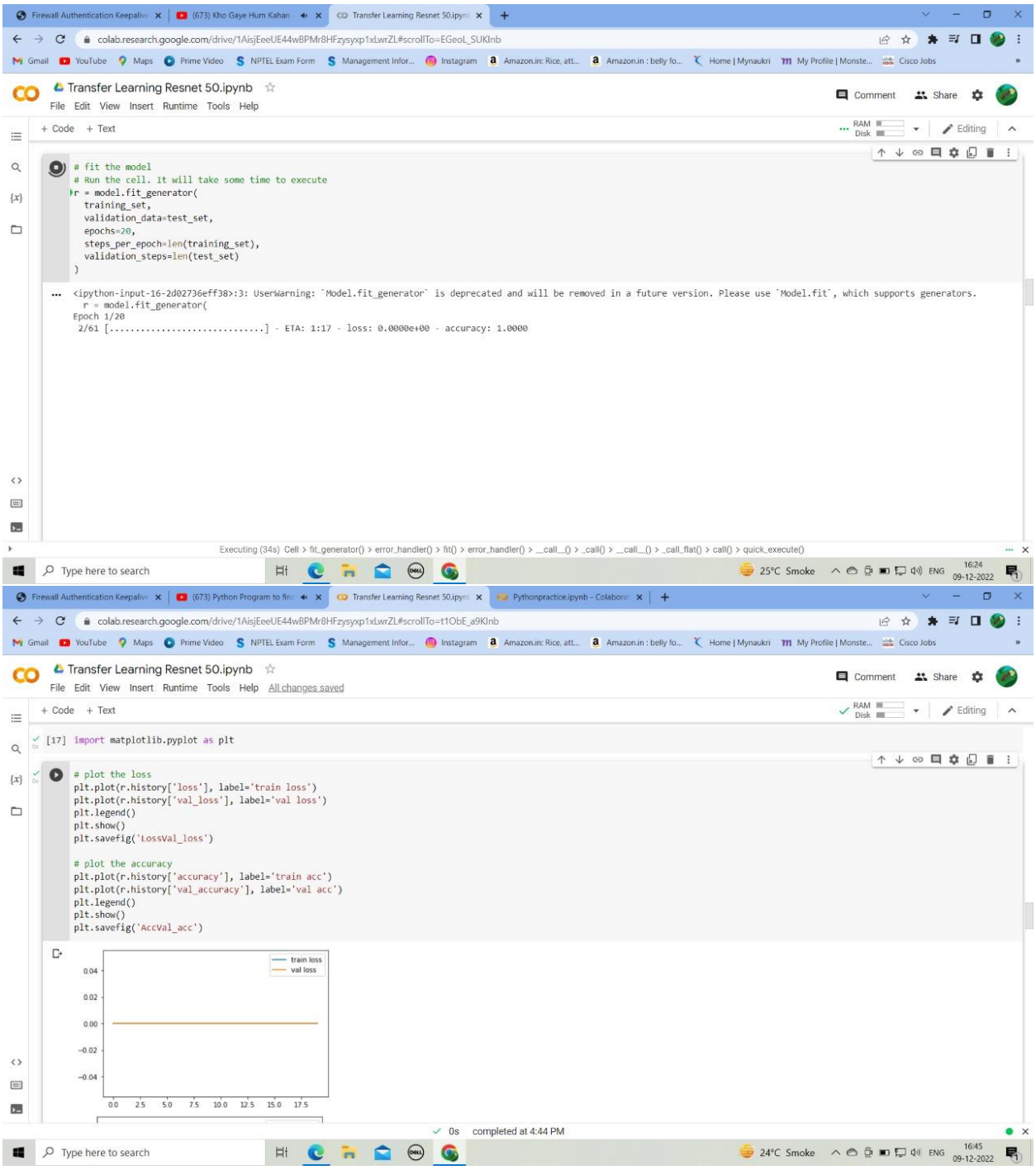
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# fit the model
# Run the cell. It will take some time to execute
r = model.fit_generator(
training_set,
validation_data=test_set,
epochs=20,
steps_per_epoch=len(training_set),
validation_steps=len(test_set)
)
<ipython-input-16-2d02736eff38>:3: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
r = model.fit_generator(
Epoch 1/20
2/61 [.....] - ETA: 1:17 - loss: 0.0000e+00 - accuracy: 1.0000
Executing (34s) Cell > fit_generator() > error_handler() > fit() > error_handler() > __call__() > _call() > __call__() > _call_flat() > call() > quick_execute()
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Transfer Learning Resnet 50.ipynb
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[17] import matplotlib.pyplot as plt
# plot the loss
plt.plot(r.history['loss'], label='train loss')
plt.plot(r.history['val_loss'], label='val loss')
plt.legend()
plt.show()
plt.savefig('LossVal_loss')
# plot the accuracy
plt.plot(r.history['accuracy'], label='train acc')
plt.plot(r.history['val_accuracy'], label='val acc')
plt.legend()
plt.show()
plt.savefig('AccVal_acc')
