

Project 2(c)

Image Recognition (Cats vs Dogs) using Keras

In this assignment, you will write another CNN architecture (similar to the one you implemented in 2(b)). However, this portion focusses on parameter tuning and understanding of the nuts and bolts of the CNN.

You will need to download [the modified catsvsdogs data set](#) and train a CNN with given architecture on it.

Problem 1: Download the [modified catsvsdogs data set](#). Write a preprocessing function that would prepare the data set for the Keras deep learning model.

Problem 2: This data set is altered (an altered version of the Kaggle cats vs dogs data set) such that the default values of the hyperparameters do not yield good accuracy. Using the following architecture, tune the hyperparameters such that the model produces acceptable accuracy. You may change any/all of the following parameters until you are satisfied with the training process:

- Batch size
- Weight initialization
- Learning rate
- Momentum
- Optimization
- Dropout

The architecture to be implemented is as follows.

Architecture:

```
im_width = 64
im_height = 64
model = Sequential()
model.add(Conv2D(kernel_size=(3,3),filters=3,input_shape=(im_width, im_height,
1),activation="relu",padding="valid"))
model.add(Conv2D(kernel_size=(3,3),filters=10,activation="relu",padding="same"))
model.add(MaxPooling2D(pool_size=(2,2),strides=(2,2)))
model.add(Conv2D(kernel_size=(3,3),filters=3,activation="relu",padding="same"))
model.add(Conv2D(kernel_size=(5,5),filters=5,activation="relu",padding="same"))
model.add(MaxPooling2D(pool_size=(3,3),strides=(2,2)))
model.add(Conv2D(kernel_size=(2,2),strides=(2,2),filters=10))
model.add(Flatten())
model.add(Dropout(0.2))
model.add(Dense(100,activation="sigmoid"))
model.add(Dense(1,activation="sigmoid"))
model.summary()
```

You are not allowed to add more convolutional layers, and the training needs to be run for 100 epochs at maximum.

Provide all the steps/changes you did to improve training, and justify each change. Produce the training/test plots for each change.

The top accuracy will set the bar and other students will be graded relatively. Minimum accuracy of 80% is required for minimum credit.

Good luck!