Recap: CNNs Part II

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Why think about receptive field size?

- Receptive field should match size of features that are to be detected

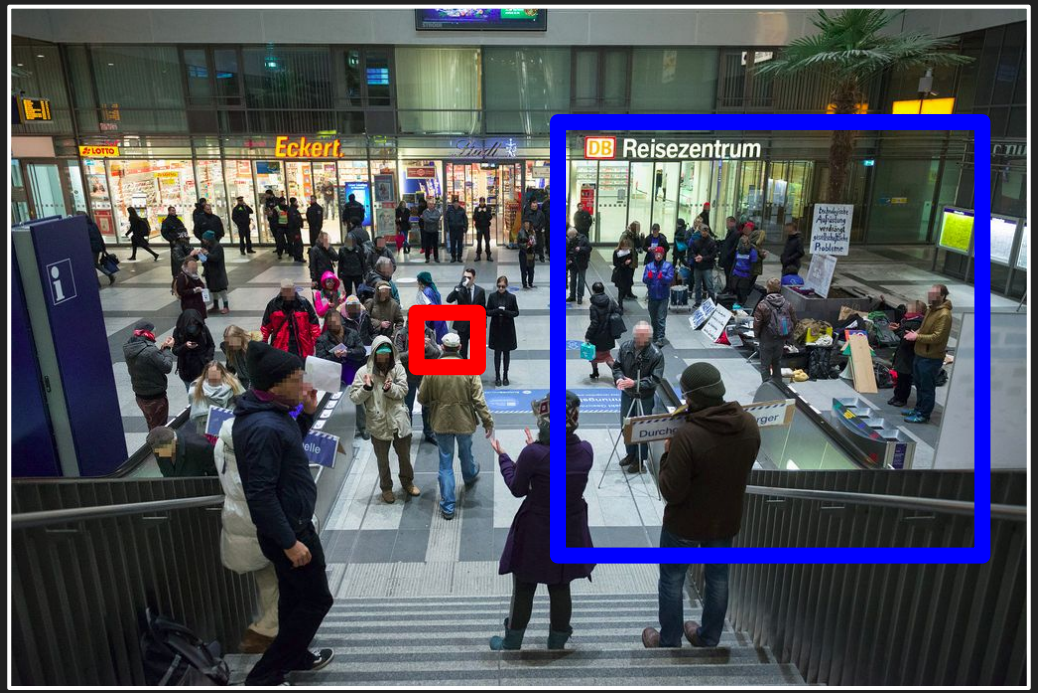


Image Source: https://farm5.static.flickr.com/4568/26923139189_1b51549f96_b.jpg

