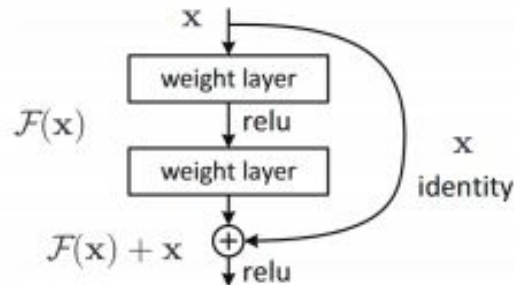


## Assignment 4 Report

Model Architecture: (ResNet)

Residual network was introduced in 2015 by Kaiming He et al. in the article “Deep Residual Learning for Image Recognition” .

Resnet is by far the most used architecture nowadays. Resnet proposed the use of skip connections every second convolution, not only that, the network also used batch normalization instead of dropout that was used in the earlier convolutional neural networks architectures before it.



*Figure 14-2. A simple ResNet block (courtesy of Kaiming He et al.)*

In the diagram above the  $x$  get added after the second convolution, so effectively we get  $x + \text{conv2}(\text{conv1}(x))$ .

There are five different types resnet architecture based on the number of layers present in each architecture. We have ResNet 18, ResNet 34, ResNet 50, ResNet 101, and ResNet 152

I used resnet 34 in this assignment.

Technique used (Transfer Learning):

Transfer Learning is simply taking a model trained on a large dataset and transferring its knowledge to a smaller dataset.

Transfer Learning as features extractor in CNNs:

In this method all the convolutional layers except the linear layers in an architecture are frozen so that its weights don't get updated during training. Backpropagation only takes in the linear layers thus only the linear layers are trained when using Transfer learning as features extractor.

Fine tuning:

Fine tuning in CNNs transfer learning means all the layers get their weights updated during training.

Here is the link to the my notebook:

[https://colab.research.google.com/drive/1jPFFF8a85jBp0xSDyAeXI\\_52CdWZwfhw?usp=sharing](https://colab.research.google.com/drive/1jPFFF8a85jBp0xSDyAeXI_52CdWZwfhw?usp=sharing)

