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Transfer Learning

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ImageNet Dataset

- OpenDataset
  - http://image-net.org/
  - 14 millions of images with class labels





- Large Scale Visual Recognition Challenge
  - Classification for ImageNet , 1000 classes
  - Pretrained neural network were trained using data from the challenge

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Cats and Dogs classification

- Kaggle Competition
  - https://www.kaggle.com/c/dogs-vs-cats




- Two classes
  - Cat and Dog
  - Binary classification (0 – cat, 1 – dog)

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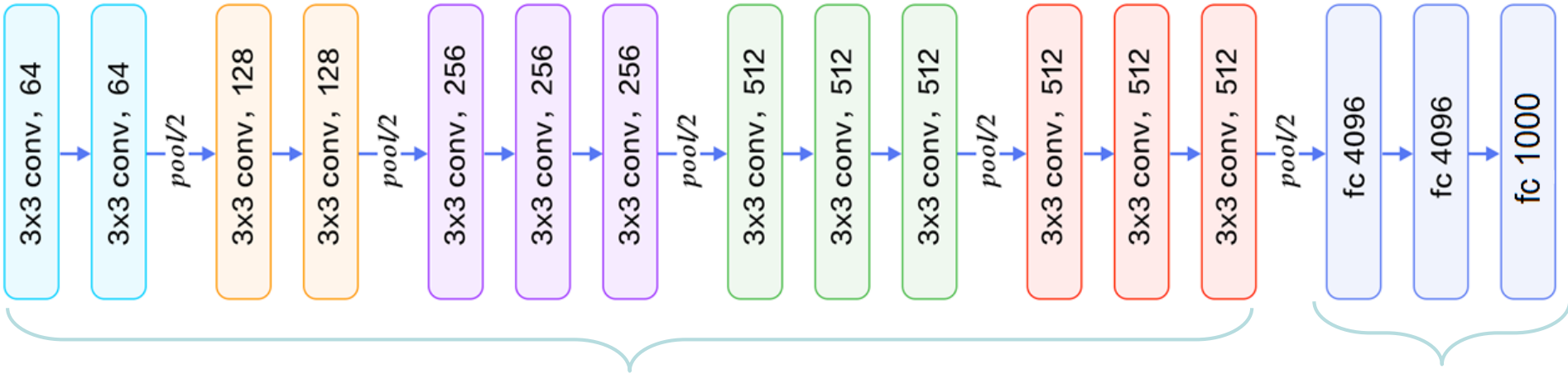
VGG16 Architecture



Detection of important features in the image

Determining the class of an object

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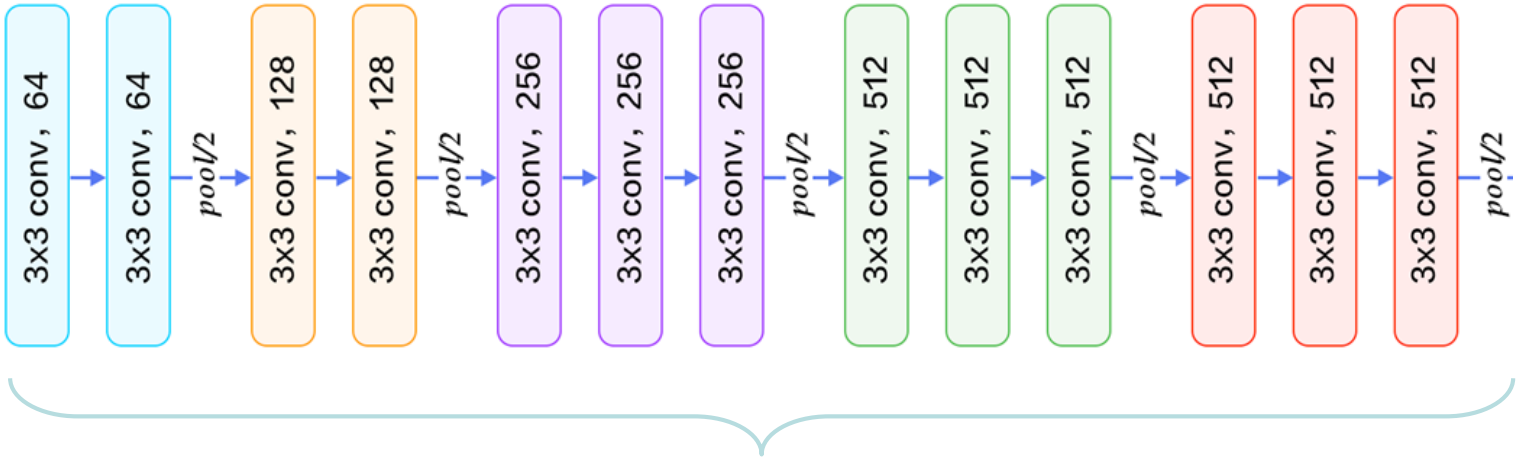

