

FLOWER DETECTION USING MACHINE LEARNING

Submitted in partial fulfillment of the requirements of the degree

BACHELOR OF ENGINEERING IN COMPUTER ENGINEERING

By

- 1.) Saniya Zad - VU1F1920046
- 2.) Tejas kadam - VU1F1920052
- 3.) Pranavi Bhambare VU1F1920061
- 4.) Rushank Wani - VU1F1920062

Name of the Mentor
Prof. Sumit Shinde



a

Department of Computer Engineering

Vasantdada Patil Pratishthan's College

**Of Engineering & Visual Arts
Sion, Mumbai - 400022**

University of Mumbai

(AY 2020-21)

CERTIFICATE

This is to certify that the Mini Project entitled “ **Flower Detection using machine learning** ” is a bonafide work of **Saniya Zad(VU1F1920046), Tejas Kadam(VU1F1920052), Pranavi Bhambare(VU1F1920061), Rushank Wani(VU1F1920062)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of “**Bachelor of Engineering**” in “**Computer Engineering**” .

(Prof. _____)

Mentor

(Prof. _____)

Head of Department

(Prof. _____)

Principal

Mini Project Approval

This Mini Project entitled “ **Flower Detection using machine learning** ” by **Saniya Zad(VU1F1920046), Tejas Kadam(VU1F1920052),Pranavi Bhambare(VU1F1920061), Rushank Wani(VU1F1920062)** is approved for the degree of **Bachelor of Engineering in Computer Engineering.**

Examiners

1.....
(Internal Examiner Name & Sign)

2.....
(External Examiner name & Sign)

Date:

Place:

Contents

Abstract	i
Acknowledgments	ii
List of Abbreviations	iii

1 Introduction

- 1.1 Introduction**
- 1.2 Motivation**
- 1.3 Problem Statement & Objectives**

2 Literature Survey

- 2.1 Survey of Existing System/SRS**
- 2.2 Limitation Existing system or Research gap**

3 Proposed System (eg New Approach of Data Summarization)

- 3.1 Introduction**
- 3.2 Architecture/ Framework**
- 3.3 Algorithm and Process Design**
- 3.4 Details of Hardware & Software**
- 3.5 Conclusion and Future work.**

References

4 Annexure

- 4.1 Published Paper /Camera Ready Paper/ Business pitch/proof of concept**

Abstract :

Beauty is incomplete without flowers. In our everyday life, while walking beside the rail line or in the garden we used to see a lot of flowers. But in most cases we have no knowledge about those flowers. Even sometimes we were unknown of names. In that case we choose this idea to research and develop our project that will introduce people to the unknown flower. This project is an attempt at using the concept of neural network to create an image classifier by tensorflow. Convolutional neural networks (CNN) are widely used in image classification.

Acknowledgments:

The success and final outcome of this mini project required a lot of guidance and assistance from many people and we are extremely privileged to have got this all along the completion of our project. All that we have done is only due to such supervision and assistance and we would not forget to thank them.

We respect and thank **Prof. Sumit Shinde**, for providing us an opportunity to do the project work and giving us all support and guidance which made us complete the project duly. We are extremely thankful to him for providing such nice support and guidance, although he had a busy schedule managing the college work.

List of Abbreviations:

- CNN: Convolutional Neural Network
- URL: Uniform resource locator

1. Introduction:

1.1. Introduction

Since the invention of the computer, it has begun to change our daily life. It improves the quality of our lives. Basically machine learning, developed skills to develop the computer itself with the knowledge given.

There are many applications of CNNs, one of the most popular of which is image classification, and CNNs have even been used specifically for flower classification. Thus, this project is explorative and aimed at learning how to design a neural network using Tensorflow, but ultimately has practical applications for developers, botanists, or nature enthusiasts.

- It is very important to identify naturally occurring objects and recognize their type.
- It is useful to identify flower type in various fields such as gardening, botany research, Ayurveda, treatment, farming, Floriculture etc. Nature has many different kinds of flowers, similarity in some features is found between the flowers.
- Our project aim is to provide an automated system that detects and recognizes flower species.

