Flower detection using deep learning

OUP MEMBERS IN THIS PROJECT ARE:

- Saniya Zad VU1F1920046
- Tejas Kadam VU1F1920052
- Pranavi Bhambare VU1F1920061
- Rushank Wani VU1F1920062

CONTENTS

INTRODUCTION

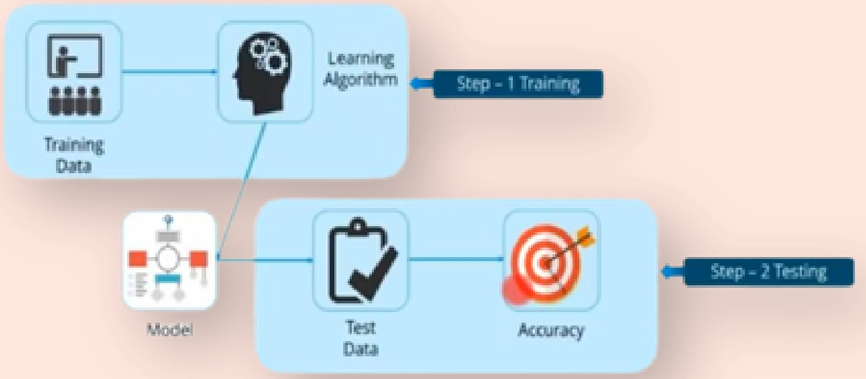
- It identifies naturally occurring flowers and its type.
- It detects flower and its species as well.
- It describes the related information about particular flower like botanical names, plant kingdom or medicinal uses if any.
- It become convenient to identify flower types in various field such as gardening,botany research etc.

LITERATURE SURVEY

Reference No.	Name of the publisher, date of publishing of the article.	Brief explanation of the article referred.	Scope for improvement.
1.	Hindawi Publications, 17th September 2020	Zhibin Cheng [1] has noted in their articles : 1.) how they have used sigmoid function as their activation function 2.) Their detection accuracy is calculated to be 90% . 3.) They have proposed a colour based recognition system that will decide the flower by sorting it pixel by pixel.	1.) Instead of using sigmoid they should have use relu as their activation function. 2.) relu (rectified linear activation):- It can be used because it is fast ,simple ,and works well.
2.	IOP, 2019	Shi [2] stated in their publishing : 'A Flower Auto-Recognition System Based on Deep Learning' 1.) They have build a CNN network 2.) Also provided dataset of pictures captured from phone. 3) .They got accuracy of 95% 4.) They have used 32 different categories of flowers.	1.) Due to less amount of dataset difficult to dentify flower 2.)Also importance of commonly seen flowers are not given.
3.	International Journal of Research Publication and Reviews (IJRPR), 2020	[3] which Rohit Sangale stated in their article: 1.) They have used a dataset containing 8189 images of 102 categories of flowers 2.)They have achieved an accuracy of 98% with a CNN consisting 2 hidden layers.	---