Detection of important features in the image

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Detection of important features in the image

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Data Preparation

- Data format
  - JPEG images
- Data preparation
  - Separate directory for images of each class
- 3 datasets
  - Training, validation and test datasets are in separate directories
- Loading data from the hard drive
  - Keras Generators

```
cats_vs_dogs/
|----train/
|    |----cats/
|    |----dogs/
|
|----validation/
|    |----cats/
|    |----dogs/
|
|----test
```

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Modern CNN Architectures

- ResNet (residual network)
  - Pretrained neural network from Microsoft
  - Main component is residual block
  - Several ResNet networks with various number of layers
- Inception
  - Pretrained neural network from Google
  - Several convolutions in one block of the network
  - Several versions

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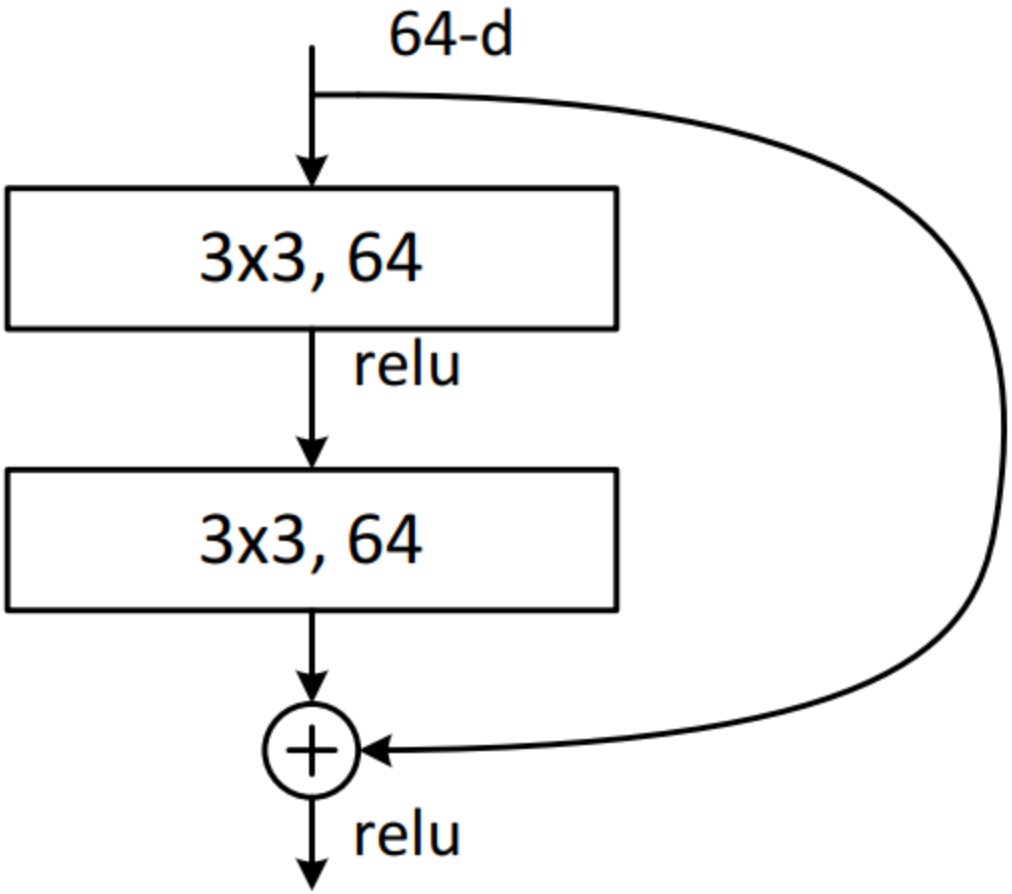
Residual block