1.2. Motivation

- Memorizing and recognizing species of flowers are difficult and also important tasks for people.
- All of us are aware how fast things are moving online and in the coming few years there is a chance that we humans might lose touch with nature and its beautiful gifts. This project could be a small support for us to at least have some touch with nature's floral beauty around us.
- This project is inspired from the idea of some day having a robot gardening your gardens for you and teaching the new generation about the vast floral beauty that earth has been surrounded by.

1.3. Problem Statement & objective

Problem Statement:

- Many people have forgotten the herbal way of medication by using commonly appearing flowers .
- As we modernize we have lost touch with the holy importance of flowers that were used in rituals.

Objective:

- The main Objective of the project is to develop awareness in people of the ethological importance of commonly seen flowers.
- According to the preaching of our ancestors flowers can be used for medication, cosmetics, in cuisines.

2. Literature Survey:

2.1. Survey of Existing Systems

- Zhibin Cheng [1] has noted in their articles about how they have used sigmoid function as their activation function and their detection accuracy is calculated to be 90% . They have proposed a colour based recognition system that will decide the flower by sorting it pixel by pixel and then using the colour information to deduce an outcome.
- Shi [2] stated in their publishing that their ‘A Flower Auto-Recognition System Based on Deep Learning’ is built on the training of the pictures taken from phones which give about 95% accuracy and they have selected 32 different categories of flowers. This report was published in 2019.
- Jyoti [3] has cited in their publication they have used videos of different flowers as a dataset to train their model, their CNN divided the flower images upload into 3 parts of key image segmented image and gradient image by which their machine detects the type of flower. This article was published in 2018.
- The article [4] which Rohit Sangale cited is about how they have used a dataset containing 8189 images from Oxford University and have achieved an accuracy of 98% with a CNN consisting 2 hidden layers.

2.2. Limitations of existing systems

- The activation function used is not much suited for this type of detection system.[\[1\]](#)
- Classification of similar types of flowers from different angles is difficult.[\[2\]](#)
- If video dataset is used the background is more exposed to the machine rather than the main object so even though its accuracy come high it might not detect the flowers that well.[\[3\]](#)

3. Proposed System:

3.1. Introduction

- Our project aim is to provide an automated system that detects and recognizes flower species.
- Flower recognition system gives the people with limited experience in flower species, the ability to recognize the species of a flower.

