Inception Module

AlexNet → VGG-16

AlexNet → VGG-16

Model	# layers
AlexNet	8
VGG-16	16

AlexNet → VGG-16

Model	# layers	Maximum # filters
AlexNet	8	384
VGG-16	16	512

Reasons for Improved Performance

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- Depth of the network

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- Depth of the network
- Width of the network

Disadvantages of Deeper Networks

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- Higher chance of Overfitting

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- Higher chance of Overfitting
- Increasing number of parameters

Dimensionality Reduction Module (1X1 convolution)

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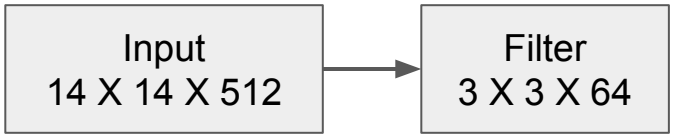
Input
14 X 14 X 512

Dimensionality Reduction Module (1X1 convolution)



Dimensionality Reduction Module (1X1 convolution)

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operations = 14*14*512*3*3*64 = 57.8 Million

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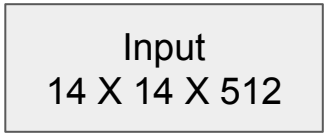
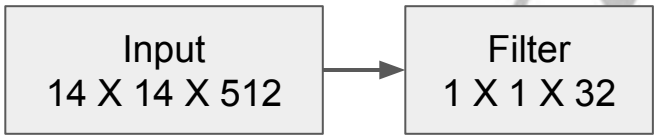


Dimensionality Reduction Module (1X1 convolution)

operations = 14*14*512*3*3*64 = 57.8 Million



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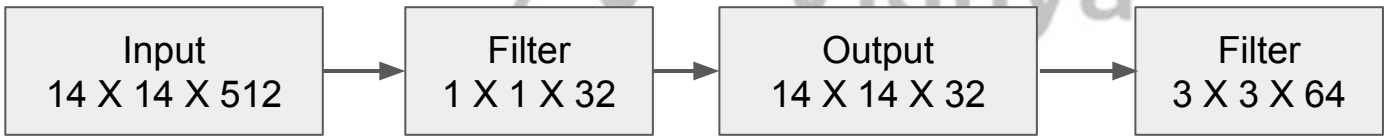

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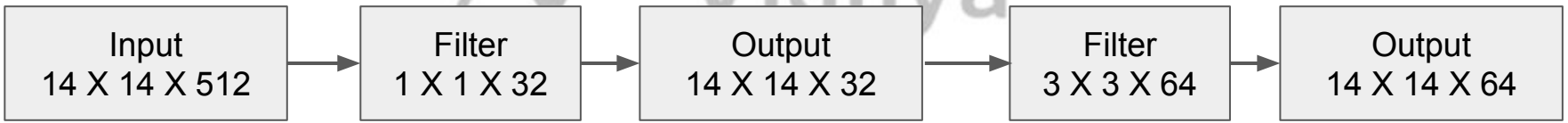
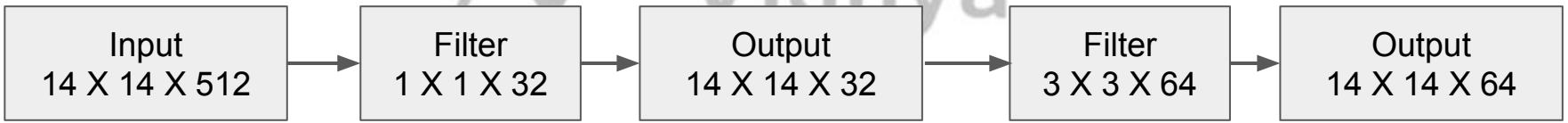
operations = 14*14*512*3*3*64 = 57.8 Million



Dimensionality Reduction Module (1X1 convolution)

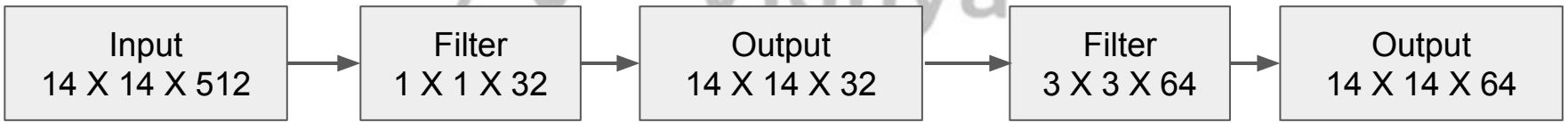
operations = 14*14*512*3*3*64 = 57.8 Million



operations = 14*14*512*1*1*32 = 3.2 Million

Dimensionality Reduction Module (1X1 convolution)