train loss
val loss
0.04
0.02
0.00
−0.02
−0.04
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2.5
5.0
7.5
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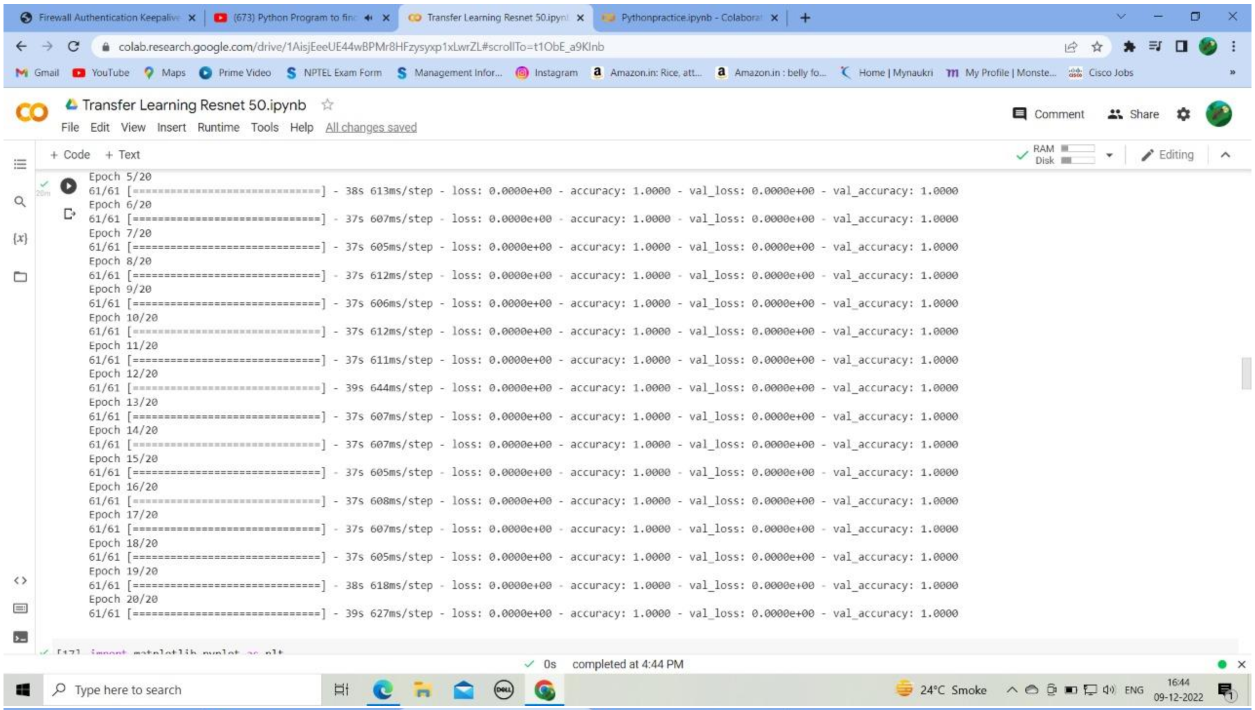
Transfer Learning Resnet 50.ipynb
Epoch 5/20
61/61 [==============================] - 38s 613ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 6/20
61/61 [==============================] - 37s 607ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 7/20
61/61 [==============================] - 37s 605ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 8/20
61/61 [==============================] - 37s 612ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 9/20
61/61 [==============================] - 37s 606ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 10/20
61/61 [==============================] - 37s 612ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 11/20
61/61 [==============================] - 37s 611ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 12/20
61/61 [==============================] - 39s 644ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 13/20