Calculating the Receptive Field

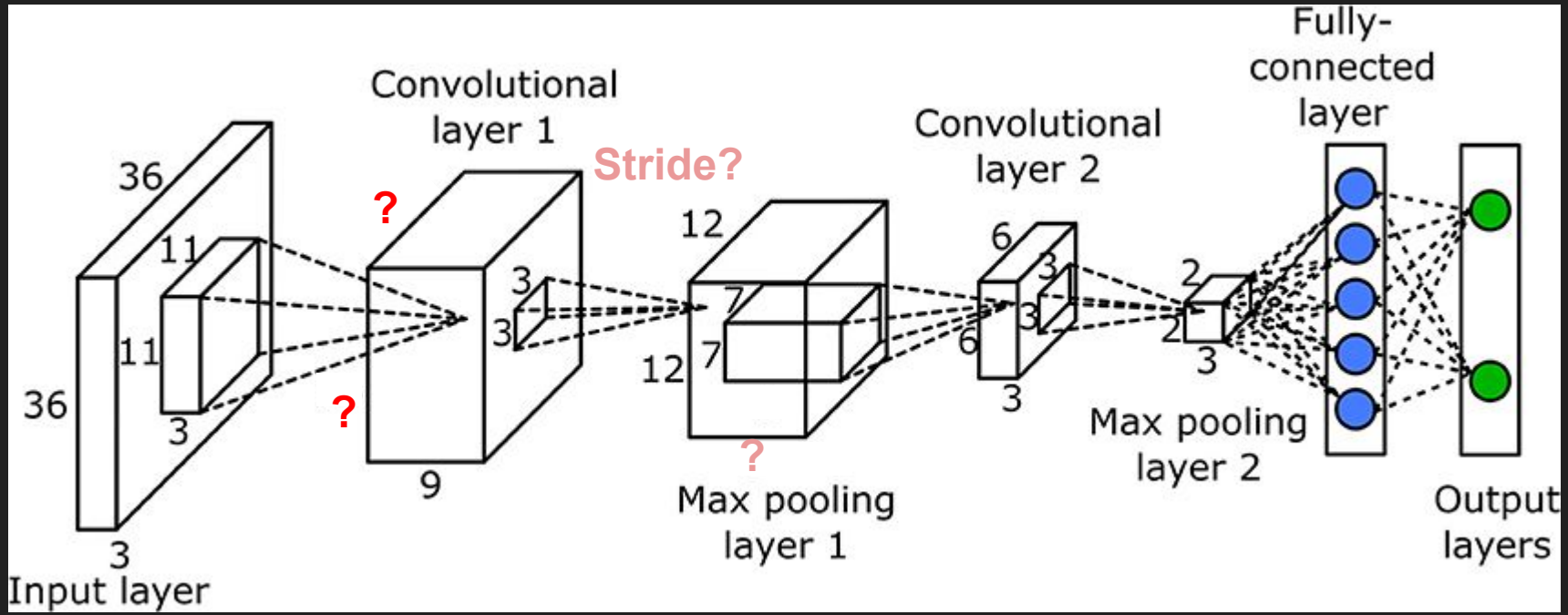
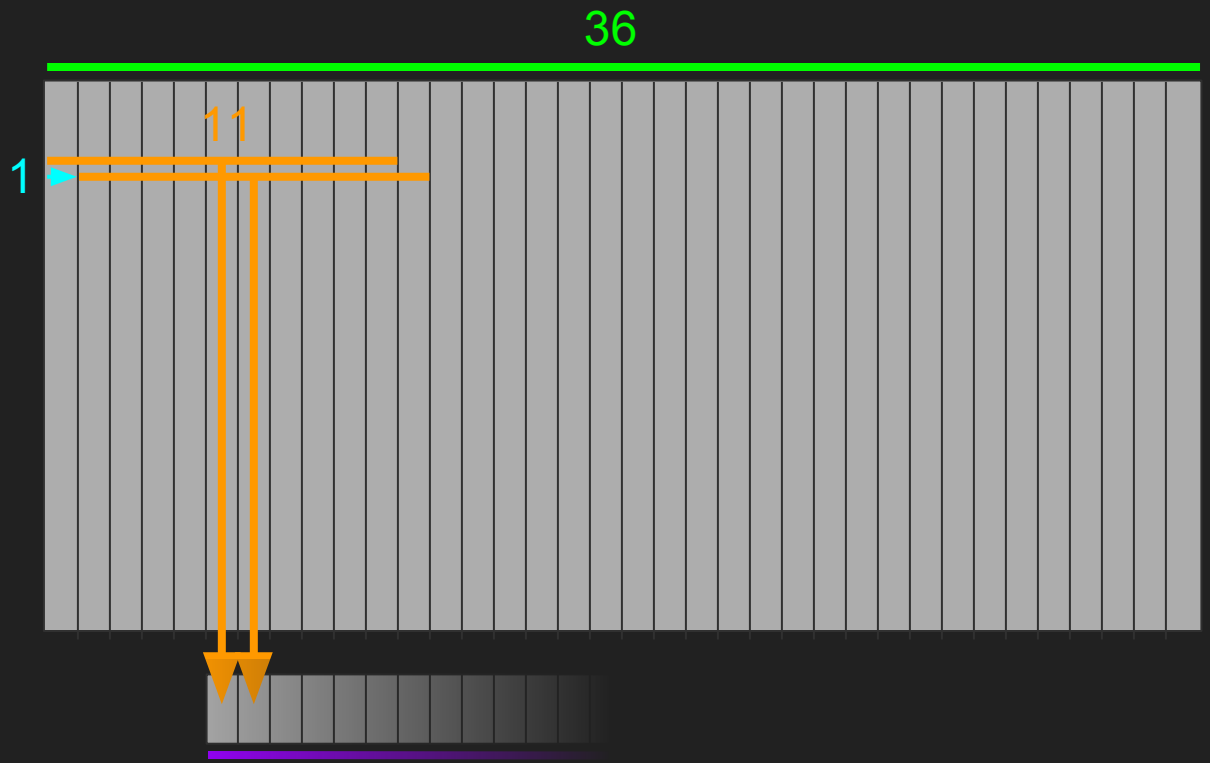
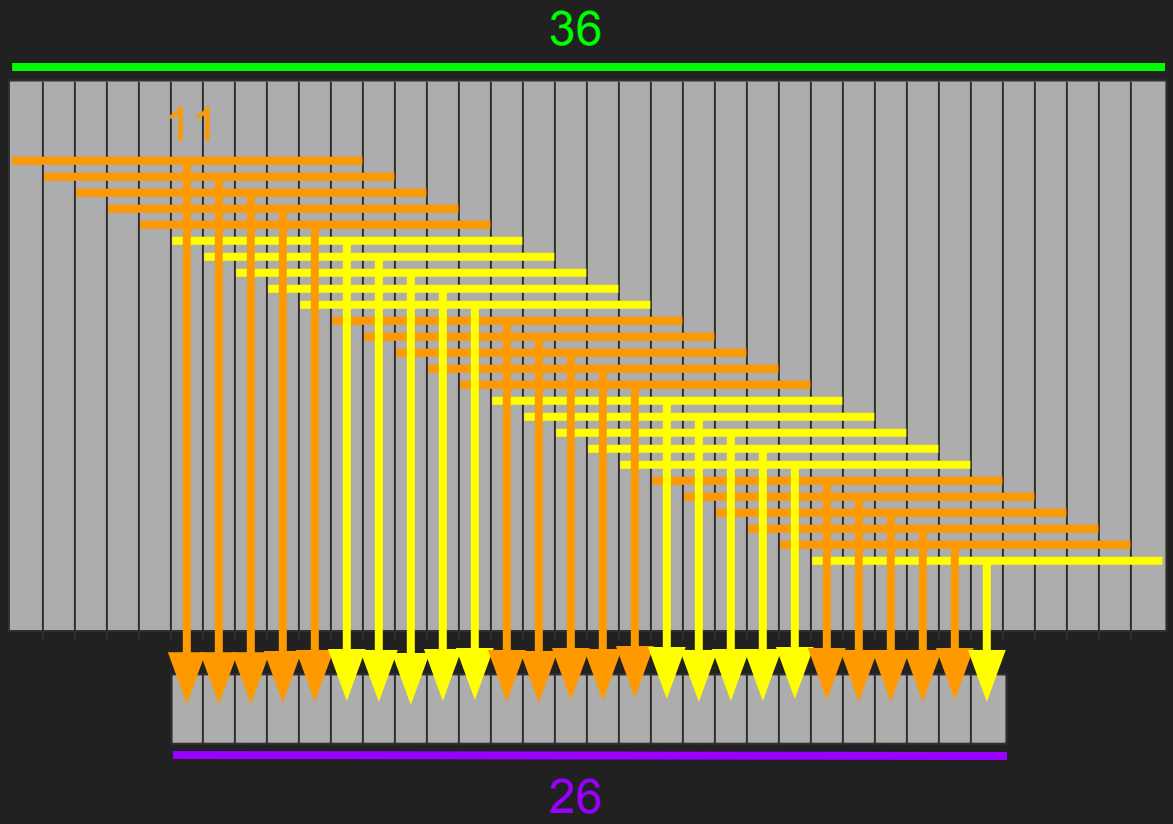