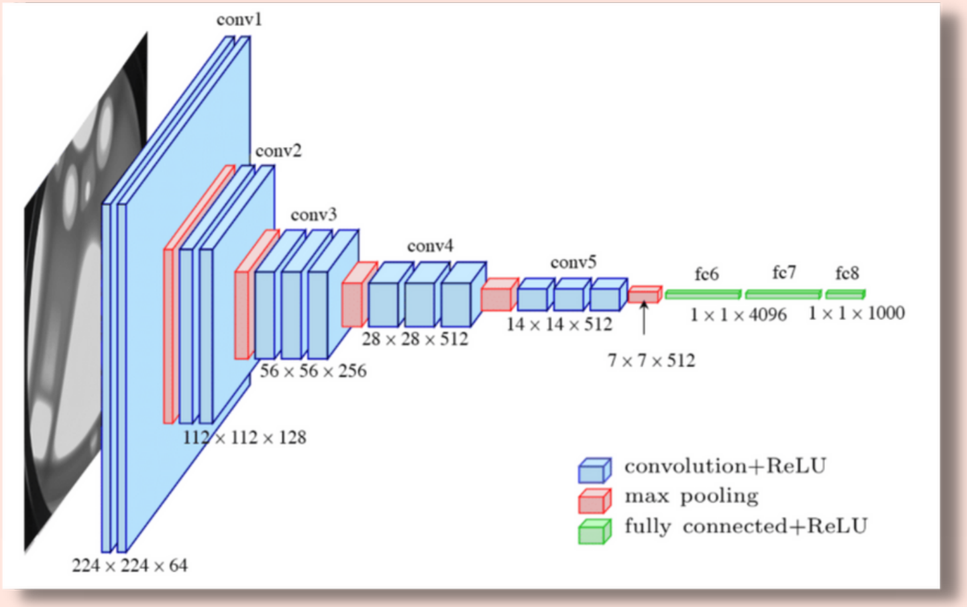
BACKEND ARCHITECTURE OF DEEP LEARNING

- Deep learning is a type of machine learning and artificial intelligence that imitates the way we humans gain certain types of knowledge.
- Dataset is collected and divided into training and testing dataset. Ratio of 80% to 20%.
- The training dataset is sent to the neural network for training.
- Model with prediction ability is generated after the training is complete.
- Model is tested using test dataset containing unknown values for the model.
- Hence the accuracy is calculated.

