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AI FLOWER CLASSIFICATION APPLICATION

Aishwarya V[1] Arivukkarasi B[2] Kanchana K[3]

1Student, Dept. of Computer Science and Engineering, Prathyusha Engineering College, Tiruvallur, Tamilnadu, India

2Student, Dept. of Computer Science and Engineering, Prathyusha Engineering College, Tiruvallur, Tamilnadu, India

3Student, Dept. of Computer Science and Engineering, Prathyusha Engineering College, Tiruvallur, Tamilnadu, India

Abstract: The identification of flower is complex , time consuming, and due to the use of specific botanical terms it is frustrating for non-experts. This creates a hurdle for people in acquiring species knowledge. Today, there is an increasing interest in automating the process of species identification. The availability and ubiquity of relevant technologies such as, digital cameras and mobile devices, the remote access to databases, new techniques in image processing and patter recognition we let the idea of automated species identification become reality. This is a through analysis and comparison of primary studies on computer vision approaches for plant species identification. Plant species identification is a research field area, which includes pre-processing, segmentation, feature extraction and classification. In this filed, there exists many algorithms to analyze the image. The application aims at understanding pre-processing, extracting the features, and classifying using various machine learning techniques It is useful to identify flower type in various fields such as Gardening, botany research, Ayurvedic treatment , Farming, Floriculture etc.

KEYWORDS—Flower classification; Image processing; Machine Learning (ML); Deep Learning (DL); Artificial Neural Networks (ANN); Convolutional Neural Network(CNN).

I. INTRODUCTION

There are many kinds of flowers in the universe. The attraction of people towards flowers in term of beauty has been going on since ancient times. Flowers are a symbol of beauty, holiness, reverence, and love. There are different types of flowers in the world. Over the last ten to twenty years there have been various studies on flowers image in the world among the studies includes flowers image classification flower species classification, color detection, and flower maturity detection, etc. There is currently a lot of research being done on flower image using machine learning algorithm. In recent years, image processing plays a vital role in the field of machine learning. Image processing (IP) means extracting useful information from the image .The Machine Learning (ML) algorithms are used to apply the image classification and Machine Learning(ML) models provide high accuracy at the feasible computation speed. Deep learning algorithm special convolutional neural network has been widely used in image processing areas including flower species classification. For that, much research is being conducted on image processing by machine learning and deep learning algorithms. The flower classification is processing using machine learning because it is difficult to identify all types of flowers and time consuming for humans. In this application convolutional neural networks are used. The features extracted are sepal, filament, and other specific parts of a flower.

II. LITERATURE SURVEY

Tanakorn Tiay, Pipimphorn Benyaphaichit, and Panomkhawn Riyamongkol presented a flower recognition system based on image processing [1].This system uses edge and color characteristics of flower image to classify flowers. The accuracy is said to be 50% to 60%. Dr.S.M.Mukane, Ms.J.A.Kendule proposed to have a method for classification of flowers using Artificial Neural Network

