Disaster Classification

Network Summary

```
Model: "sequential_2"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_5 (Conv2D)            (None, 148, 148, 32)      896
_________________________________________________________________
max_pooling2d_5 (MaxPooling2 (None, 74, 74, 32)        0
_________________________________________________________________
conv2d_6 (Conv2D)            (None, 72, 72, 64)        18496
_________________________________________________________________
max_pooling2d_6 (MaxPooling2 (None, 36, 36, 64)        0
_________________________________________________________________
conv2d_7 (Conv2D)            (None, 34, 34, 128)       73856
_________________________________________________________________
max_pooling2d_7 (MaxPooling2 (None, 17, 17, 128)       0
_________________________________________________________________
conv2d_8 (Conv2D)            (None, 15, 15, 128)       147584
_________________________________________________________________
max_pooling2d_8 (MaxPooling2 (None, 7, 7, 128)         0
_________________________________________________________________
flatten_2 (Flatten)          (None, 6272)              0
_________________________________________________________________
dense_3 (Dense)              (None, 512)               3211776
_________________________________________________________________
dense_4 (Dense)              (None, 4)                 2052
_________________________________________________________________
activation_2 (Activation)    (None, 4)                 0
=================================================================
Total params: 3,454,660
Trainable params: 3,454,660
Non-trainable params: 0
```

Data Generator Settings

- Batch Size for Data Generators = 20
- Target Size = 150 x 150

Data Info

- Training Samples = 2800
  - 700 Training Images for Each Class
- Validation Samples = 600
  - 150 Validation Images for Each Class
- Test Samples = 528
  - 150 Images Each for Flood, Earthquake, Wildfire
  - 78 Images for Cyclone Class

Training Settings

```
Loss           = Categorical_Crossentropy
Optimizer      = RMSprop
Learning Rate  = 1e-4
Metrics        = Accuracy
Epochs         = 50
steps_per_epoch= Training Samples/Batch Size = 140
validation_steps =Validation Samples/BatchSize = 30
```

Trained Model Notes

During training, the best model was being saved through callback and at the end of the training the model from the last epoch was also saved. It turned out that the last model had better scores on the Test Set (87%) than the best model (86%) saved during training therefore the final model was selected.

The selected (last) model had 86% accuracy on the validation set and 87% accuracy on the test set.

Drop out and Data Augmentation were tried and tested but then were not used in the final training of the model because the model was giving better accuracy performance without the use of dropout and data augmentation.

```
Validation Accuracy = 86%
Test Accuracy = 87%
```

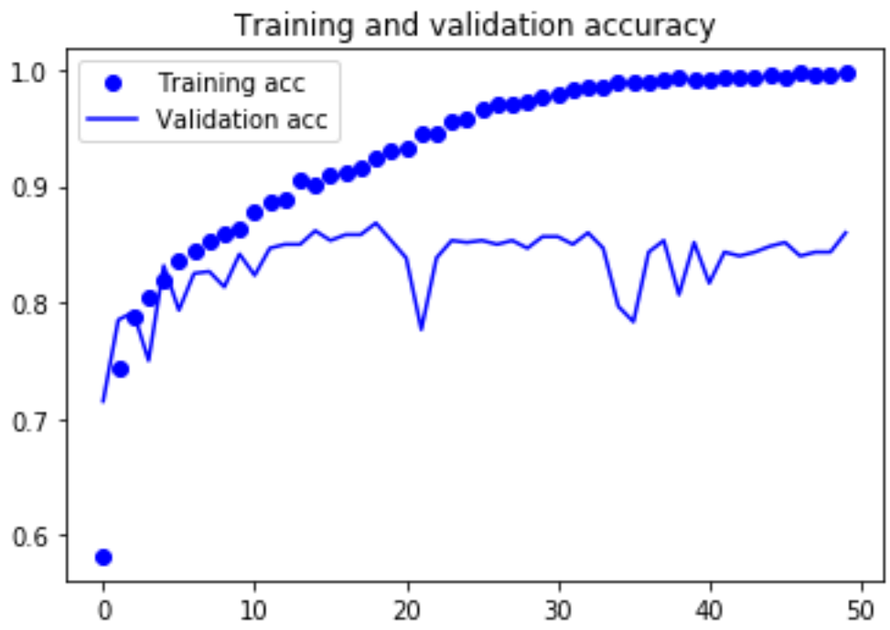
Confusion Matrix for the Test Set

	Cyclone	Earthquake	Flood	Wildfire
Cyclone	69	3	1	5
Earthquake	2	134	10	4
Flood	5	17	124	4
Wildfire	5	9	3	133

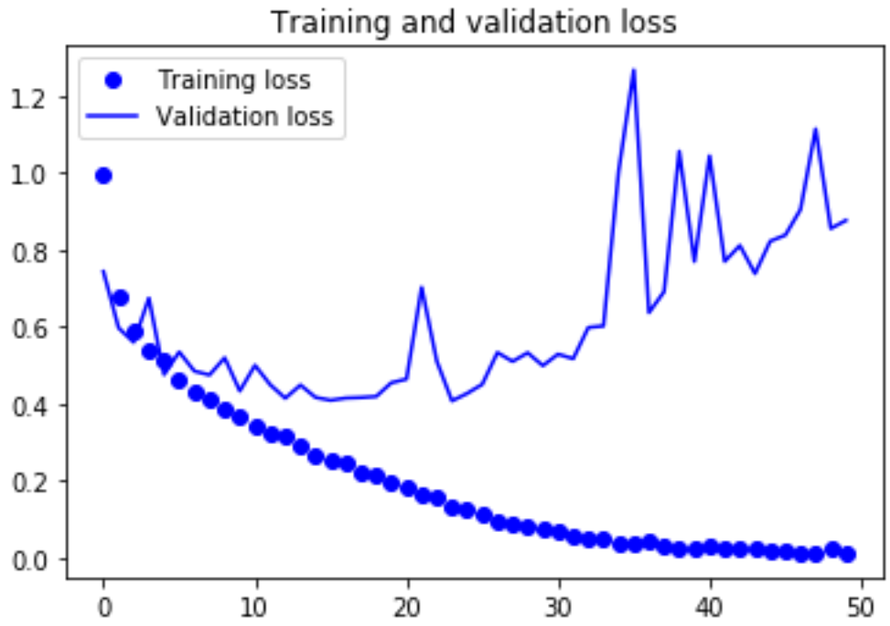
Classification Report for the Test Set

	precision	recall	f1-score	support
Cyclone	0.85	0.88	0.87	78
Earthquake	0.82	0.89	0.86	150
Flood	0.90	0.83	0.86	150
Wildfire	0.91	0.89	0.90	150
accuracy			0.87	528
macro avg	0.87	0.87	0.87	528
weighted avg	0.87	0.87	0.87	528

Accuracy Graph



Loss Graph


Training and validation loss
Training loss
Validation loss
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50