Image Source: https://www.frontiersin.org/articles/10.3389/fpls.2017.02235/full



OutputSize = (InputSize - FilterSize) / stride + 1
= 25 / 1 + 1
= 25 + 1 = 26

Formula Source: http://cs231n.stanford.edu/slides/2017/cs231n_2017_lecture5.pdf



Color is for counting purposes only

Calculating the Receptive Field

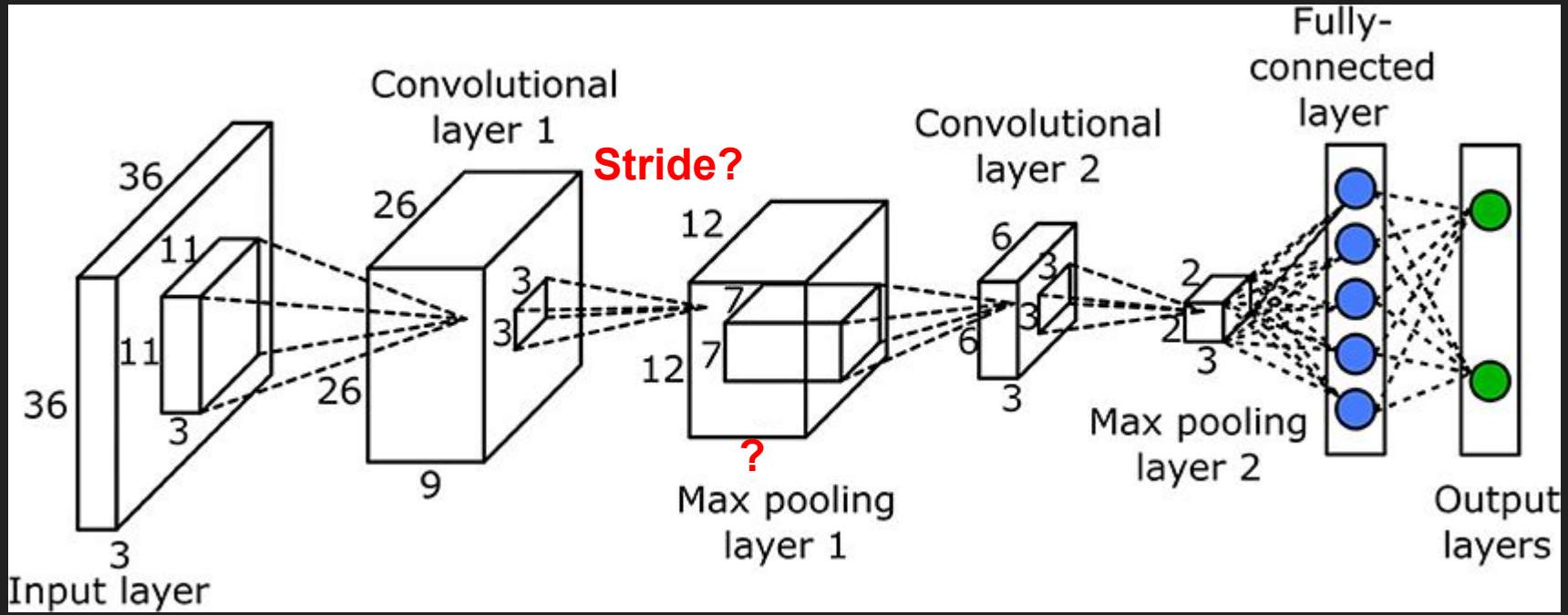
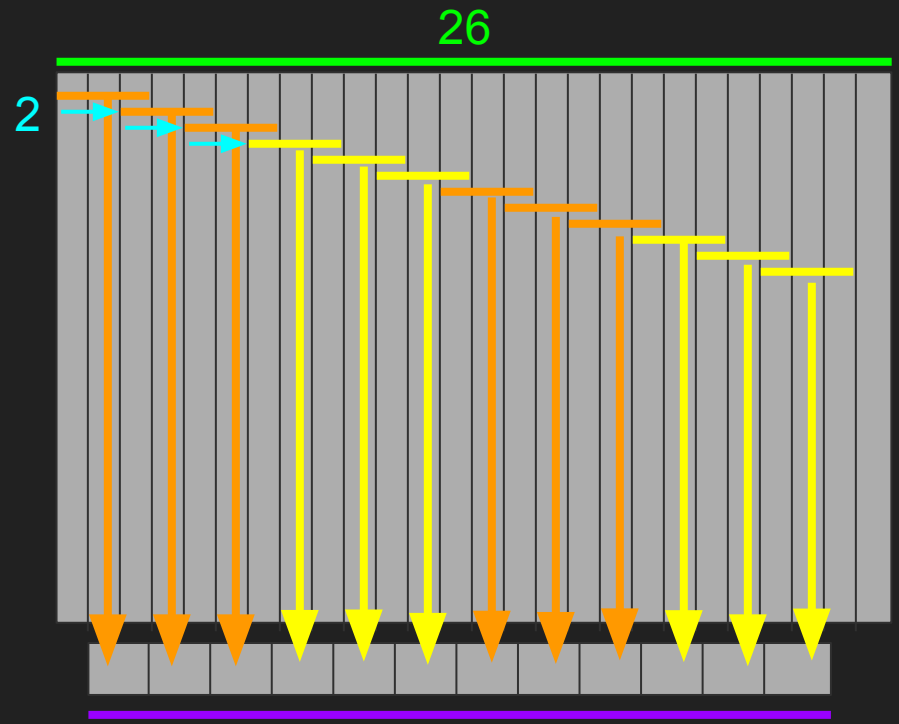