operations = 14*14*512*3*3*64 = 57.8 Million

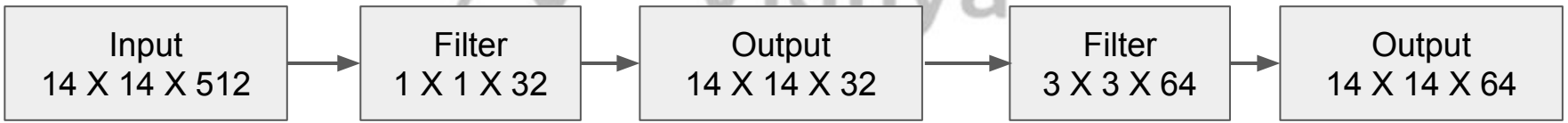


operations = 14*14*512*1*1*32 = 3.2 Million

operations = 14*14*32*3*3*64 = 3.6 Million

Dimensionality Reduction Module (1X1 convolution)

operations = 14*14*512*3*3*64 = 57.8 Million



operations = 14*14*512*1*1*32 = 3.2 Million

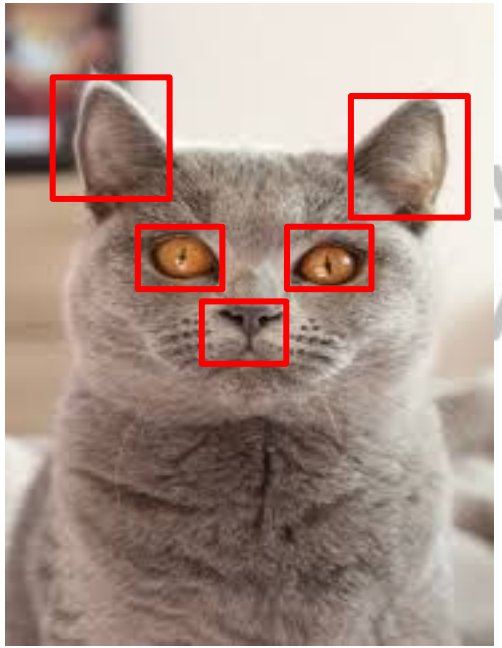
operations = 14*14*32*3*3*64 = 3.6 Million

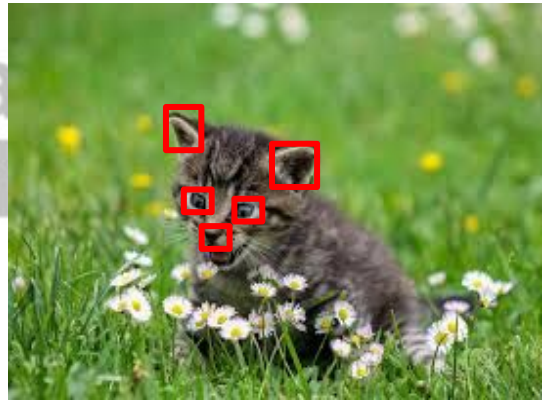
Total # operations = 3.2 + 3.6 = 6.8 Million