 (ANN) classifier[2]. The proposed method is based on textural features such as Gray Level Co-occurrence Matrix(GLCM) and Discrete Wavelet Transform (DWT). The accuracy of this system is said to be more than 85%.Archana L.Lakesar worked on the paper [3] Which has various methods for classification of flowers using Artificial Neural Network (ANN) classifier. The proposed method is based on textural features such as Gray Level Co-occurrence Matrix(GLCM), Discrete Wavelet Transform(DWT) and Color features such as normalized color histogram. A flower image is segmented using a threshold-based method. I t yields 85% accuracy. Asmita Shukla, Ankita Agarwal, Hemlata Pant, Priyanka Mishra presented a paper[4] in which they used to remove the inadmissible background and consider only the spotlight(foreground) object that is flower. The main objective is to simplify the representation of the flower and to provide something which is more significant and easier to analyze. The classification is performed using Support Vector Machine(SVM) and KNN algorithm. Malarvizhi K, Sowmithra M, Gokula Priya D, Kabila B worked on a paper which aims at understanding pre-processing, extracting the leaf features using contours and classifying using various machine-learning techniques [5], namely, Support Vector Machine (SVM), k-Nearest-Neighbor(k-NN), and Random Forest(RF). It presents the leaf of various plant species from which the vein characteristics extracted, presented to detect, and classify various kinds of plant species and other artificial intelligent techniques used to perform pattern recognition. The features extracted using found to fit well with the RF classifier which is little greater than SVM and k-NN classifier, respectively.
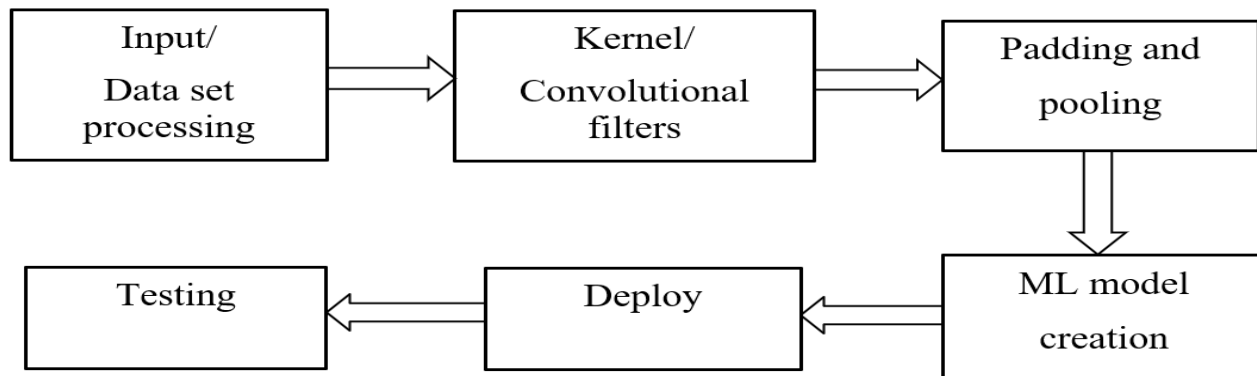
III. EXISTING SYSTEM

Earlier, there was no such computerized system to classify flower types or species which led people or farmers to make wrong assumptions on how to treat the plant and what fertilizers to use. Then a automated system was developed to identify and classify flowers which uses a machine learning algorithm to classify them. The existing system uses a simple neural network such as ANNs which helps in solving problems with simple data. which is based on three interconnected layers (input layer, hidden layer, output layer).

IV. PROPOSED SYSTEM

The existing system uses ANNs which is good for simple data. But for complex and bulk data ANNs are not the best. Here we use deep learning neural networks such as CNNs (Convolutional Neutral Networks). The main difference is we use convolution operation to process data. These are most efficient because it reduces the number of parameters used, which makes it different from other learning models. This algorithm involves 4 layers. It tends to be more accurate (95% -97%). Pooling layers reduces the number of parameters used.

V. SYSTEM DESIGN

System architecture is the conceptual model that defines the structure, behaviour, and more views of the system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviours of the system.
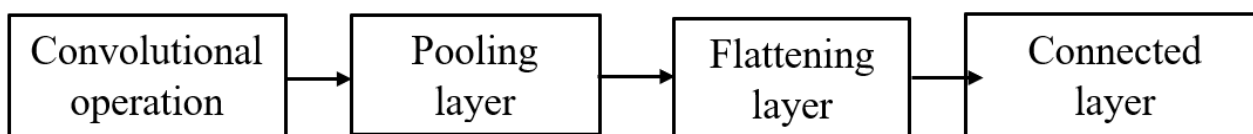
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┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│   Input/    │     │   Kernel/   │     │ Padding and │
│  Data set   │ ──▶ │Convolutional│ ──▶ │   pooling   │
│ processing  │     │   filters   │     │             │
└─────────────┘     └─────────────┘     └─────────────┘
                                              │
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┌─────────────┐     ┌─────────────┐     ┌─────────────┐
│   Testing   │ ◀── │   Deploy    │ ◀── │  ML model   │
│             │     │             │     │  creation   │
└─────────────┘     └─────────────┘     └─────────────┘
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VI. METHODOLOGY AND DATASET

(i)IMAGE PROCESSING

Image processing consists of JPEG, PNGs, GIFs data as input. These are the visual representation of data files. The image is RGB images as each are made up of pixels. Three channel images are used such as RGB, RGV. The pixel range is from -255 to 255. This model contains large amount of data set. There are 3 types of data set such as training data set, validation data set, test data set. Each image is represented with label. The input layer known as the data layer consists of all images in training set and the output layer gives the label of the input image.