61/61 [==============================] - 37s 607ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 14/20
61/61 [==============================] - 37s 607ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 15/20
61/61 [==============================] - 37s 605ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 16/20
61/61 [==============================] - 37s 608ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 17/20
61/61 [==============================] - 37s 607ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 18/20
61/61 [==============================] - 37s 605ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 19/20
61/61 [==============================] - 38s 618ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
Epoch 20/20
61/61 [==============================] - 39s 627ms/step - loss: 0.0000e+00 - accuracy: 1.0000 - val_loss: 0.0000e+00 - val_accuracy: 1.0000
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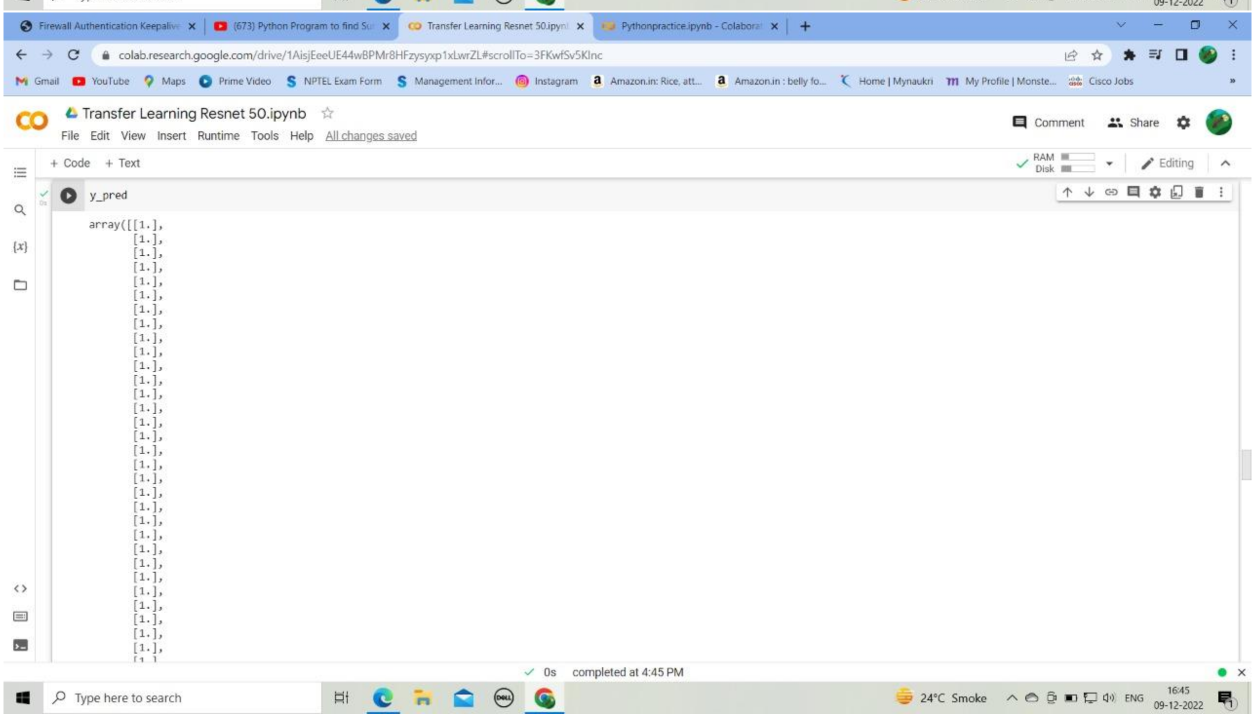
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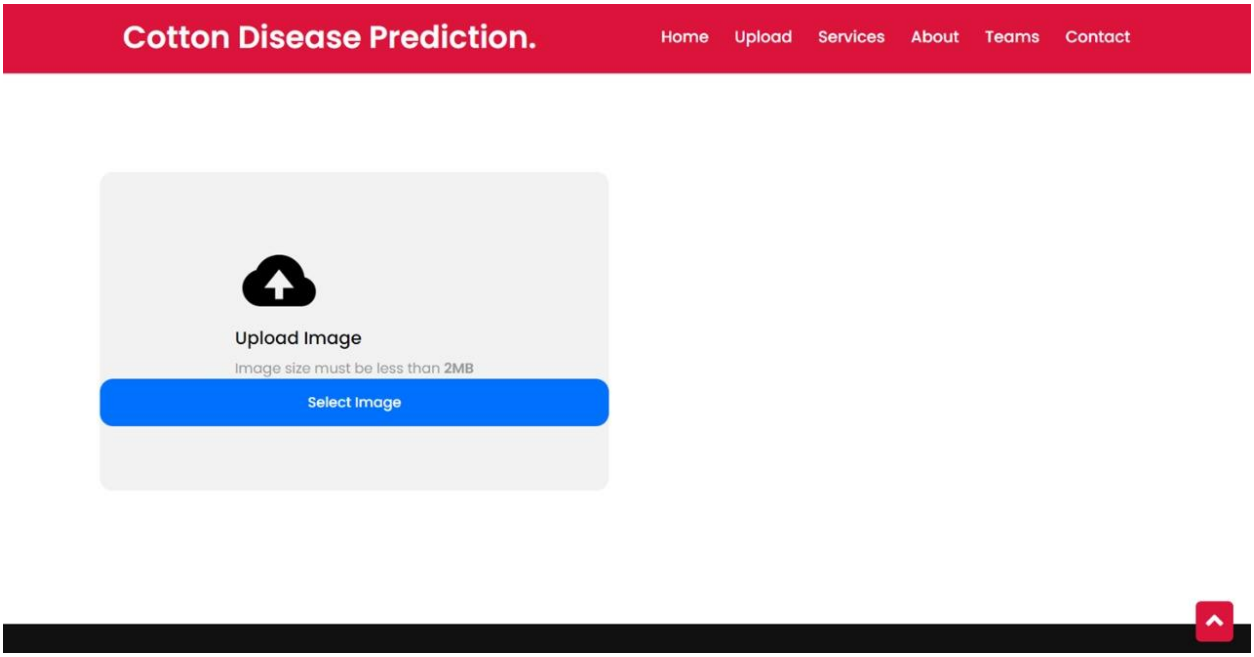
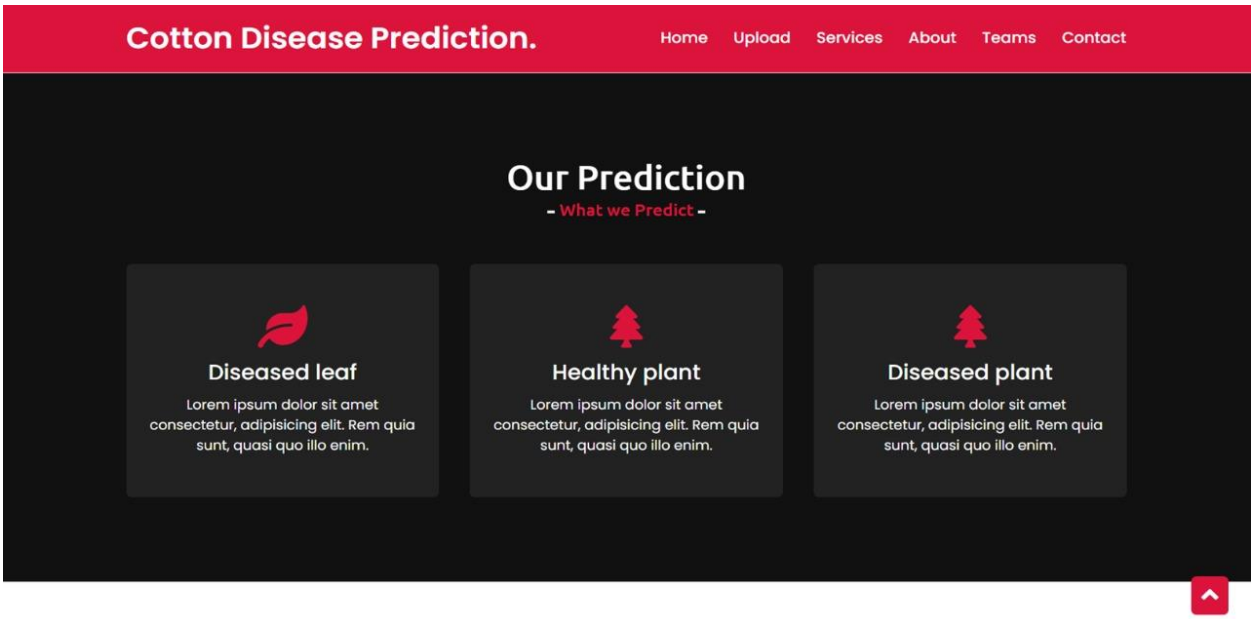
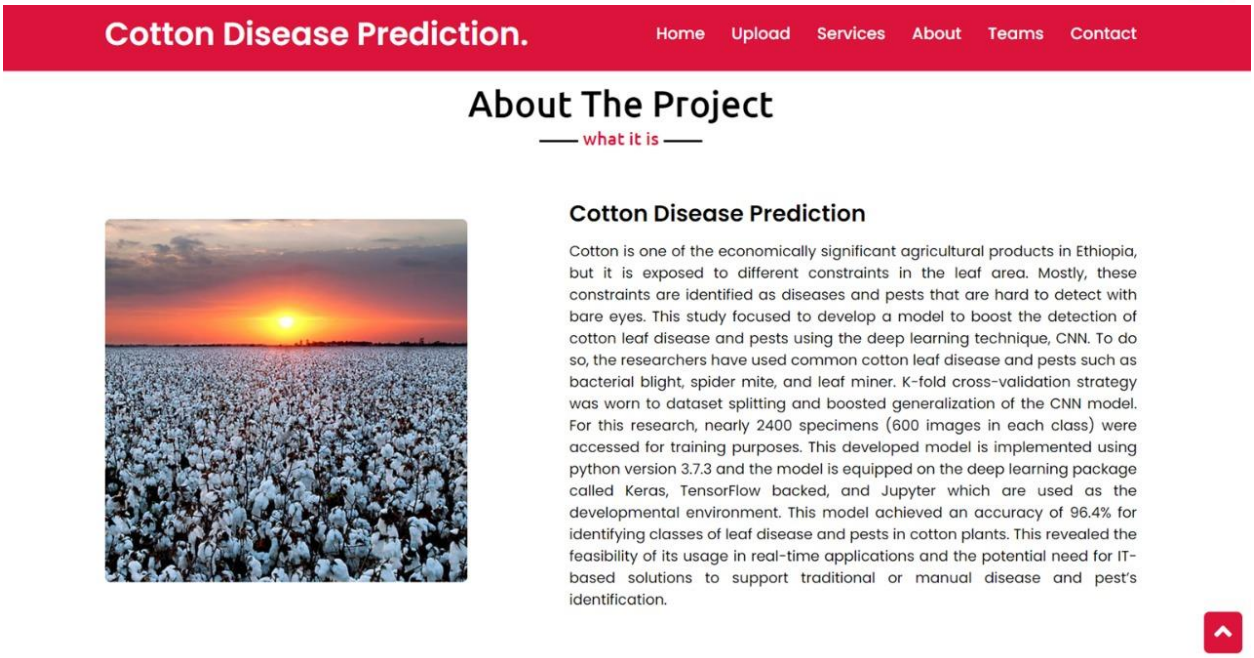
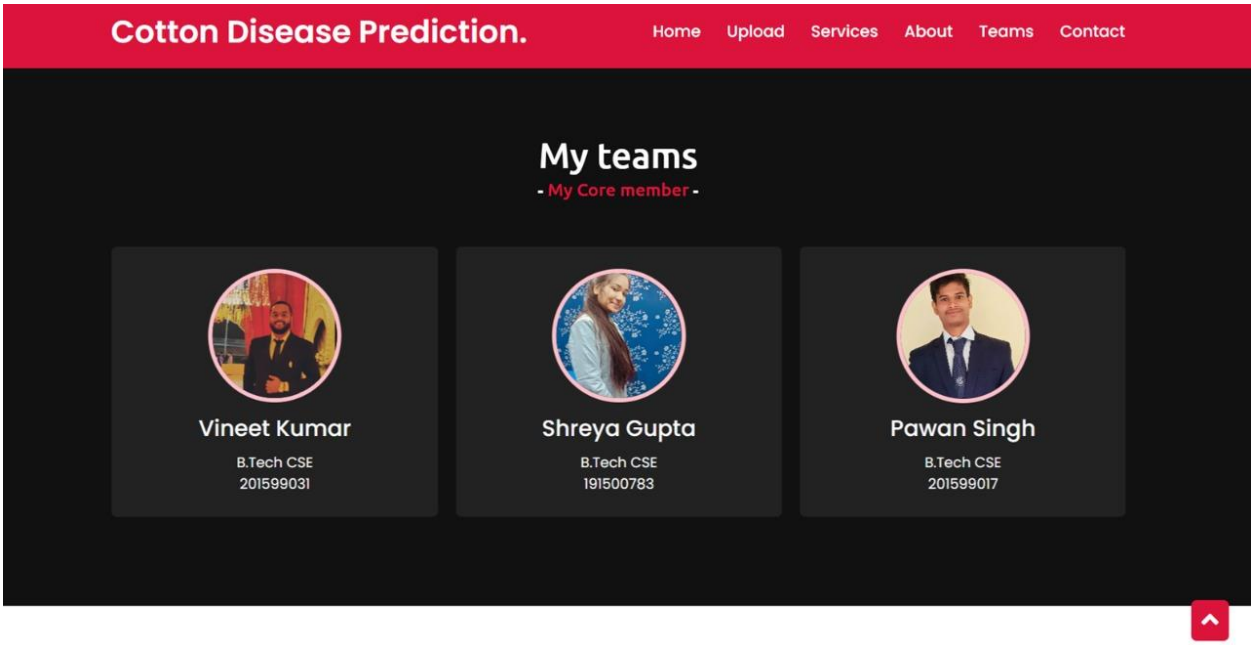
