**[CS-8395 Spring 2020]**

**Deep Learning in Medical Image Computing**

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**Paper Title: Deep Residual Learning for Image Recognition**

**Please summarize the paper using your own words: (<100 words)**

Although a deep network have more capacity and hence should have better learning capability then a shallower network, in practice it face a degradation problem which prevents it from learning. This results in a poorer performance compared to their shallower counterpart. To alleviate this issue, the authors propose skip connection to make the network learn residuals between output and input of a convolution block instead of a y=f(x) mapping.

**Question1 for the paper:**

Say for a residual block, the input size is 64x56x56 (channel x featureMapDimension x featureMapDimension), and the output size is 128x28x28. To match the feature map sizes (56 and 28) in the equation F = H+x, do the shortcut connection need to include a convolutional filter with stride two? If yes, isn’t it including extra parameters to the network?

**Question 2 for the paper:**

A follow up to the previous scenario. The input channel numbers are zero padded i.e., feature maps containing all zeros are included to increase the dimension from 64 to 128 and then the addition via skip connection is performed. How are the all zero maps concatenated to the input? Are they bunched up at the end or are they placed in between the existing feature maps? Doesn’t the organization affect network’s performance?