Agenda

1) VGG16

2) Transfer Learning

1) LeNet

2) AlexNet

{ZFNet}*

VGG16

{5x5, 7x7}

{3x3 Conv}

224x224x64

MP 112x112x64

Conv 112x112x(128 Kernels)

224x224

{7x7} 1x1

Conv (1,1)

Blocks → Conv Block, Transition Block

Size Reduction MP

Conv

BLOCK
conv (3,3)
conv (5,5)
conv (3,3)

Trans

conv(1,1)
MP

Variants of Trans Blocks

1) C(1,1) } Trans
MP
C(3,3) Conv Block

2) MP
C(1,1) } Trans
C(3,3) Conv Block

3) C(1,1)
MP
C(1,1) } Trans

8
16
32

3 × 3 × 512

1 × 1 × 128

32
64
128
512
↓
128

512 - 128

(1, 1)

0· = ? → Reduced
↳ lesser no of params.

512
400
300

60% - 40%

128 80 - 90

Fixed

low level features
Edges/ Gradients → Patterns → Textures → Parts of Object → Object

(Mid level: Patterns → Textures)

(High: Parts of Object, Object)

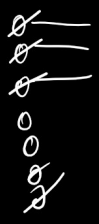
Shapes

Dataset zebra house

Dropout 0.3

No firing of Neurons

ANN



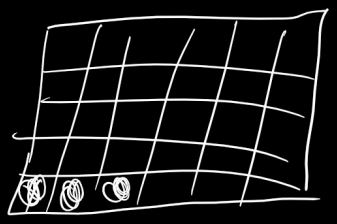
Generalization Power

0.3

Random Shuffle

CNN

learning



Dropout

Regularization

1) Dropout

2) Data Aug

Case use case 10% Accuracy X

~2-3% .5-3%

Neural Network

L2

Train Loss :- {0.79} GAN 48374217 89.71

Accuracy :- {0.8} Adam @ 1.8

Competitions

Competitions Network Minima

A) B) C D E F

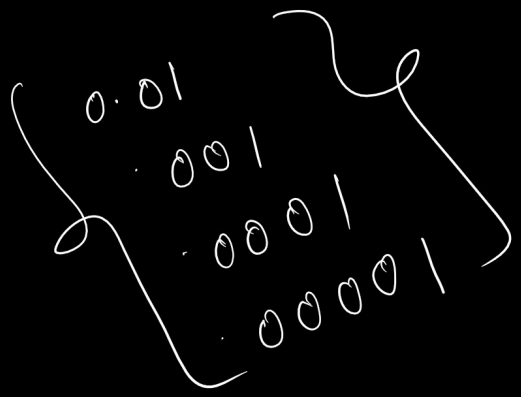
Min SGD

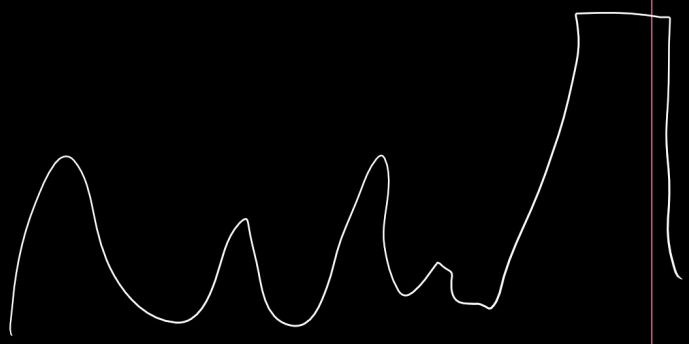
Last Winner we need surpass the current Rate

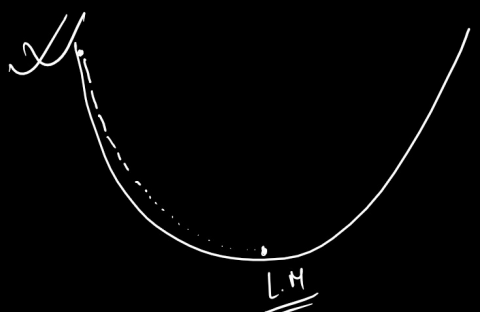
.001 ✓
.0001 ✗

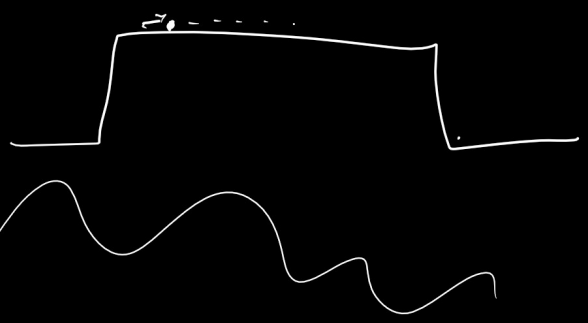
Learning Rate = 0.01

Optimizer - Adam ✗
SGD ✓









LR Scheduler

if else

if epochs ≥ 20
then use LR (0.01

if epoch ≥ 50
LR (0.001)

Callbacks

if epoch > 100
LR (0.0001)

→ Data Aug

Changing Your Input slightly
with different variations.

