Exercise 2: Image Recognition to Identify Species of Flowers

In this exercise you will develop a Convolutional Neural Network (CNN) model to identify species of flowers from photographs. You will train this model using the tf_flowers datasetfrom Tensor Flow:

https://www.tensorflow.org/datasets/catalog/tf_flowers

This dataset contains 3670 colour photographs of flowers, consisting of five differentspecies:

- Daisy.
- Dandelion.
- Roses.
- Sunflowers.
- Tulips.

The easiest way to obtain this dataset is to download it directly from the following url: http://download.tensorflow.org/example_images/flower_photos.tgz

Once you have unzipped the tgz file, you will see that the images are arranged in five sub-directories, corresponding to the five class labels. See the workshop exercises from Week 9for more information on how to load image data from a directory.

Goal

Your goal for this exercise is to develop a CNN model that will identify the species of a flower from a photograph. You should write up your results in the style of a scientific report. Your report should address the following questions:

a. Describe the architecture of the CNN model that you used (for example, the numberand types of layers that you used, the activation functions that you used etc), and discuss your justifications for the choices that you made.
b. Describe the regularisation methods that you used in your CNN model. How do theyaffect the accuracy of your results?
c. Discuss any other hyperparameter tuning that you undertook to optimise your model. Which hyperparameters have the strongest effect on the performance of your model? Use suitable figures to visualise the accuracy and performance of yourfinal model.
d. Was there any evidence of overfitting in any of your models? Justify your answerwith suitable figures.