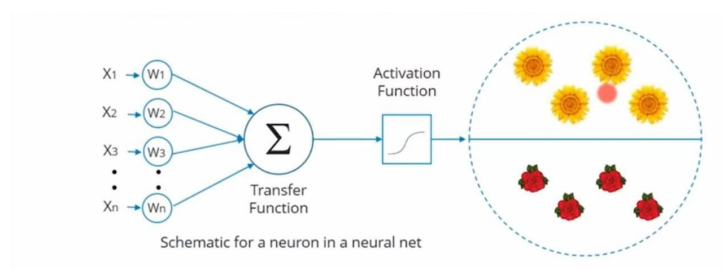
3.2. Architecture/Framework

01. Backend part:

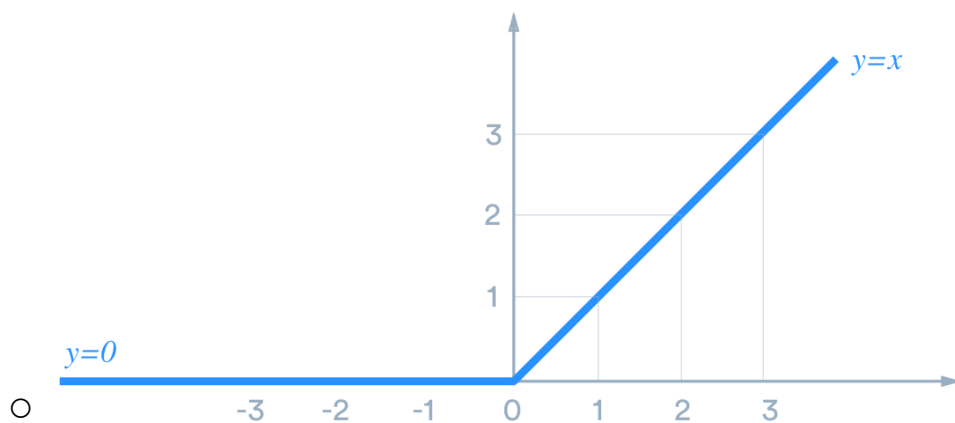
- Backend is designed using concepts of Deep learning like CNN and image recognition.
- Api available on tensorflow is being used for training the model.
- The data is being separated into training and validation in the ratio of 80% training and 20% validation i.e testing.
- Django Framework is used for our web application.

➤ CNN

- Within Deep Learning, a Convolutional Neural Network or CNN is a type of artificial neural network, which is widely used for image/object recognition and classification.



- Our CNN consists of different hidden layers for clearing the images and making it easy for our model to train itself on a deeper and better scale.
- In our project we have used a 'relu' named activation function in hidden layers which looks like this below figure.

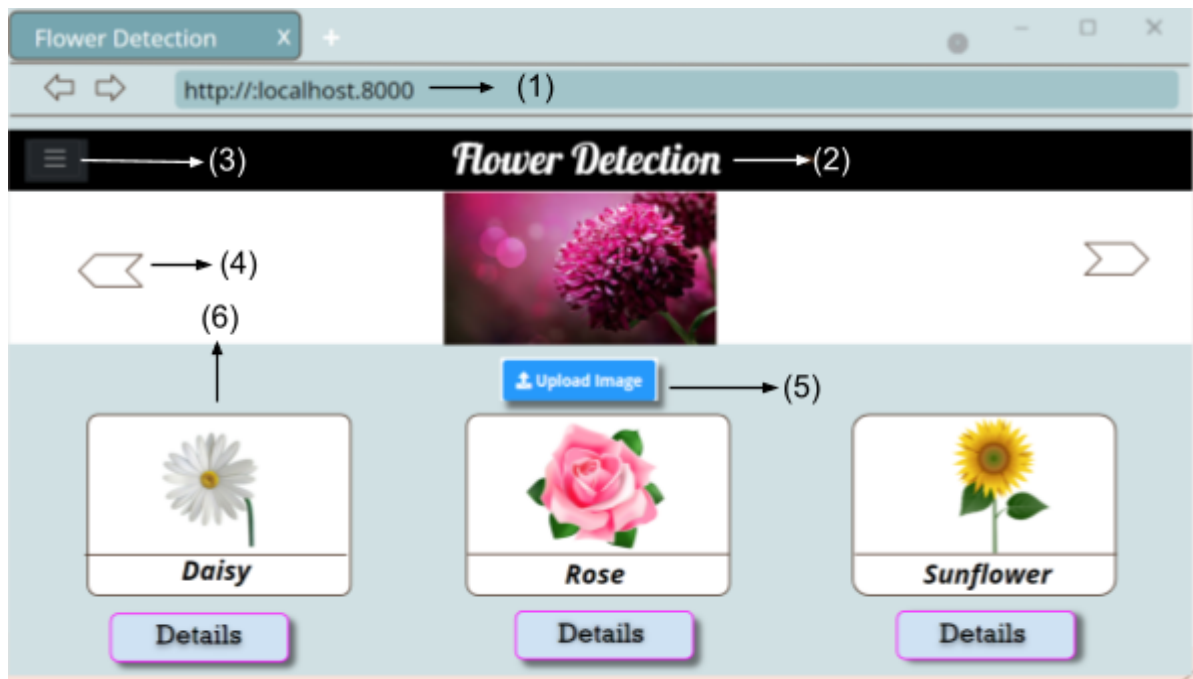


- Optimizer named 'Adam' is being used. It is an algorithm used to change the attributes of the neural network such as weights and learning rate to reduce the losses. Optimizers are used to solve optimization problems by minimizing the function.