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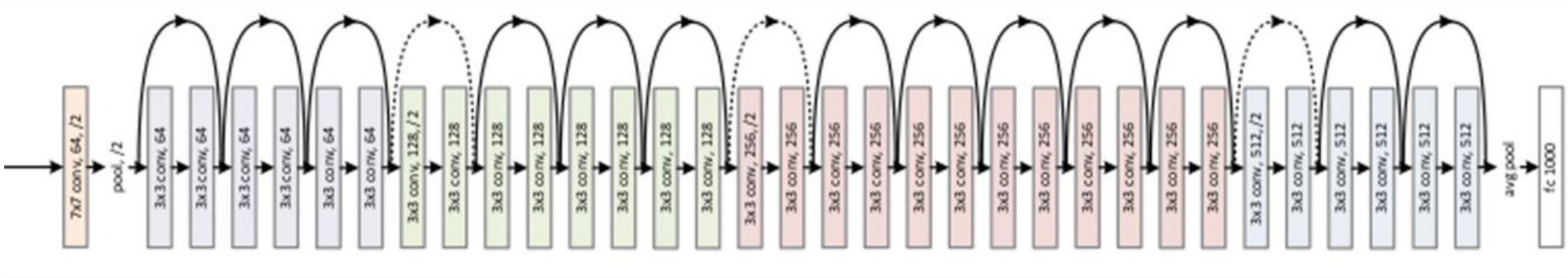
ResNet-34