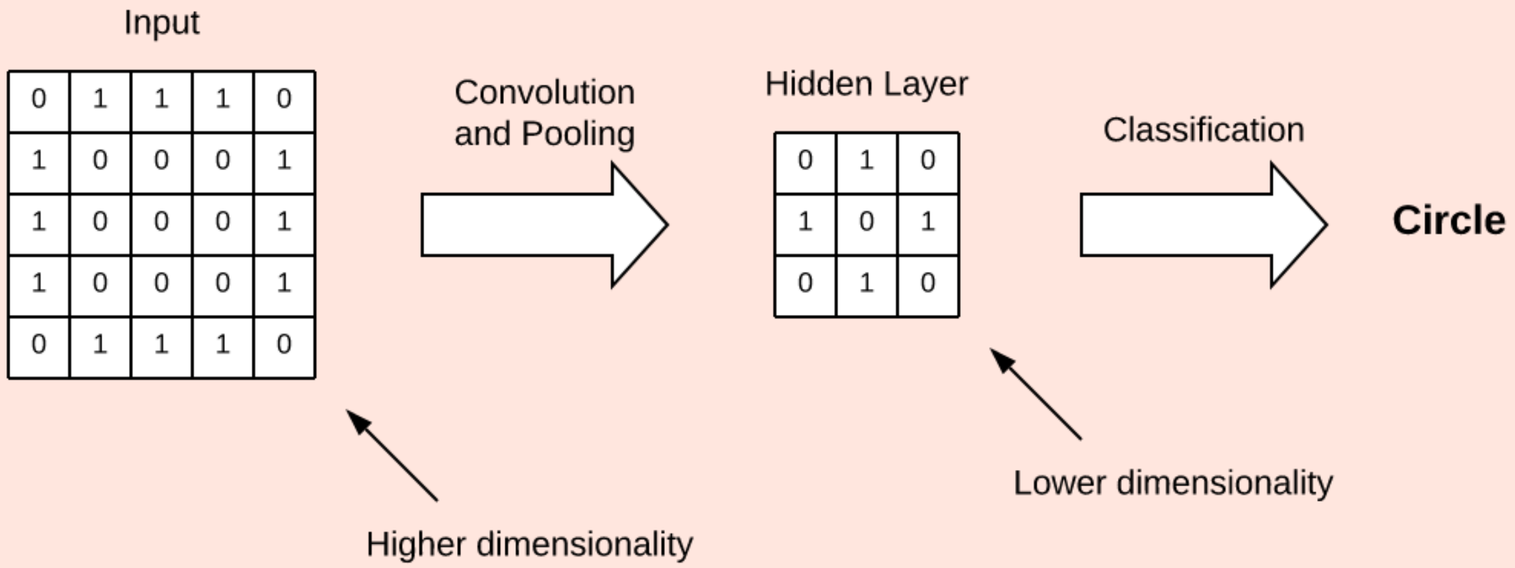


SYSTEM ARCHITECTURE OF CNN

- Convolutional networks are a specialized type of neural networks that use convolution in place of general matrix multiplication in at least one of their layers.
- A convolutional neural network consists of an input layer, hidden layers and an output layer.
- The input layer is the input of the whole CNN. In the neural network of image processing, it generally represents the pixel matrix of the image.
- The output layer collects input from the other layers and sends the output to transform into the number of classes as desired by the network.



- In a convolutional neural network, the hidden layers include layers that perform convolutions i.e. it allows you to determine the response to more complex inputs.
- Pooling layers reduce the dimensions of data by combining the outputs of neuron clusters at one layer into a single neuron in the next layer.
- Flattening of the input into one dimensional layer.

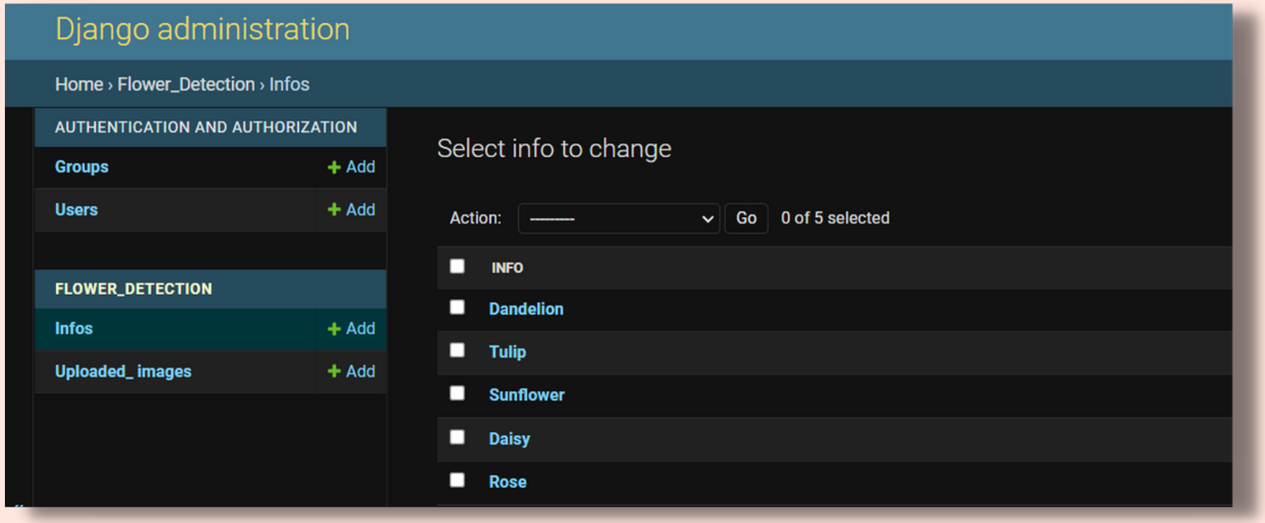


WHY CNN ?