(ii)CONVOLUTION AND FILTERS

Convolutional filters are also known as a kernel/filter. Kernel is a moving filters function applied on image for data formatting phase. The convolutional function involves four stages of operation. They are convolutional operation, pooling layer, flattering layer, connected layer. The first layer is to extract features from the input images using kernel/filters. The pooling layer is used to reduce the number of parameters. It retains the most valuable information which is one of the merits. This is passed to the next layer where the entire matrix is flattened into a single vector. The flattened vector is considered as an input layer.

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┌──────────────┐     ┌──────────┐     ┌────────────┐     ┌───────────┐
│ Convolutional│ ──▶ │ Pooling  │ ──▶ │ Flattening │ ──▶ │ Connected │
│  operation   │     │  layer   │     │   layer    │     │   layer   │
└──────────────┘     └──────────┘     └────────────┘     └───────────┘
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(iii)PADDING AND POOLING

Padding and Pooling is an operation of minimizing and maximizing data. Padding is a function of adding bunch of extra pixels in the image. It helps in increasing pixels of convolutional to get better representation of pixels. Here, GPUs and TPUs are used for memory intensive operations. Pooling operations minimizes the image but still records the valuable information by taking the highest pixels and results.

(iv)ML MODEL CREATION

To create a ML model first, we should collect the data that will be used to train model. The data should be formatted in a wat that the model can learn from it. The model should be selected depending on the nature of the data and problem trying to b solved. With the training data set we teach the model how to make predictions. During training, the model will adjust its internal parameters to minimize the difference between its predictions and the actual outcomes. Then to evaluate the model we use a separate set of data to test the performance of the model.

(v)DEPLOYING MODEL

Based on the evaluations results, you may need to adjust the model and data to improve its performance. Once the model is satisfactory, it can be deployed and be used as a real world application.

