

# ResNet Paper(Summary)

*Deep Residual Learning for Image Recognition*

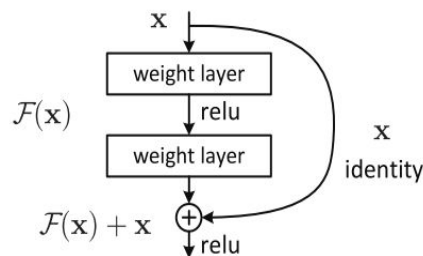
----- Mridul Dubey

## PROBLEM

Increasing network depth does not work simply by stacking layers together. Deep networks are hard to train because of vanishing gradient problems(As the network goes deeper,its performance gets saturated or even starts degrading rapidly).There were some methods to deal with it but they were not that efficient.

## Residual Block

Instead of direct mapping that we apply in plain network, they suggest to use residual functions,they comment that it is easy to optimize the residual mapping than to optimize the original



Here  $F(x)$  is stacked non linear layers and  $x$  is an identity function( $F(x)=x$ ).Is is known as identity shortcut connection.The shortcut connections introduce neither extra parameter nor computation complexity.

## Network Architecture

If we stack up many residual blocks we get a ResNet architecture, it consists of one convolution and pooling step followed by 4 layers of similar structure. A plain network can be made a ResNet by just adding a shortcut connection to it.It does not affect the efficiency of the model as the identity function does not take any time to train.In plain