First Page

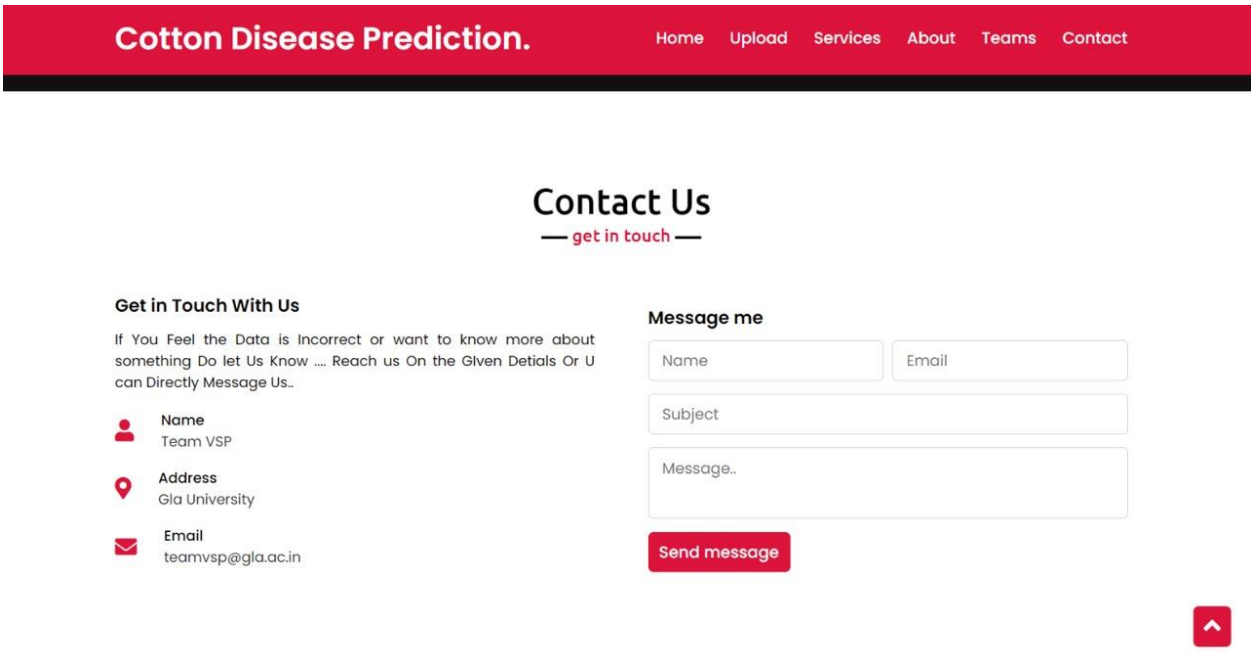
Cotton Disease Prediction 14




Cotton Disease Prediction.
Home
Upload
Services
About
Teams
Contact
Our Prediction
- What we Predict -
Diseased leaf
Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.
Healthy plant
Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.
Diseased plant
Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.


Cotton Disease Prediction.
Home
Upload
Services
About
Teams
Contact
About The Project
what it is
Cotton Disease Prediction
Cotton is one of the economically significant agricultural products in Ethiopia, but it is exposed to different constraints in the leaf area. Mostly, these constraints are identified as diseases and pests that are hard to detect with bare eyes. This study focused to develop a model to boost the detection of cotton leaf disease and pests using the deep learning technique, CNN. To do so, the researchers have used common cotton leaf disease and pests such as bacterial blight, spider mite, and leaf miner. K-fold cross-validation strategy was worn to dataset splitting and boosted generalization of the CNN model. For this research, nearly 2400 specimens (600 images in each class) were accessed for training purposes. This developed model is implemented using python version 3.7.3 and the model is equipped on the deep learning package called Keras, TensorFlow backed, and Jupyter which are used as the developmental environment. This model achieved an accuracy of 96.4% for identifying classes of leaf disease and pests in cotton plants. This revealed the feasibility of its usage in real-time applications and the potential need for IT-based solutions to support traditional or manual disease and pest's identification.


Cotton Disease Prediction.
Home
Upload
Services
About
Teams
Contact
My teams
- My Core member -
Vineet Kumar
B.Tech CSE
201599031
Shreya Gupta
B.Tech CSE
191500783
Pawan Singh
B.Tech CSE
201599017


Cotton Disease Prediction.
Home
Upload
Services
About
Teams
Contact
Contact Us
— get in touch —
Get in Touch With Us
If You Feel the Data is Incorrect or want to know more about something Do let Us Know .... Reach us On the Given Detials Or U can Directly Message Us..
Name
Team VSP
Address
Gla University
Email
teamvsp@gla.ac.in
Message me
Name
Email
Subject
Message..