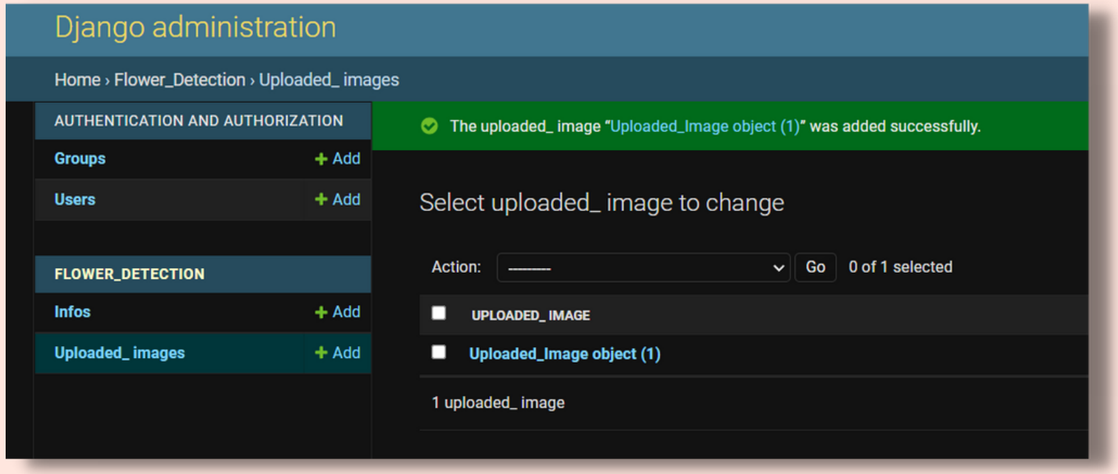
- It is easy to understand and fast to implement.
- It has the highest accuracy among all algorithms that predicts images.
- The main advantage of CNN compared to its predecessors is that it automatically detects the important features without any human supervision.
- For example, given many pictures of cats and dogs, it can learn the key features for each class by itself.

BACKEND ARCHITECTURE (DATABASES)

- Flower information is properly stored in a django database.