Inception Module

Inception Module

Inception Module

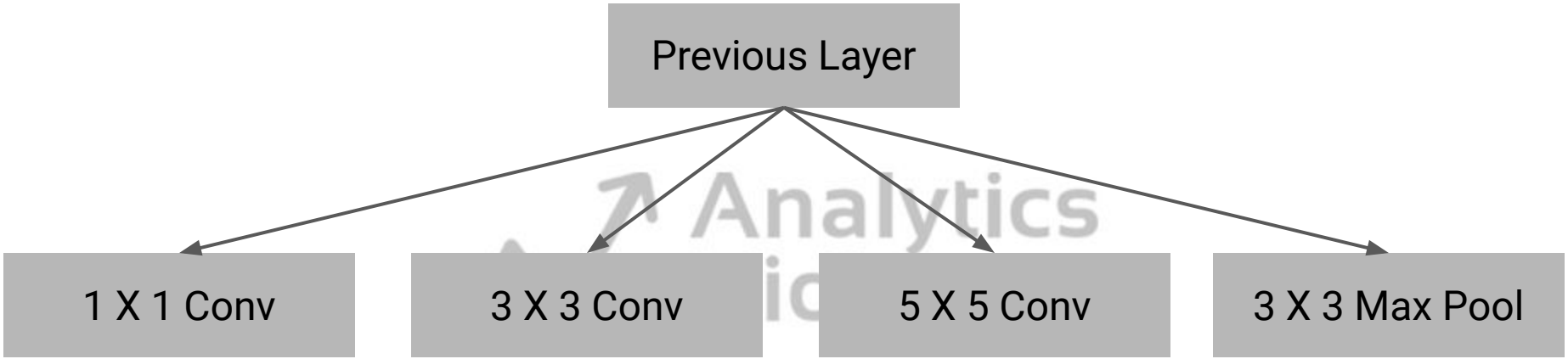




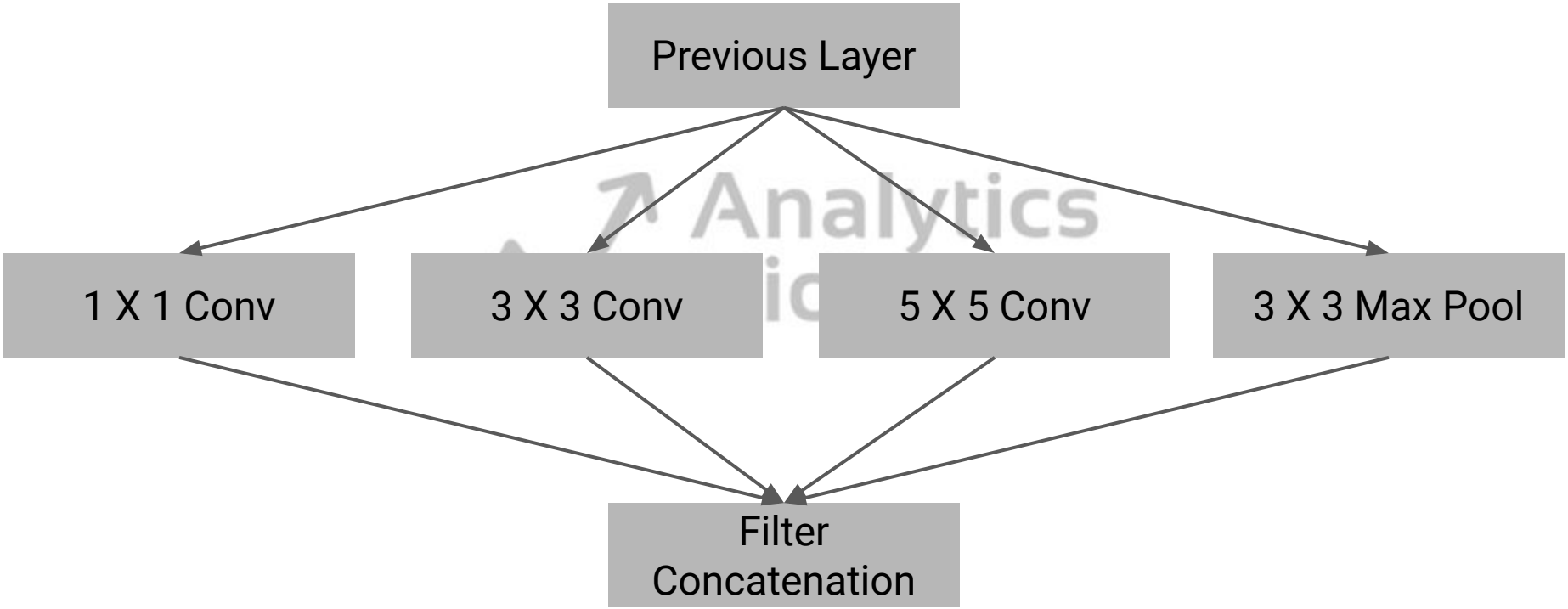
Inception Module

Previous Layer

Inception Module



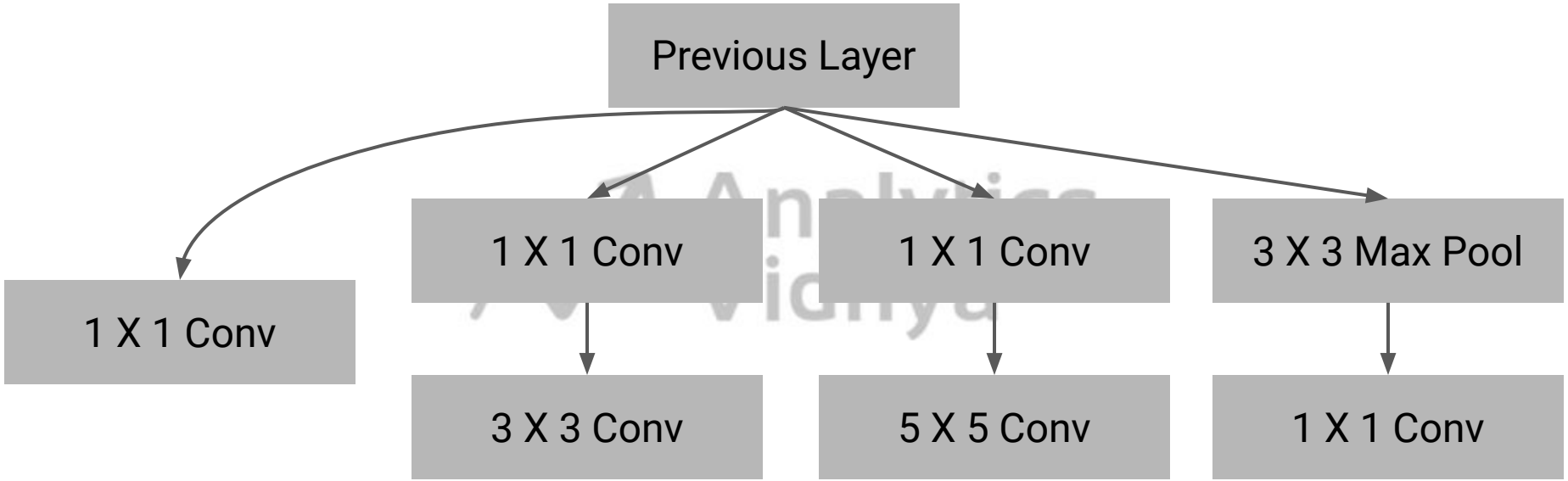
Inception Module



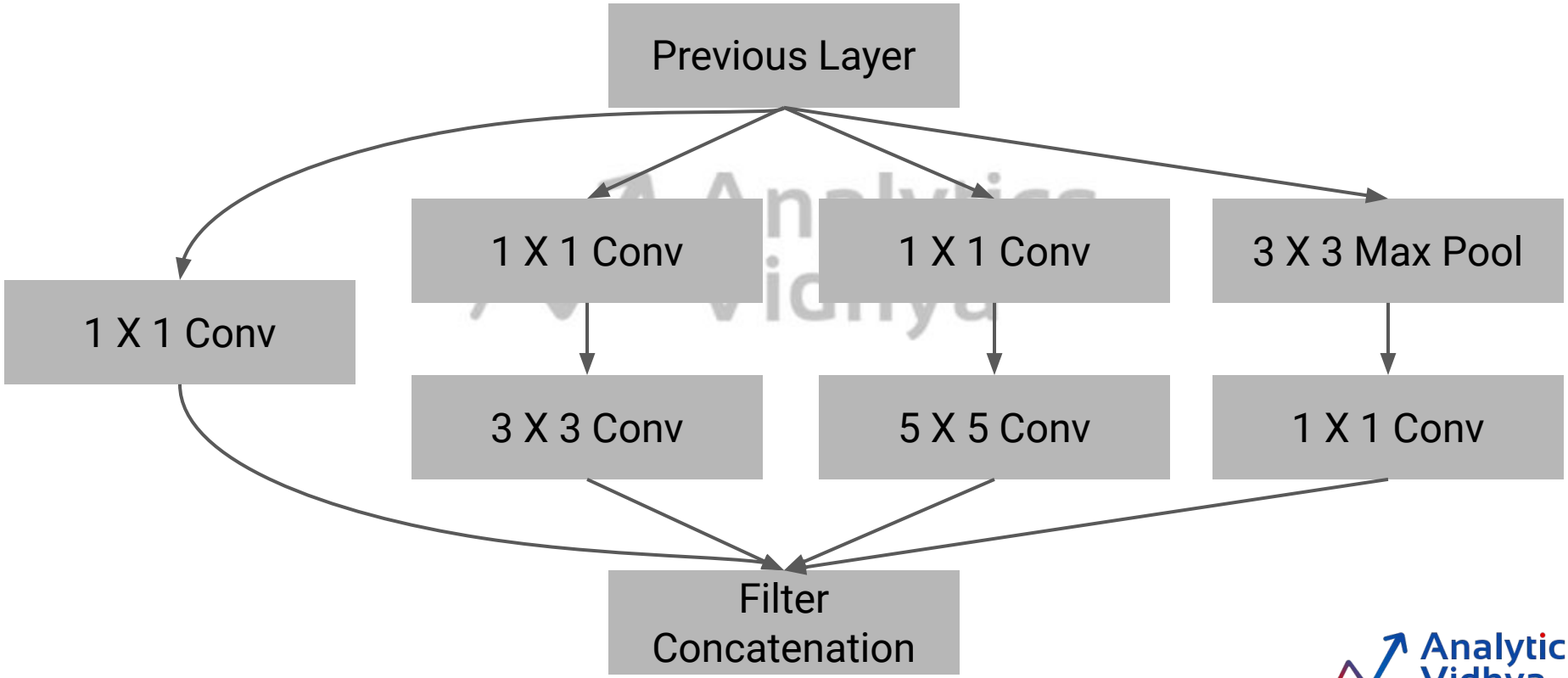
Inception Module with Dimensionality Reduction

Previous Layer

Inception Module with Dimensionality Reduction



Inception Module with Dimensionality Reduction



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- No need to worry about deciding the filter size
- Reduces the number of operations using dimensionality reduction module
- Can build deeper networks

Thank You

Analytics
Vidhya