Send message

Code:

Html File:

```
<!DOCTYPE html>
<html lang="en">
<head>
   <meta charset="UTF-8">
   <meta name="viewport" content="width=device-width, initial-scale=1.0">
   <link href='https://unpkg.com/boxicons@2.0.9/css/boxicons.min.css' rel='stylesheet'>
   <title>Cotton Prediction Website</title>
   <link rel="stylesheet" href="style.css">
   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/5.15.3/css/all.min.css"/>
   <script src="https://code.jquery.com/jquery-3.5.1.min.js"></script>
   <script src="https://cdnjs.cloudflare.com/ajax/libs/typed.js/2.0.11/typed.min.js"></script>
   <script src="https://cdnjs.cloudflare.com/ajax/libs/waypoints/4.0.1/jquery.waypoints.min.js"></script>
   <script src="https://cdnjs.cloudflare.com/ajax/libs/OwlCarousel2/2.3.4/owl.carousel.min.js"></script>
   <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/OwlCarousel2/2.3.4/assets/owl.carousel.min.css"/>

</head>
<body>
   <div class="scroll-up-btn">
      <i class="fas fa-angle-up"></i>
   </div>
   <nav class="navbar">
      <div class="max-width">
         <div class="logo"><a href="#">Cotton Disease <span> Prediction.</span></a></div>
         <ul class="menu">
            <li><a href="#home" class="menu-btn">Home</a></li>
            <li><a href="#upload" class="menu-btn">Upload</a></li>
            <li><a href="#services" class="menu-btn">Services</a></li>
            <li><a href="#about" class="menu-btn">About</a></li>
            <li><a href="#teams" class="menu-btn">Teams</a></li>
            <li><a href="#contact" class="menu-btn">Contact</a></li>
         </ul>
         <div class="menu-btn">
            <i class="fas fa-bars"></i>
         </div>
      </div>
   </nav>
```

```
    <section class="home" id="home">
      <div class="max-width">
        <div class="home-content">
          <div class="text-1">Welcome to the </div>
          <div class="text-2">Cotton Disease Prediction</div>
        </div>
      </div>
    </section>

    <div class="container">
      <section class="upload" id="upload">
                    <input type="file" id="file" accept="image/*" hidden>
                    <div class="upload-content" data-img="">
                        <i class='bx bxs-cloud-upload icon'></i>
                        <h3>Upload Image</h3>
                        <p>Image size must be less than <span>2MB</span></p>
                    </div>
                    <button class="select-image">Select Image</button>
          </div>
</body>
</html>
 <!-- services section start -->
 <section class="services" id="services">
    <div class="max-width">
      <h2 class="title">Our Prediction</h2>
      <div class="serv-content">
        <div class="card">
          <div class="box">
            <i class="fas fa-leaf"></i>
            <div class="text">Diseased leaf</div>
            <p>Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.</p>
          </div>
        </div>
        <div class="card">
          <div class="box">
            <i class="fas fa-tree"></i>
            <div class="text">Healthy plant</div>
            <p>Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.</p>
          </div>
```

```
        </div>
        <div class="card">
          <div class="box">
            <i class="fas fa-tree"></i>
            <div class="text">Diseased plant</div>
            <p>Lorem ipsum dolor sit amet consectetur, adipisicing elit. Rem quia sunt, quasi quo illo enim.</p>
          </div>
        </div>

      </div>
    </div>
  </div>
</section>


  <!-- about section start -->
  <section class="about" id="about">
    <div class="max-width">
      <h2 class="title">About The Project</h2>
      <div class="about-content">
        <div class="column left">
          <img src="c2.jpg" alt="">
        </div>
        <div class="column right">
          <div class="text">Cotton Disease Prediction </div>
          <p>Cotton is one of the economically significant agricultural products in Ethiopia, but it is exposed to different constraints in the leaf area. Mostly, these constraints are identified as diseases and pests that are hard to detect with bare eyes. This study focused to develop a model to boost the detection of cotton leaf disease and pests using the deep learning technique, CNN. To do so, the researchers have used common cotton leaf disease and pests such as bacterial blight, spider mite, and leaf miner. K-fold cross-validation strategy was worn to dataset splitting and boosted generalization of the CNN model. For this research, nearly 2400 specimens (600 images in each class) were accessed for training purposes. This developed model is implemented using python version 3.7.3 and the model is equipped on the deep learning package called Keras, TensorFlow backed, and Jupyter which are used as the developmental environment. This model achieved an accuracy of 96.4% for identifying classes of leaf disease and pests in cotton plants. This revealed the feasibility of its usage in real-time applications and the potential need for IT-based solutions to support traditional or manual disease and pest's identification.</p>
        </div>
      </div>
    </div>
  </section>
```

```
<!-- teams section start -->
<section class="teams" id="teams">
   <div class="max-width">
      <h2 class="title">My teams</h2>
      <div class="carousel owl-carousel">
         <div class="card">
            <div class="box">
               <img src="v.jpeg" alt="">
               <div class="text">Vineet Kumar</div>
               <p>B.Tech CSE</p>
               <p>201599031</p>
            </div>
         </div>
         <div class="card">
            <div class="box">
               <img src="s.jpeg" alt="">
               <div class="text">Shreya Gupta</div>
               <p>B.Tech CSE</p>
               <p>191500783</p>
            </div>
         </div>
         <div class="card">
            <div class="box">
               <img src="p.jpg" alt="">
               <div class="text">Pawan Singh</div>
               <p>B.Tech CSE</p>
               <p>201599017</p>
            </div>
         </div>
      </div>
   </div>
</section>

<!-- contact section start -->
<section class="contact" id="contact">
   <div class="max-width">
      <h2 class="title">Contact Us</h2>
      <div class="contact-content">
```

```
        <div class="column left">
          <div class="text">Get in Touch With Us</div>
          <p>If You Feel the Data is Incorrect or want to know more about something Do let Us Know .... Reach us On the GIven Detials Or U can Directly Message Us.. </p>
          <div class="icons">
            <div class="row">
              <i class="fas fa-user"></i>
              <div class="info">
                <div class="head">Name</div>
                <div class="sub-title">Team VSP</div>
              </div>
            </div>
            <div class="row">
              <i class="fas fa-map-marker-alt"></i>
              <div class="info">
                <div class="head">Address</div>
