V.V. imp

CNN - Transfer Learning

pre-trained model → BERT, VGG16, ULMFit, VGG16 with IMDB, MNIST

Q: What is Transfer Learning?

Idea:- Instead of building a Neural Network from scratch to solve our task, we can reuse existing models (eg:- VGG16, ResNet etc) which is already trained on a different dataset.

=> Learning from scratch => DL - Data hungry - Image dataset (Large data)

=> Time => model => training => pre-trained

Transfer learning (weight & Bias matrix)

Solved problem → New problem

Pre-trained model

Training part

T = {
- → Import the necessary libraries
- → load the dataset
- → Pre-process data
- → load weight & bias of Pre-trained model
- → Fine tune the Model for the current Problem
- → validate if it works fine, iterate again if it does not

}

Prediction

→ Get Predictions on new data

2006 – Fei Fei Li → Model of algorithm

Data Scientist

→ crowd sources → Amazon Mechanical Turk

Image → 14 Million = 1.4 crore image – 20000 categories
→ Labels

1 million image → building box
↳ Object detection / face recognition

Dog – breed – Colour

Famous Architectures

- 2010 — ML model → 28%.
- 2011 → ML model → 25%.
- 2012 → AlexNet → 16.4%.
- 2013 → ZFNET — 11.7%.
- 2014 → VGG16 — 7.3% → Famous Architech
- 2015 → GoogleNet → 6.5%.
- 2016 → ResNet → 3.5%.

* Advantages of Transfer Learning

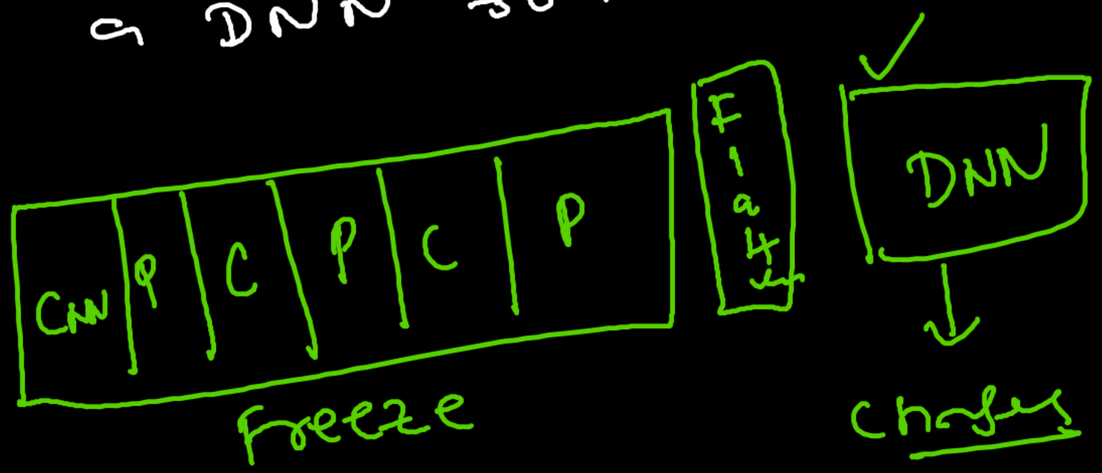
1. Less time to train the model
2. Improved Performance
3. No need to set the Param & more validation

Transfer Learning

Feature extraction

↓

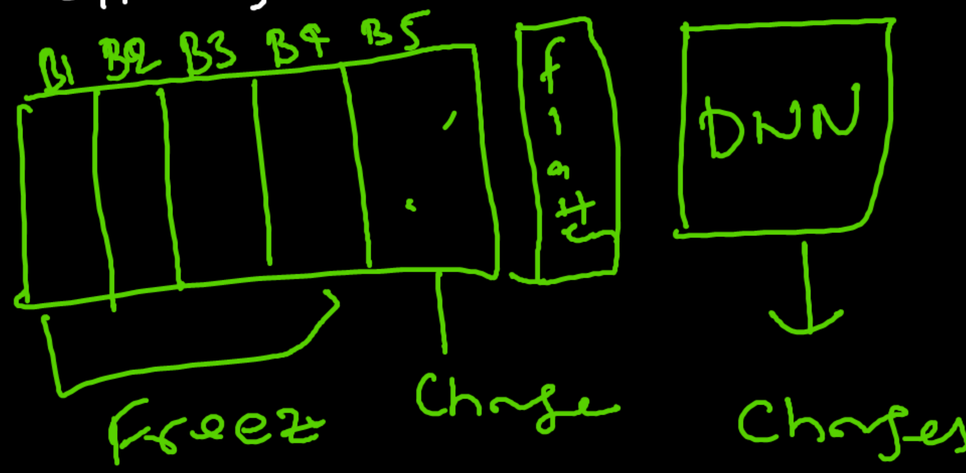
Freez all the existing Param and only change in a DNN side



Fine tuning

/

We can change param along with DNN



Comp

New dataset / Image - Dog image

VGG16 — ImageNet dataset - Dogs

Feature extraction - Freeze → All the CNN param
Not train
to the
ImageNet

Mobile Part / Laptop Part

↓

Fine-tuning → Last layer - insert