Summary of the projet

1- List of the group members
2- Introduce the problem we are trying to solve
3- The Analysis of the available data
4- Our Solutions
5- Comments on our results

List of the group members

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What are we solving?

In the realm of computer vision and deep learning, one of the exciting and challenging tasks is flower image classification. The objective is to develop an intelligent system that can accurately recognize and classify flower species from a diverse collection of images. This problem involves assigning one of five possible labels to each flower image, corresponding to five distinct flower categories.

Utilizing deep learning techniques, such as Convolutional Neural Networks (CNNs), holds great promisefor this task. CNNs are specifically designed to automatically extract intricate patterns and features from images, enabling them to effectively learn and differentiate various flower species based on their unique visual characteristics.

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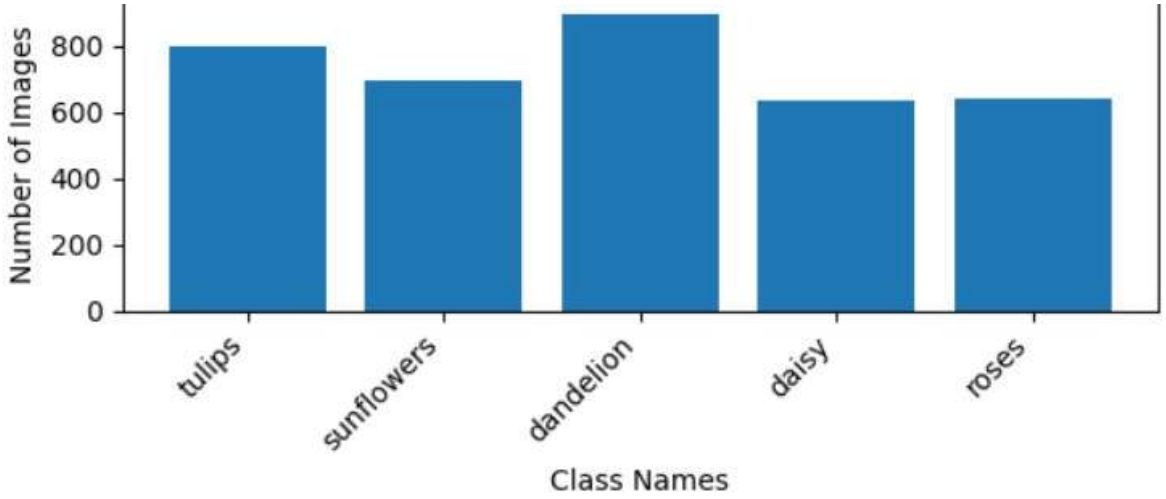
The analysis

The dataset used in this study consists of a total of 3670 images of various flowers. Each flower class has a specific number of images, with 799 images of tulips, 699 images of sunflowers, 898 images of dandelions, 633 images of daisies, and 641 images of roses.

The dataset's datafile size is approximately 223,452 kilobytes, making it a substantial collection of flower images for analysis and
classification purposes. With this diverse and sizeable dataset, we were able to train and evaluate our model effectively, enabling accurate recognition and classification of different types of flowers based on



The analysis

The problem itself is an unbalanced problem, that is the number of examples in different classes is not equal. The model in this case can have difficulties to learn the classes with fewer data points. In order to overcome this problem a Data Augmentation technique have been performed, obtaining 200 images for each category on the training set.

In order to overcome the previous challenge, a data augmentation procedure has been applied in order to create sligtly different copies of the data right after separating the data in training, testing and validation folders.

Augmented Image 5

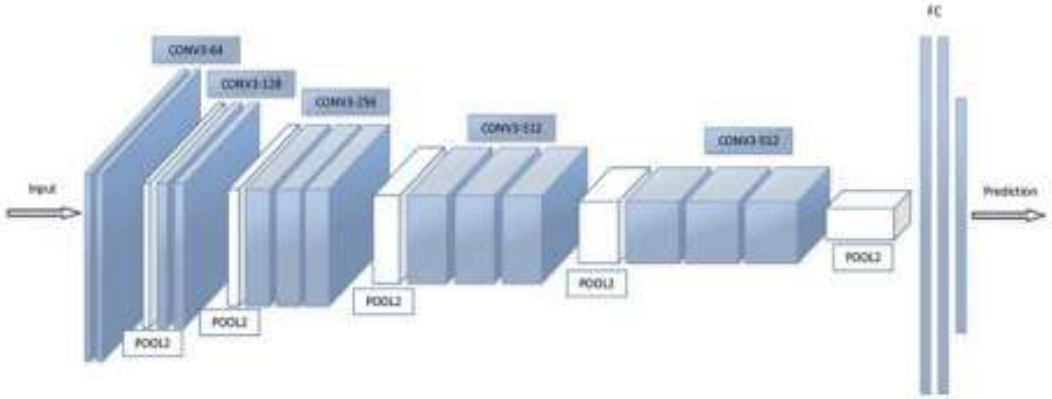
Augmented Image 3

Augmented Image 2

Our Solutions

- Convolutional Neural Network (CNN) architecture proves to be a powerful and effective solution for flower dataset classification. By leveraging convolutional layers, activation functions, and pooling layers, the model can efficiently extract and learn intricate features from flower images.