➤ Image Recognition

- Image Recognition is the task of identifying objects of interest within an image and recognizing which category they belong to.
- Image recognition works involve the creation of a neural network that processes the individual pixels of an image.

02. Frontend part:



What have we used ?

- Front end part is designed by using HTML language and CSS for styling purposes.
- Visual Studio code is being used as a platform for our code.

What will be in our web application ?

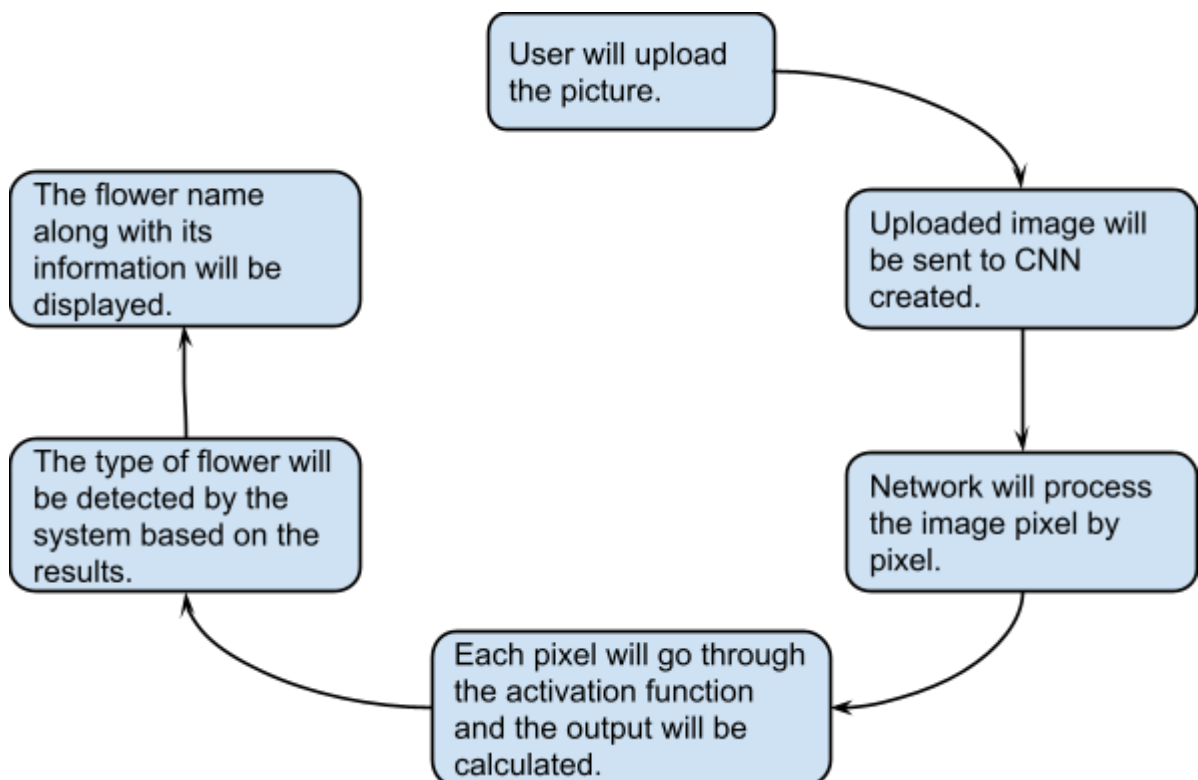
- We created a server in which 'localhost.8000'
 - (1), a hostname is a page that refers back to the same computer. The port number 8000 is commonly used for web development frameworks. This website has limitations because it is only visible to those devices who are connected to the same server.
- The main page consists of a 'title'
 - (2) as "FLOWER DETECTION",
- Also this page contains a 'navigation bar'
 - (3) which will show buttons like Home, Search, About us, Contact Us, after clicking on the 'dropdown' as

shown in the above architecture part.