Image Source: https://www.frontiersin.org/articles/10.3389/fpls.2017.02235/full

OutputSize = (InputSize - FilterSize) / stride + 1

stride = ⌊(InputSize - FilterSize) / (OutputSize - 1)⌋

stride = ⌊23 / 11⌋ = 2



OutputSize = (InputSize - FilterSize) / stride + 1

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stride = ⌊23 / 11⌋ = 2

Calculating the Receptive Field

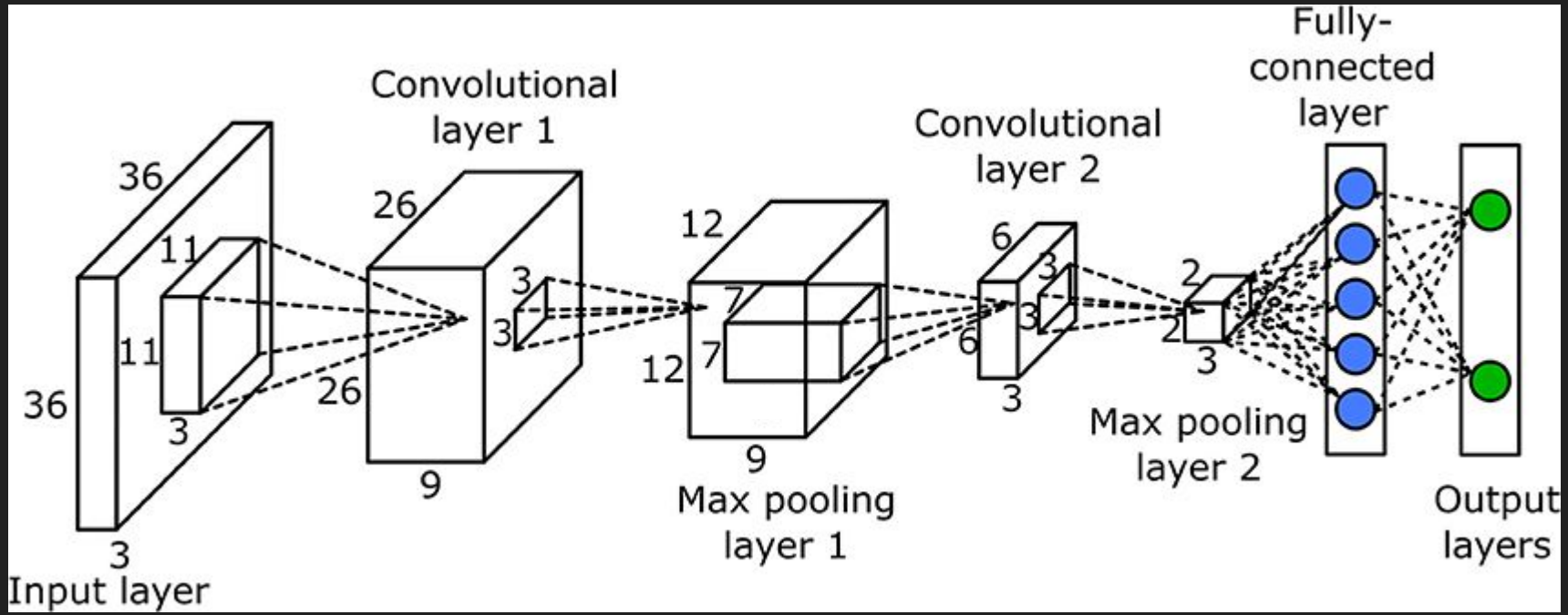
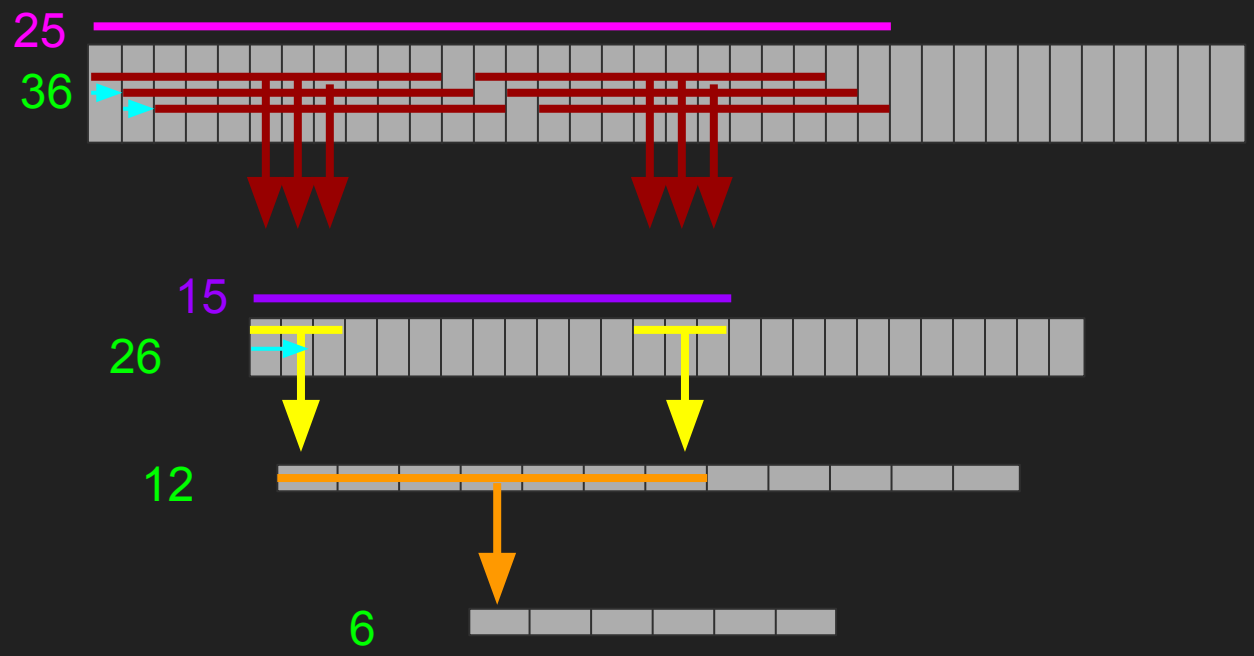