VII. RESULTS

This application is designed and developed for people to identity different types of plant species as it will be useful for researchers at beginner level and farmers and people with home garden to identify flowers and use the best suitable fertilizers. Our application can identify the flower by the accuracy of 95% - 98%. It is an application which is easy to use which produces results with high accuracy.
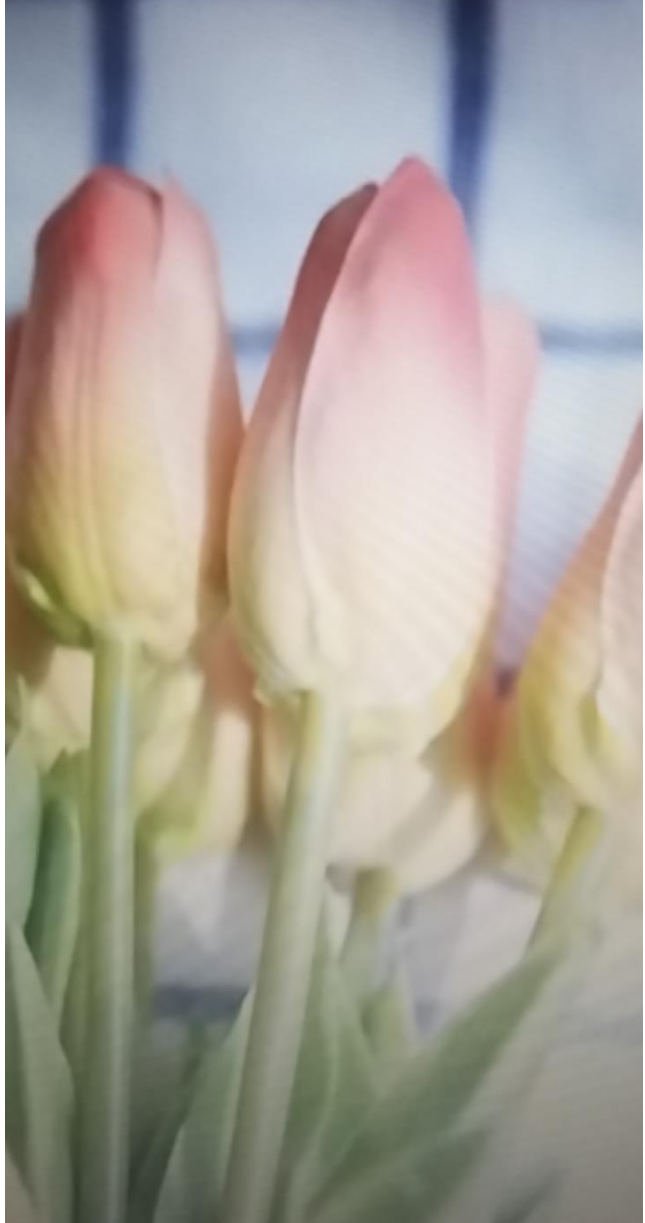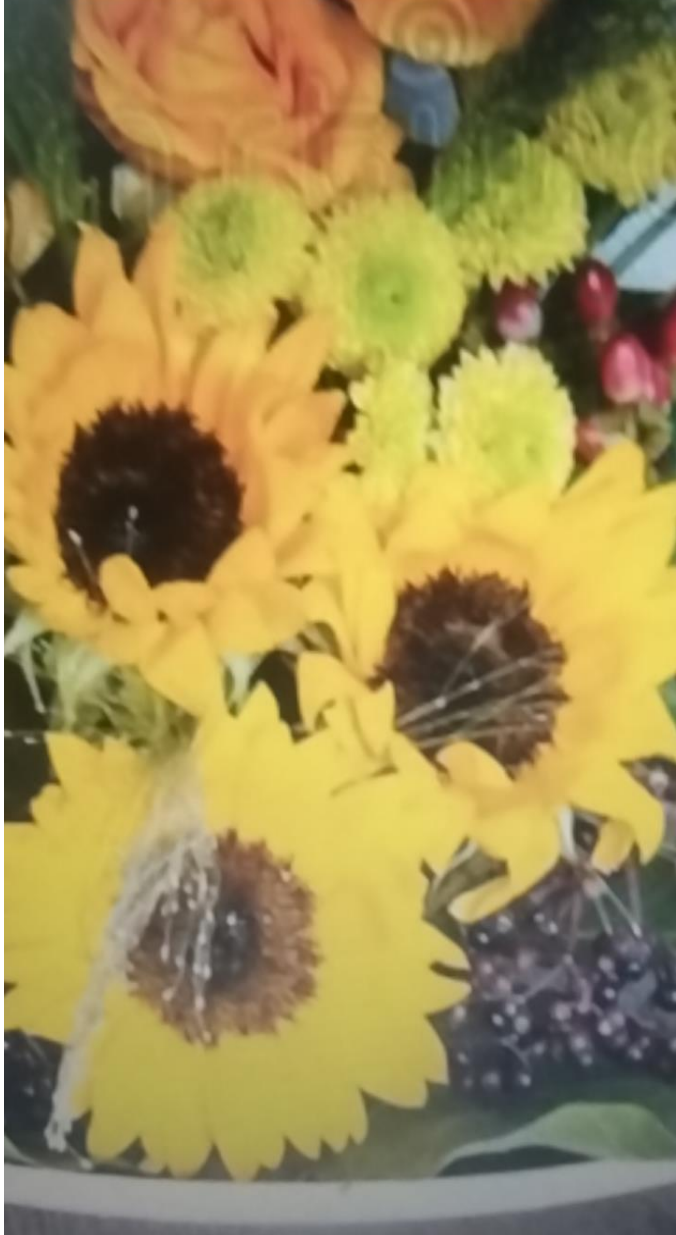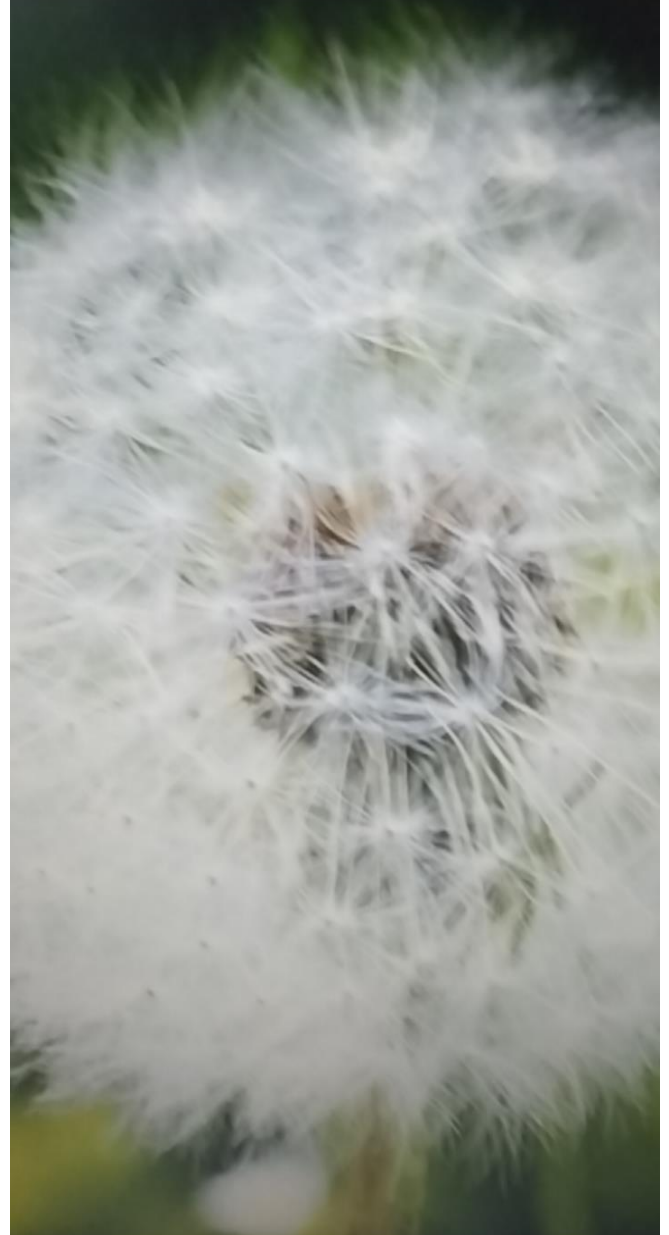
VIII. CONCLUSION