- The solution applied involved the usage of the VGG16, RestNet, DenseNet architectures in order to use the concept of Transfer Learning, to apply the features learned by our custom created model available in this project.

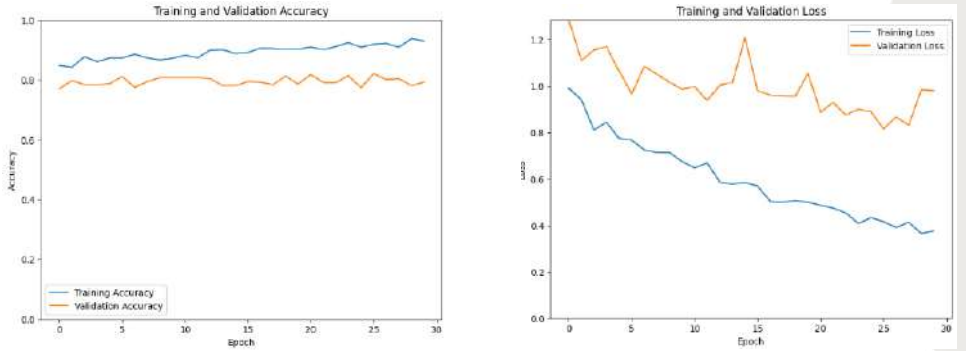


Our Solutions

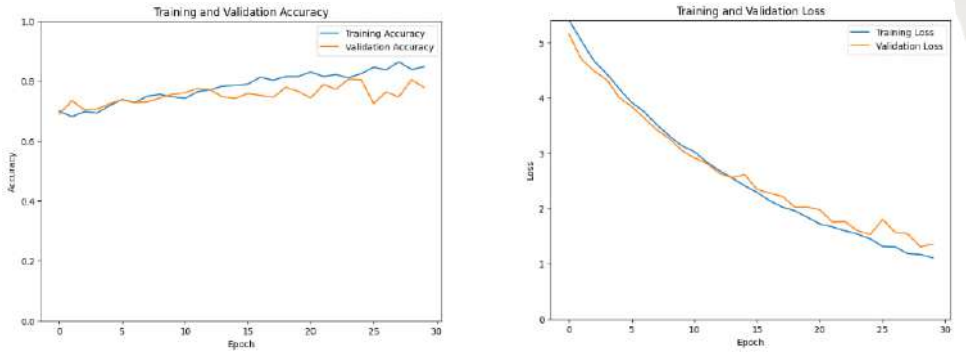
- Different other models have been trained in this project: custom models in order to try out how one can created them from scratch.
  Performances have increased from the first model (around 70%) to more than 90% in the when applying the transfer learning techniques using ResNet.

- Other models have also been trained (VGG16, DenseNet), but from the accuracy metric point of view, only RestNEt has been able to outperform the other models in only 30 epochs reaching over 93% accuracy both for the accuracy on the training set and 79% for the validation set.

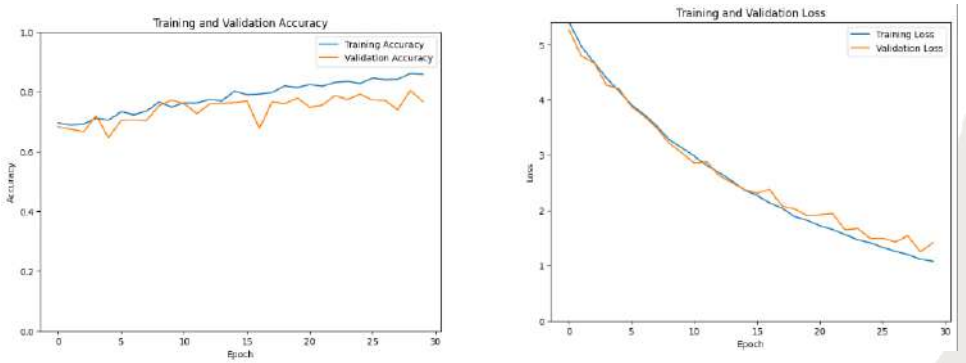
RestNet



DenseNet



VGG16



Thank you for you attention!