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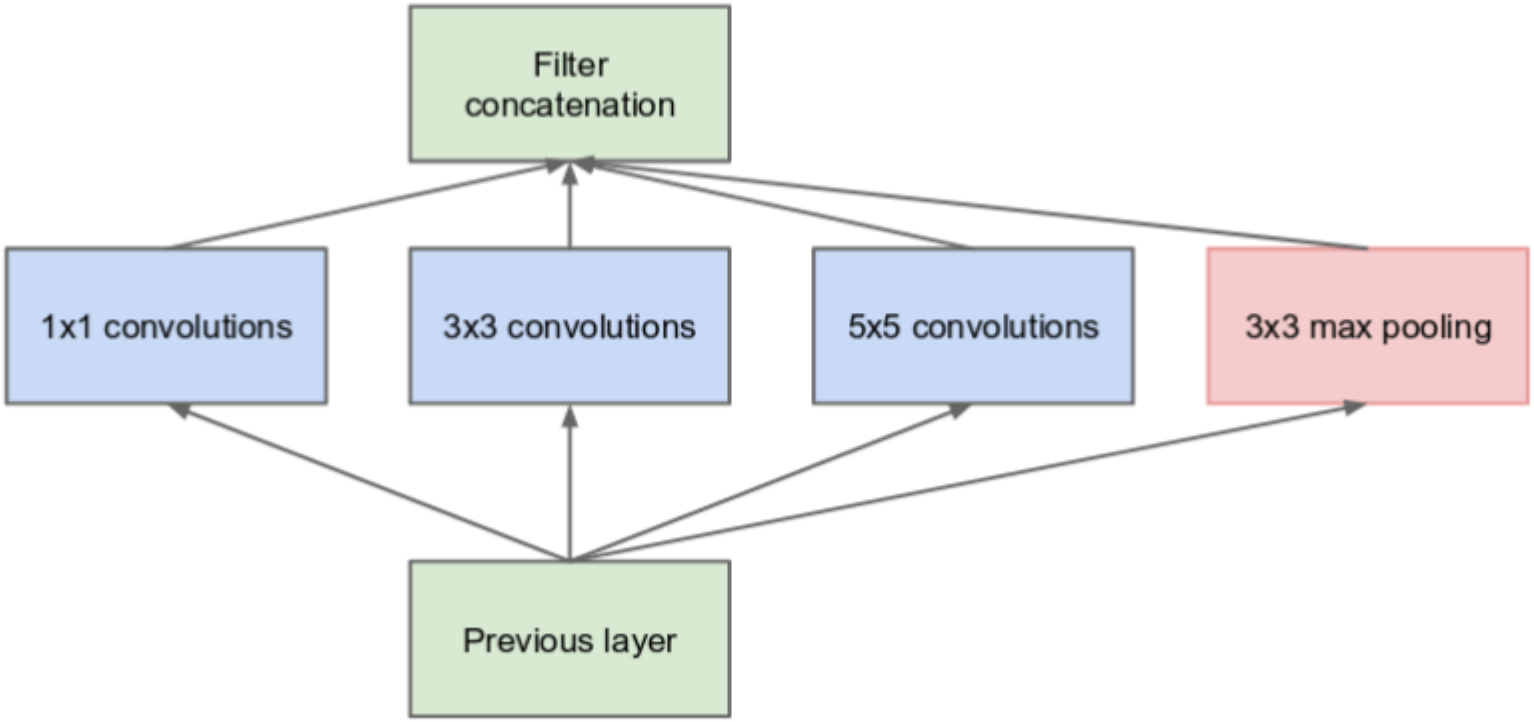
Inception Block