In this we have provided a system to classify different flower species using the machine learning algorithm. The proposed system uses a machine learning model to automatically classify the flower species with the highest accuracy. The proposed system includes five phases: Image processing, convolution and filters, padding & pooling, ML model creation, deploying model. The algorithm performs four operations such as convolutional operation, padding & pooling, flattening layer, connected layer. The system has been trained with a dataset where 70% of the images are used for training and 30% of the images are used for validating and 10% of the images are used for testing randomly. From the experimental result, we see that the Convolutional Neural Network (CNN) has achieved the highest accuracy is 93.9% from Artificial Neural Network (ANN). In general, we can say that the Convolutional Neural Network (CNN) classifier provides better accuracy.

IX. REFERENCES

[1]"Flower recognition system based on image processing" by Tanakorn Tiay, Pipimphorn Benyaphaichit, and Panomkhawn Riyamongkol (2014).

[2] "Flower classification using neural network based image processing" by R.S.M.Mukane and Ms.J.A.Kendule, iosr-jece Volume 7, Issue 3 (2013).

[3] "A Review on Flower Classification Using Neural Network Classifier" by Archana L. Lakesar, Volume 7, Issue 5, May 2018.

[4] "Flower Classification using Supervised Learning" by Asmita Shukla, Ankita Agarwal, Hemlata Pant, Priyanka Mishra, Volume 9, Issue 5, May 2020.

[5] "Machine learning for plant species classification using leaf vein morphometric" by Malarvizhi K, Sowmithra M, Gokula priya D, Kabila B, Volume 10, Issue 04, April 2021.