                <div class="sub-title">Gla University</div>
              </div>
            </div>
            <div class="row">
              <i class="fas fa-envelope"></i>
              <div class="info">
                <div class="head">Email</div>
                <div class="sub-title">teamvsp@gla.ac.in</div>
              </div>
            </div>
          </div>
        </div>
        <div class="column right">
          <div class="text">Message me</div>
          <form action="#">
            <div class="fields">
              <div class="field name">
                <input type="text" placeholder="Name" required>
              </div>
              <div class="field email">
                <input type="email" placeholder="Email" required>
              </div>
            </div>
            <div class="field">
```

```
                <input type="text" placeholder="Subject" required>
              </div>
              <div class="field textarea">
                <textarea cols="30" rows="10" placeholder="Message.." required></textarea>
              </div>
              <div class="button-area">
                <button type="submit">Send message</button>
              </div>
            </form>
          </div>
        </div>
      </div>
    </section>


    <script src="style.js"></script>
</body>
</html>
```

CSS FILE:

```
/*  import google fonts */
@import
url('https://fonts.googleapis.com/css2?family=Poppins:wght@400;500;600;700&family
=Ubuntu:wght@400;500;700&display=swap');
@import
url('https://fonts.googleapis.com/css2?family=Poppins:wght@300;400;500;600;700&di
splay=swap');
*{
    margin: 0;
    padding: 0;
    box-sizing: border-box;
    text-decoration: none;
    font-family: 'Poppins', sans-serif;
}
html{
    scroll-behavior: smooth;
}
```

```
/* custom scroll bar */
::-webkit-scrollbar {
    width: 10px;
}
::-webkit-scrollbar-track {
    background: #f1f1f1;
}
::-webkit-scrollbar-thumb {
    background: #888;
}

::-webkit-scrollbar-thumb:hover {
    background: #555;
}

/* all similar content styling codes */
section{
    padding: 100px 0;
}
.max-width{
    max-width: 1300px;
    padding: 0 80px;
    margin: auto;
}
.about, .services, .teams, .contact, footer{
    font-family: 'Poppins', sans-serif;
}
.about .about-content,
.services .serv-content,
.contact .contact-content{
    display: flex;
    flex-wrap: wrap;
    align-items: center;
    justify-content: space-between;
}
section .title{
    position: relative;
    text-align: center;
```

```
    font-size: 40px;
    font-weight: 500;
    margin-bottom: 60px;
    padding-bottom: 20px;
    font-family: 'Ubuntu', sans-serif;
}
section .title::before{
    content: "";
    position: absolute;
    bottom: 0px;
    left: 50%;
    width: 180px;
    height: 3px;
    background: #111;
    transform: translateX(-50%);
}
section .title::after{
    position: absolute;
    bottom: -8px;
    left: 50%;
    font-size: 20px;
    color: crimson;
    padding: 0 5px;
    background: #fff;
    transform: translateX(-50%);
}

/* navbar styling */
.navbar{
    position: fixed;
    width: 100%;
    z-index: 999;
    padding: 30px 0;
    font-family: 'Ubuntu', sans-serif;
    transition: all 0.3s ease;
}
.navbar.sticky{
    padding: 15px 0;
```

```
    background:crimson;
}
.navbar .max-width{
    display: flex;
    align-items: center;
    justify-content: space-between;
}
.navbar .logo a{
    color: #fff;
    font-size: 35px;
    font-weight: 600;
}
.navbar .logo a span{
    color:crimson;
    transition: all 0.3s ease;
}
.navbar.sticky .logo a span{
    color: #fff;
}
.navbar .menu li{
    list-style: none;
    display: inline-block;
}
.navbar .menu li a{
    display: block;
    color: #fff;
    font-size: 18px;
    font-weight: 500;
    margin-left: 25px;
    transition: color 0.3s ease;
}
.navbar .menu li a:hover{
    color: crimson;
}
.navbar.sticky .menu li a:hover{
    color: #fff;
}
```

```
/* menu btn styling */
.menu-btn{
    color: #fff;
    font-size: 23px;
    cursor: pointer;
    display: none;
}
.scroll-up-btn{
    position: fixed;
    height: 45px;
    width: 42px;
    background: crimson;
    right: 30px;
    bottom: 10px;
    text-align: center;
    line-height: 45px;
    color: #fff;
    z-index: 9999;
    font-size: 30px;
    border-radius: 6px;
    border-bottom-width: 2px;
    cursor: pointer;
    opacity: 0;
    pointer-events: none;
    transition: all 0.3s ease;
}
.scroll-up-btn.show{
    bottom: 30px;
    opacity: 1;
    pointer-events: auto;
}
.scroll-up-btn:hover{
    filter: brightness(90%);
}


/* home section styling */
.home{
```

```
    display: flex;
    background: url("c3.jpg") no-repeat center;
    height: 100vh;
    color:white;
    min-height: 500px;
    background-size: cover;
    background-attachment: fixed;
    font-family: 'Ubuntu', sans-serif;
}
.home .max-width{
  width: 100%;
  display: flex;
}
.home .max-width .row{
  margin-right: 0;
}
.home .home-content .text-1{
    font-size: 27px;
}
.home .home-content .text-2{
    font-size: 75px;
    font-weight: 600;
    margin-left: -3px;
}
.home .home-content .text-3{
    font-size: 40px;
    margin: 5px 0;
}
.home .home-content .text-3 span{
    color: crimson;
    font-weight: 500;
}
.home .home-content a{
    display: inline-block;
    background: crimson;
    color: #fff;
    font-size: 25px;
    padding: 12px 36px;
```

```
    margin-top: 20px;
    font-weight: 400;
    border-radius: 6px;
    border: 2px solid crimson;
    transition: all 0.3s ease;
}
.home .home-content a:hover{
    color: crimson;
    background: none;
}

/*Upload A file */
:root {
      --blue: #0071FF;
      --dark-blue: #005DD1;
      --grey: #f2f2f2;
}

.upload .body {
      justify-content: center;
      align-items: center;
      min-height: 100vh;
      background: var(--light-blue);
}


.container {
      max-width: 400px;
      width: 100%;
      background: #fff;
      padding: 120px;
      border-radius: 30px;
}
.upload {
      position: relative;
      width: 360%;
      height: 360px;
      background: var(--grey);
```

```
        margin-bottom: 30px;
        border-radius: 15px;
        overflow: hidden;
        display: flex;
        justify-content: center;
        align-items: center;
        flex-direction: column;
}
.upload .icon {
        font-size: 100px;
}
.upload h3 {
        font-size: 20px;
        font-weight: 500;
        margin-bottom: 6px;
}
.upload p {
        color: #999;
}
.upload p span {
        font-weight: 600;
}
.upload img {
        position: absolute;
        top: 0;
        left: 0;
        width: 100%;
        height: 100%;
        object-fit: cover;
        object-position: center;
        z-index: 100;
}
.upload::before {
        content: attr(data-img);
        position: absolute;
        top: 0;
        left: 0;
        width: 100%;
```

```
        font-size: 27px;
    }
    .about .about-content .right .text,
    .skills .skills-content .left .text{
        font-size: 19px;
    }
    .