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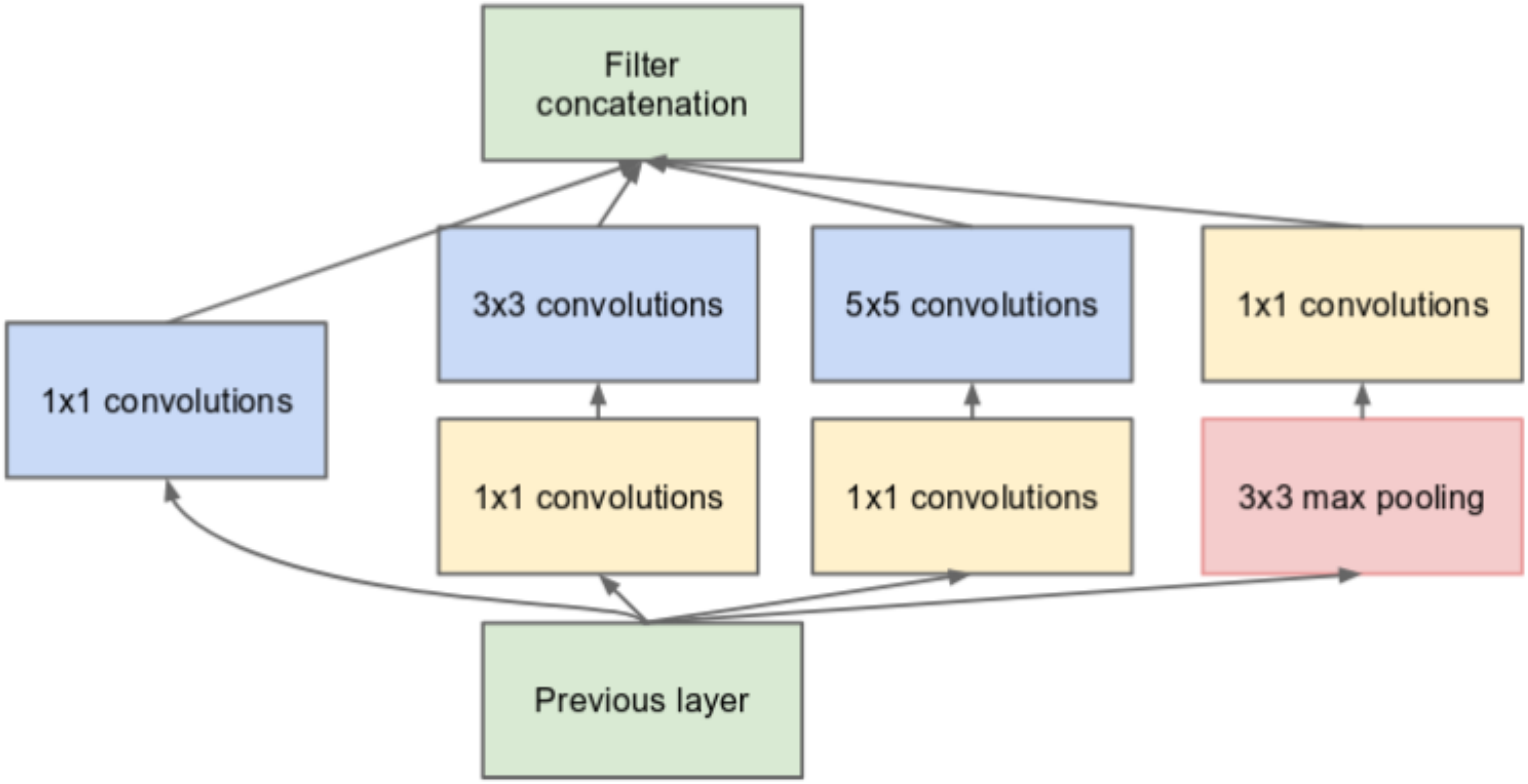
Inception Block



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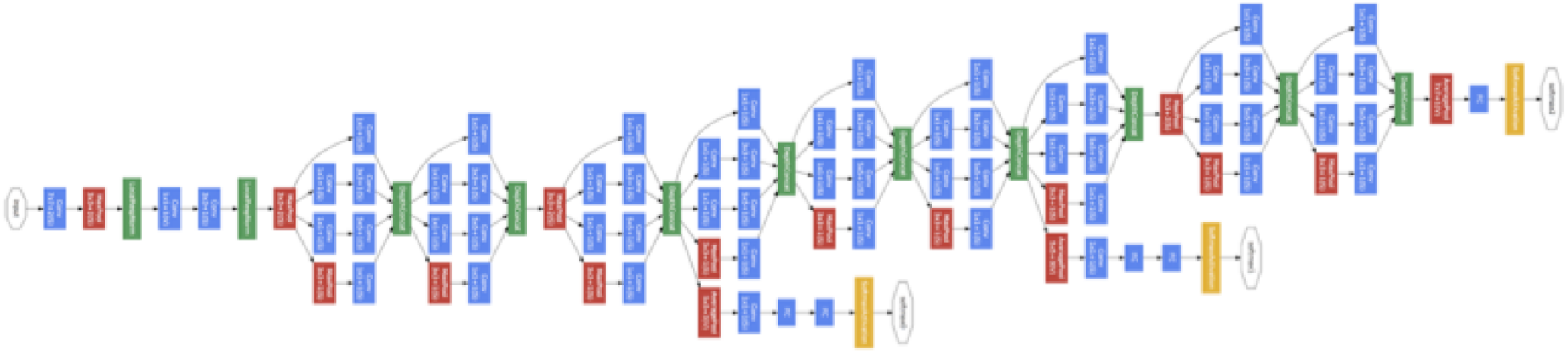
Inception



Convolution
Pooling
Softmax
Other

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Thank you!