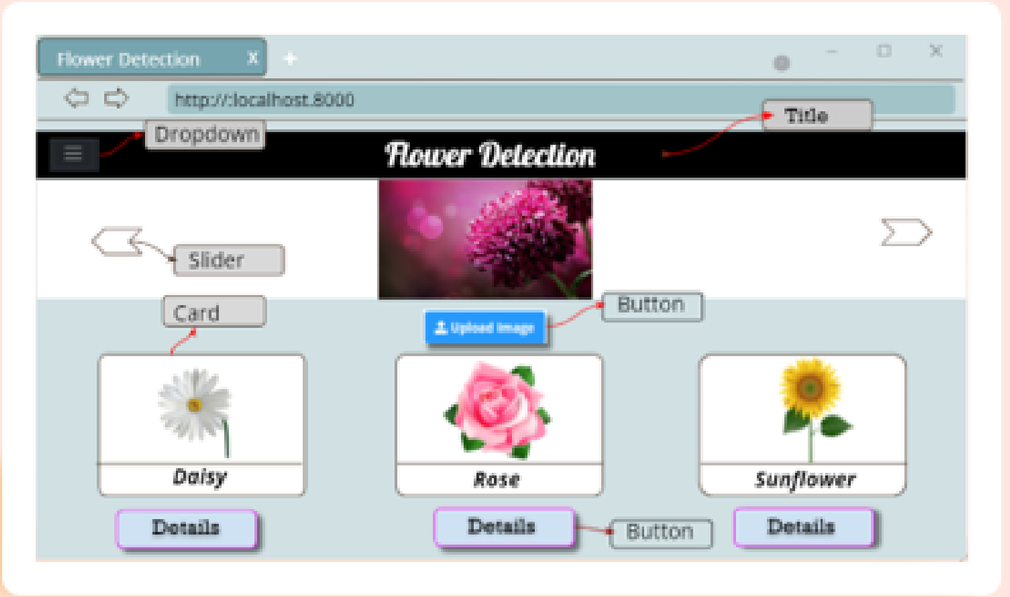


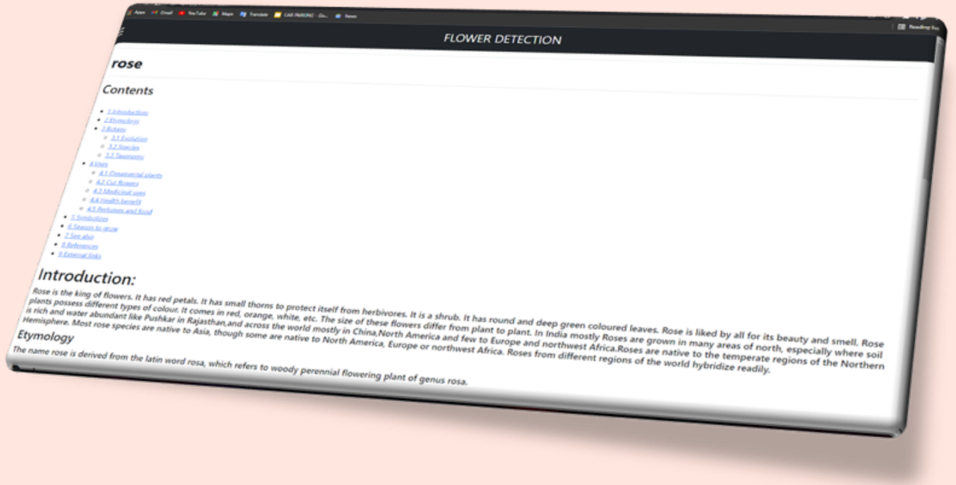
- Images uploaded by user are also stored in the database.



ARCHITECTURE OF FRONTEND

- We are in process of creating a server in which we are going to run our website.
- The main page consists of a ‘title’ as “ Flower Detection ”.
- We have added navigation bar & dropdown as shown in the image
- Below the title there is a ‘slider’ .
- There is an ‘upload image’ button below the slider .
- We have added Cards Where one will be able to get more information of that flower by clicking on ‘details’ .





PROCESS OF WORKING

User will upload the picture.

Uploaded image will be sent to CNN created.

Network will process the image pixel by pixel.

The type of flower will be detected by the system based on the results.

The flowers name along with its information is fetched from the database.

Finally the user gets to see the name of detected flower and some information related to it.

Software & Hardware requirements

SOFTWARE REQUIREMENTS (MINIMUM) :

- Windows 7 or above
- Google Chrome or any other browser

HARDWARE REQUIREMENTS (MINIMUM) :

- Stable Internet Connection

Applications

- Useful tool for travellers and explorers.
- Gardening enthusiasts or someone who loves flowers will find this web app useful & interesting.
- Nurseries could use it as an attraction for tourists.

Scope

- In future it could be used in a robot which helps you maintain your garden with flowers in it.
- It will be much helpful while spending time outdoors to identify flowers by using this system.
- It would be helpful for scientist and botanist to deal with flowers by identifying it easily.

Results

- After running 50 steps of epoch we got the accuracy as 0.9533 from the image given for training.
- We also got a loss from train images which is 0.8882.

FEATURES & LIMITATIONS

FEATURES

- Our system uses texture and colour features of flower for detection.
- Our system will provide the information of a flower in detail also it will show species related to it on our web page.

LIMITATIONS

- Our system can’t recognize some of the flowers.
- It may sometimes face a sharp drop in recognition rate if the flower is not bloomed properly.
- Real time detection using camera is currently not possible in this system.

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 flower’s biological information.
- This project could be a good source for gardening purposes.

Reference

REFERRED ARTICLES:

- 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]
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- S. Islam, M. F. Ahmed Foysal and N. Jahan, "A Computer Vision Approach to Classify Local Flower using Convolutional Neural Network," 2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS), 2020, pp. [5]

WEBLINKS:

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- https://towardsdatascience.com/understand-the-architecture-of-cnn-90a25e244c7
- https://www.tensorflow.org/tutorials/load_data/images
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- https://www.w3schools.com/html/
- https://www.djangoproject.com/start/

Thank you