Date - 14 Oct - 2024

PRE-TRAINED MODELS IN CNN

- These models are initially trained on large, general-purpose datasets like ImageNet.
- They learn to recognise various features, from simple edge to complex textures and objects.
- The architecture of pretrained models varies, but they share common traits.

1. ResNet (Residual Networks):

- it introduced by Microsoft Research, revolutionised deep learning by using residual connections to mitigate the vanishing gradient problem in deep networks.
- variants: ResNet-50, ResNet-101, ResNet-152

2. Inception (GoogleNet):

- developed by google, the inception network uses inception modules to capture multi-scale features.
- variants: inception v3, inception v4, inception ResNet

3. VGG (Visual Geometry Group)

- developed by the visual Geometry Group at the university of oxford, VGG models are known for their simplicity and depth.
- variants: VGG-16, VGG-19

4. EfficientNet:

- Developed by google, efficient Net models achieve high accuracy with fewer parameters and computational resources.
- variants: EfficientNet-B0 to EfficientNet-B7.

5. DenseNet (Dense Convolutional Network):

- Developed by researchers at Cornell University, DenseNet connects each layer to every other layer in a feed forward fashion
- Variants: DenseNet121, DenseNet-169, DenseNet-201

6. MobileNet:

- Developed by Google., MobileNet models are designed for mobile and embedded vision applications
- variants: MobileNetV1, MobileNetV2, MobileNetV3.

7. NASNet (Neural Architecture Search Network):

- Developed by Google using neural architecture search techniques to optimize the network structure.
- variants: NASNet-A, NASNet-B, NASNet-C.

8. Xception (Extreme Inception):

- Developed by google, Xception is an extension of the inception architecture with depthwise separable convolutions.

9. AlexNet:

Developed by Alex krizhevsky, AlexNet is one of the earliest deep learning models that popularized the use of CNNs in image classification.

10. Vision Transformers:

Developed by google, vision Transformers apply the transformer architecture, initially designed for NLP, to image classification.

TRANSFER LEARNING

problem with training our own model:

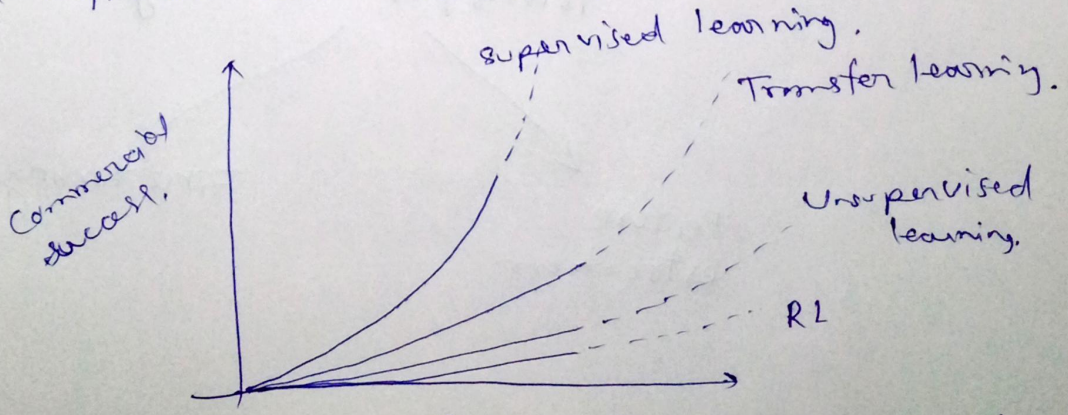
(i) Because Deep learning required lot of data with labeled

(ii) it is time consuming

- The solution of above two statement is to use pre-trained models exampl VGG, ResNet, Xception.
- But there is may be chance that the we solve our problem statement using pre-trained model but our problem statement's class is not present in dataset where the pre-trained model is trained to resolve this problem we ~~use~~ use transfer learning.

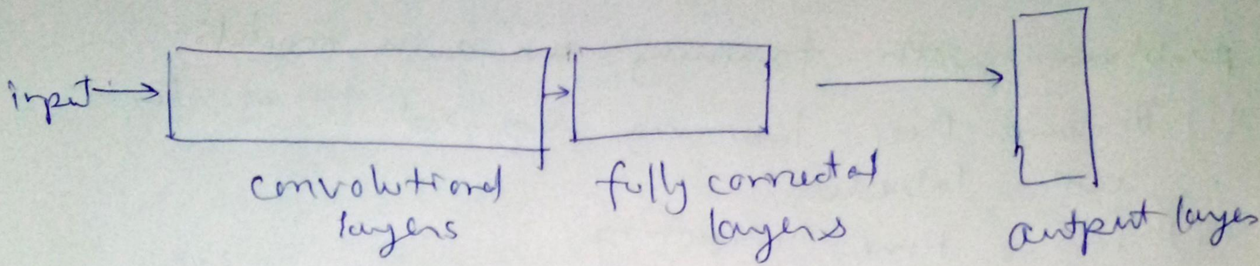
Transfer learning:

Transfer learning is a research problem in ML that focuses on storing knowledge gained while solving one problem and applying it ~~to~~ to a different but related problem.



Drivers of ML success in industry

How Transfer learning works:



- remove the fully connected layer. and then build your own fully connected layer.
- freeze the convolutional layer (part) because primitive features are same in any image and weights change ना हो इसलिए convolution layer को freeze करते है
- Training part is only done in fully connected layer
- But if apply the fine tuning then train the last part of convolution also