General Image Processing

zoom

1)

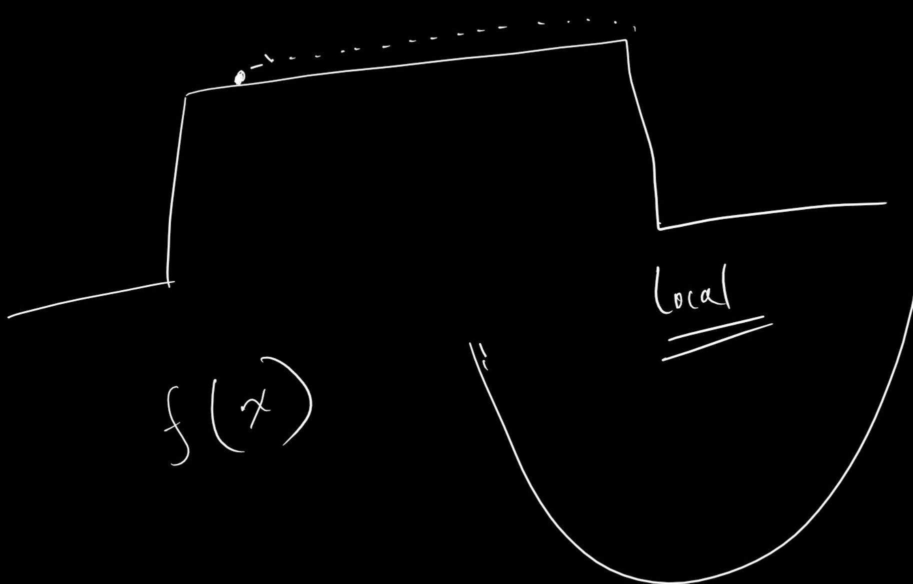
2)

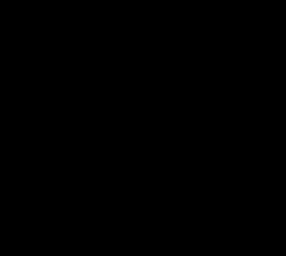
* Run Time

Pre Runtime

100
↳ 10000

Incr.





Transfer Learning

Why ? → Not start from scratch

Scratch/Each Training → Time Taking

Models to be generated faster

Weights

C_1 → Low level Features

C_2 → Low

Previous Network M_1

C_3 → mid level Features

C_4 → mid

M_2

Similar of data

Horse Zebra

Use case

1) Generic →

2) Use-case Specific

Frozen weights

C_5 →

C_6 →

New data

model

model.summary()

New weights + Old weights

Final Model

low + mid features

High level

→ 2 Conv

→ 1 Conv

Scenes

Canonical cells

Bigger Dataset

1000 classes

18

1000 different channels

10000000

Paper Submissing

Transfer learning

- Time
- Infra

1 Guy in company having 7+ exp

other guy with 1 year exp

Same Task

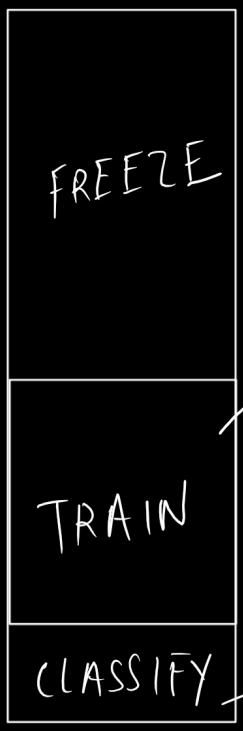
7 year Guy → 1 year Guy

Information Retain 50% - 60%

Faster is Better

Efficiency

Scratch



- last conv layer
- last 2 conv layers
- last 3 conv layers

→ Custom Dataset

→ change the no of classes

~~C4~~
C5
C6
C7

Imagenet

Generic

Problem

Data

Similar

→ Pre trained Models

Use Case Specific

C1

C2

C3

Different

Different

C01

Breaking

Pre Trained Model

- Low + Mid
- Manually we teach to learn high features
- Classification

1) Building Custom Alexnet and Training with Custom Data

Computer

Phd

Data :- minimum 3 classes having 250 images each

750 → train
→ test

2) Write the VGG16 Sequential Network by yourself

model = Sequential()