Image Source: https://www.frontiersin.org/articles/10.3389/fpls.2017.02235/full



$$ReceptiveField1 = FilterSize\_0 * stride\_1 + (FilterSize\_1 - stride\_1)$$

$$ReceptiveField2 = ReceptiveField1 * stride\_2 + (FilterSize\_2 - stride\_2)$$

Concatenating Filters of Various Sizes: Inception

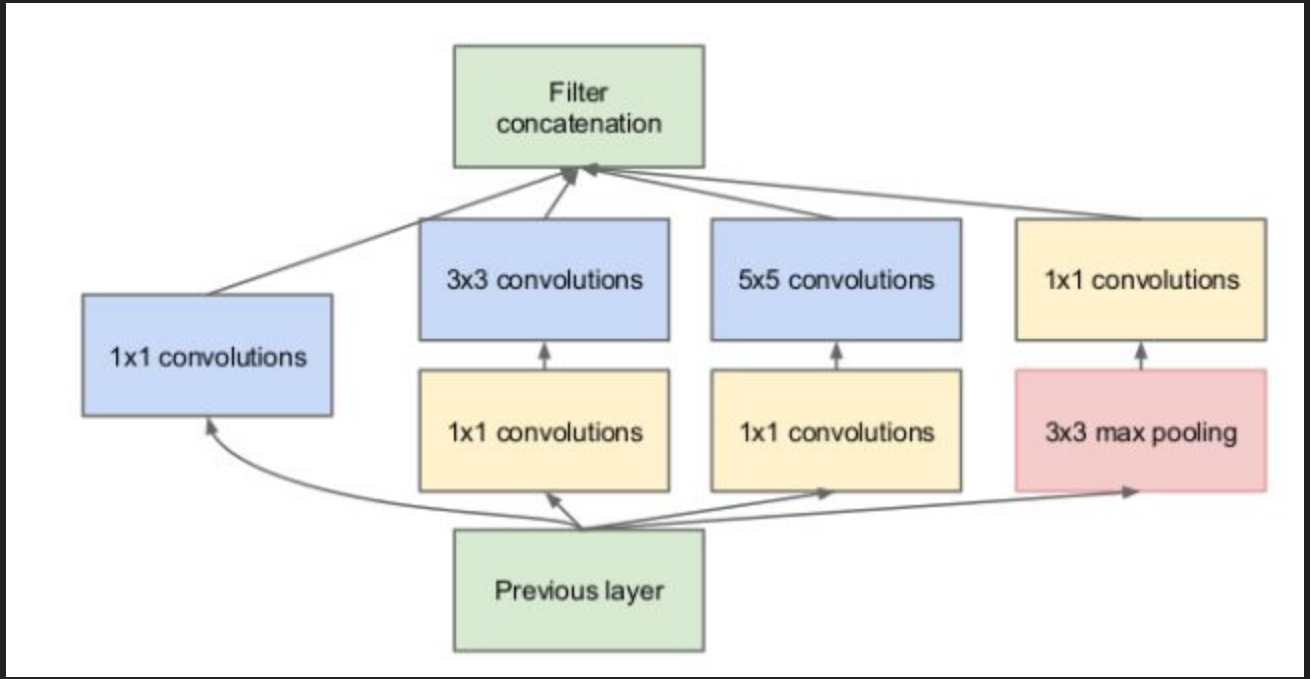


Image Source: https://arxiv.org/abs/1409.4842