- Below the title there is a 'slider'(4) which will show the images of flowers moving.
- There is an 'upload image' (5) button below the slider where one has to select an image of a flower for recognition.
- If one has to explore some more flower image information then it is visible at the bottom of the page in the form of 'cards'
(6). Where one will be able to get more information of that visible flower by clicking on 'details'.

3.3. Algorithm and Process Design

1. Firstly the user will upload the image he/she has in the given option.
2. As the system gets its input it will be sent to the CNN network that is created.
3. The images will go through the Neural network created where it will be divided to each neuron.
4. Using the trained weights which it has from earlier training, it will try to verify the image uploaded by the user.
5. System will then identify the type of flower which has been provided to it by the user.
6. Lastly the name of the flower along with the biological information it has on that particular flower will be displayed.



❖ How our Web Application will work :

1. User has to click on button named '*choose file*' to select a file from a folder.
2. Now , browse the image/file from that particular folder which has to be recognized.
3. Select the image of flower which has to be detected.
4. Upload the selected image of flower by simply clicking on '*upload*' button
5. As the system gets its input it will start detecting.
6. So the uploaded image will be sent to CNN that will process the image pixel by pixel.
7. Finally the system will identify the type of Flower which has been provided to it by the user.
8. Along with that biological information i.e Introduction ,Scientific name ,Uses ,Taxonomy ,Season in which they grow ,Etymology ,Botany will be displayed.

3.4. Details of Hardware and Software

Software Requirements (Minimum) :

- Windows
- Python pip package
- Jupyter Notebooks
- Tensorflow
- Html
- CSS

Hardware Requirements (Minimum) :

- Intel i5 Processor/ Ryzen 3 5000 series
- 8 GB RAM

3.5. Conclusion

- This web application is about flower detection using deep learning.
- CNN has become the main agenda, especially in flower detection technology.
- This project can educate one about flowers' biological information.
- This project could be a good source for gardening purposes.

3.5.1. Future work

- GUI will be added with some new features.
- Camera option for scanning will be added.
- Machine will be trained for better accuracy and performance.
- More hidden layers might be added for better pixel clarity and analysis of the image.
- 'My History' page will be added for recognizing the number of flowers which we have detected.

References

- Zhibin Cheng, Fuquan Zhang, "Flower End-to-End Detection Based on YOLOv4 Using a Mobile Device", *Wireless Communications and Mobile Computing*, vol. 2020, Article ID 8870649, 9 pages, **2020**.[\[1\]](#)
- Shi, Lin, Zhigang Li, and Dingli Song. "A flower auto-recognition system based on deep learning." *IOP Conference Series: Earth and Environmental Science*. Vol. 234. No. 1. IOP Publishing, **2019**.[\[2\]](#)
- Jyothi, V. K., D. S. Guru, and Sharath Kumar YH. "Deep learning for retrieval of natural flower videos." *Procedia computer science* 132 (**2018**): 1533-1542.[\[3\]](#)
- Sangale, Rohit, et al. "Flower Recognition Using Deep Learning.",**2020**.[\[4\]](#)

Journals / Conference Papers

[\[1\]](#) **"Flower End-to-End Detection"** : Accessed on 18/08/2021

[\[2\]](#) **"A Flower Auto-Recognition System Based on Deep Learning "** : Accessed on 25/08/2021

[\[3\]](#) **"Deep Learning for Retrieval of Natural Flower"** : Accessed on 15/09/2021

Web links

[\[1\]](#) **"The 7 steps of machine learning"** : Accessed on 01/09/2021

[\[2\]](#) **"Classify flower images using machine learning"** : Accessed on 22/09/2021

[\[3\]](#) **"Deep features for image detection in machine learning"** : Accessed on 29/09/2021

[4] **“Different layers of CNN”** : Accessed on 6/10/2021

[5] **“Load and preprocess images”** : Accessed on 6/10/2021

[6] **“Data preprocessing”** : Accessed on 6/10/2021