```

Javascript File

```
$(document).ready(function(){
   $(window).scroll(function(){
      // sticky navbar on scroll script
      if(this.scrollY > 20){
         $('.navbar').addClass("sticky");
      }else{
         $('.navbar').removeClass("sticky");
      }

      // scroll-up button show/hide script
      if(this.scrollY > 500){
         $('.scroll-up-btn').addClass("show");
      }else{
         $('.scroll-up-btn').removeClass("show");
      }
   });
   const selectImage = document.querySelector('.select-image');
const inputFile = document.querySelector('#file');
const imgArea = document.querySelector('.img-area');
```

```
selectImage.addEventListener('click', function () {
        inputFile.click();
})

inputFile.addEventListener('change', function () {
        const image = this.files[0]
        if(image.size < 2000000) {
                const reader = new FileReader();
                reader.onload = ()=> {
                        const allImg = imgArea.querySelectorAll('img');
                        allImg.forEach(item=> item.remove());
                        const imgUrl = reader.result;
                        const img = document.createElement('img');
                        img.src = imgUrl;
                        imgArea.appendChild(img);
                        imgArea.classList.add('active');
                        imgArea.dataset.img = image.name;
                }
                reader.readAsDataURL(image);
        } else {
                alert("Image size more than 2MB");
        }
})

   // slide-up script
```

```
$('.scroll-up-btn').click(function(){
    $('html').animate({scrollTop: 0});
    // removing smooth scroll on slide-up button click
    $('html').css("scrollBehavior", "auto");
});

$('.navbar .menu li a').click(function(){
    // applying again smooth scroll on menu items click
    $('html').css("scrollBehavior", "smooth");
});

// toggle menu/navbar script
$('.menu-btn').click(function(){
    $('.navbar .menu').toggleClass("active");
    $('.menu-btn i').toggleClass("active");
});

// owl carousel script
$('.carousel').owlCarousel({
    margin: 20,
    loop: true,
    autoplay: true,
    autoplayTimeOut: 2000,
    autoplayHoverPause: true,
    responsive: {
        0:{
```

```
            items: 1,
            nav: false
        },
        600:{
            items: 2,
            nav: false
        },
        1000:{
            items: 3,
            nav: false
        }
    }
  });
});
```

References

1. Ethiopian Institute of Agricultural Research, *Cotton Research Strategy*, EIAR, Addis Ababa, Ethiopia, 2017.
2. P. Sonal, P. Patil, M. Rupali, and S. Zambre, "Classification of cotton leaf spot disease using support vector machine," *International Journal of Engineering Research and Applications*, vol. 4, no. 5, pp. 92-93, 2014.
   View at: Google Scholar
3. O.-I. e. Inga Hilbert, "The cotton supply chain in Ethiopia," *Freiburg*, vol. 38, 2018.
   View at: Google Scholar
4. B. S. Prajapati, V. K. Dabhi, and H. B. Prajapati, "A survey on detection and classification of cotton leaf disease," in *Proceedings of International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT)*, pp. 1-2, Chennai, India, March 2016.
   View at: Google Scholar
5. A. R. Hevner, S. T. March, J. Park, and S. Ram, "Design Science in IS Research," *Management Information*, vol. 28, pp. 75–105, 2004.
   View at: Google Scholar

6. S. Arivazhagan and S. VinethLigi, "Mango leaf diseases identification using convolutional neural network," *International Journal of Pure and Applied Mathematics*, vol. 120, pp. 11067–11079, 2018.
   View at: Google Scholar
7. L. Yang, S. Yi, N. Zeng, Y. Liu, and Y. Zhang, "Identification of rice diseases using deep convolutional neural networks," *Neurocomputing*, vol. 276, no. 1, pp. 378–384, 2017.
   View at: Google Scholar
8. S. Wallelign, M. Polceanu, and C. Buche, "Soybean plant disease identification using convolutional neural network," in *Proceedings of Artificial Intelligence Research Society Conference*, Melbourne, FL, USA, May 2018.
   View at: Google Scholar
9. Y. Hou, S. Jia, S. Zhang et al., "Deep feature mining via attention-based BiLSTM-GCN for human motor imagery recognition," 2020, arXiv preprint arXiv:2005.00777.
   View at: Google Scholar
10. M. A. Schwemmer, N. D. Skomrock, P. B. Sederberg et al., "Meeting brain-computer interface user performance expectations using a deep neural network decoding framework," *Nature Medicine*, vol. 24, no. 11, pp. 1669–1676, 2018.