



Week 2

Introducing augmentation

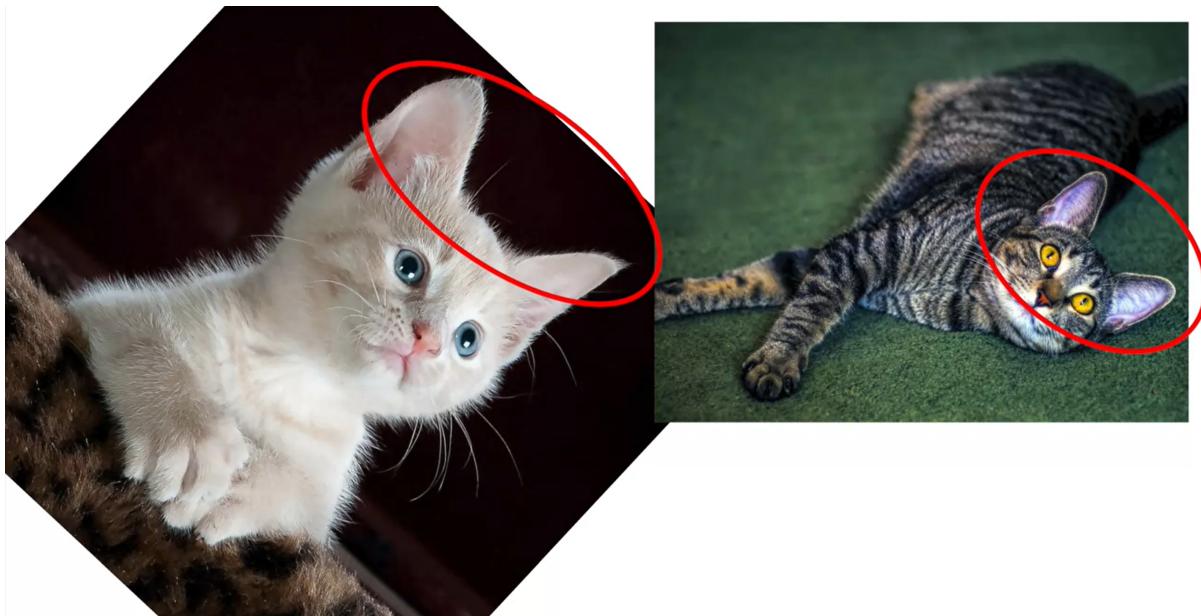
- A issue with training neural networks are overfitting
- Overfitting is when the model has a limited amount of knowledge on what something is
- For example, if you have only seen shoes like this



- Then you would not classify this as a shoe



- So theoretically you can only create a perfect model if you have a infinite amount of training data but that would take too much time to train and collect
- A method to solving this issue is using augmentation



- If we rotate the cat around then it will learn that the second image is a cat

Coding augmentation with ImageDataGenerator

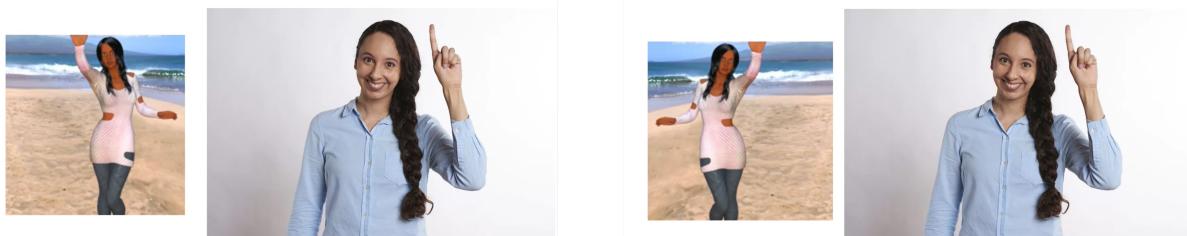
- Rescale image rescales the image
- Rotation range is the range it rotates the image
 - In the exam it has a rotation range of 40 degrees
- width or height shifting moves the image inside the frame because most of the image has the subject centered
 - the 0.2 in the example is the proportion of the image size
- Example of shearing
 - In the example code, it will shear up to 20 percent of the image



- Example of zoom
 - It basically zooms in the image by up to 20 percent in the example code



- Example of horizontal flipping
 - In the code example, it basically shows that horizontal flipping is enabled



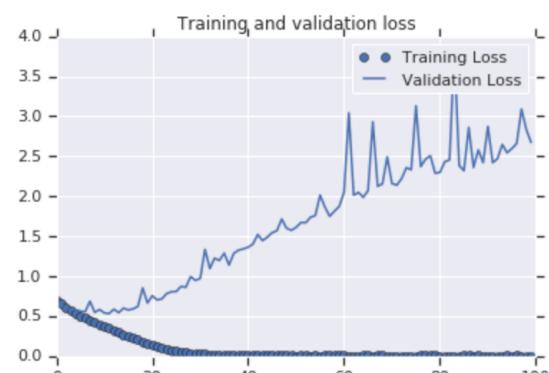
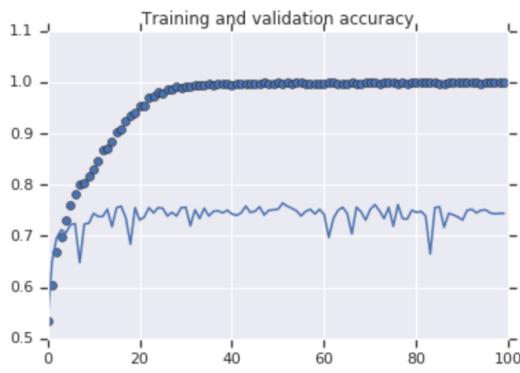
- Fill mode basically fills in any pixels that has been lost due to the operation
 - nearest uses the neighboring pixels to try and keep uniformity

```
train_datagen = ImageDataGenerator(  
    rescale=1./255,  
    rotation_range=40,  
    width_shift_range=0.2,  
    height_shift_range=0.2,  
    shear_range=0.2,  
    zoom_range=0.2,  
    horizontal_flip=True,  
    fill_mode='nearest')
```

- Specific Documentation: [LINK](#)

Without Image Transformation

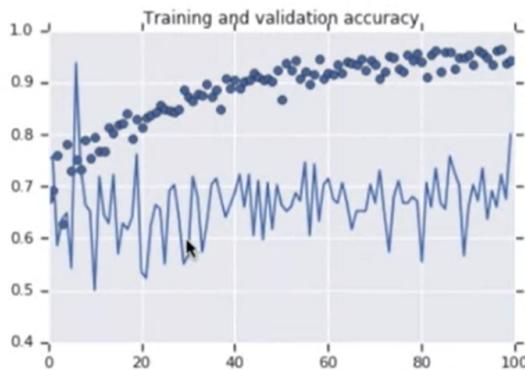
- The model is clearly overfitting since the training accuracy topped out at almost 100 percent at around 20 epochs but the validation set topped out slightly before that and it did not increase over time



With Image Transformation

Validation sets

- If the validation set is similar to the training set then the results might fluxuate



Week 2 Cats and Dogs Code

```
https://s3-us-west-2.amazonaws.com/secure.notion-static.com/e9ca5044-2d5a-46a4-91e4-313eb5850509/week\_2.py
```

Test

—FILE—