How to improve a neural network ✓

29 April 2022 13:51

1. Fine tuning NN hyperparameters
2. By solving problems:
   - → Vanishing / Exploding gradient
   - → Not enough data
   - → Slow training
   - → Overfitting

epochs, # hidden layers, # neurons per layer, learning rate → GD, Optimizer → GD, Batch size, Activation function

32 row → 1 update

128 → 64 → 32 hidden

Roadmap → 15 videos

ANN → Keras 90% (92%)

DL?

perceptron

MLP → forward prop → train MLP / ANN → Backprop → GD

update no meaning

minima of weight

weights, gradient

sigmoid 0.00001

Fine tuning Hyperparameters

- No. of hidden layers ✓
- No. of neurons per layer ✓
- learning rate
- Optimizer
- Activation function
- Batch size
- Epochs

1 No. of hidden layers

hidden

Representation

human faces

Transfer learning → CNN

reuse

NN ← line, shapes

1 hidden layer → 512 neurons → complex → lot of neuron

1 h → 512

fewer neurons

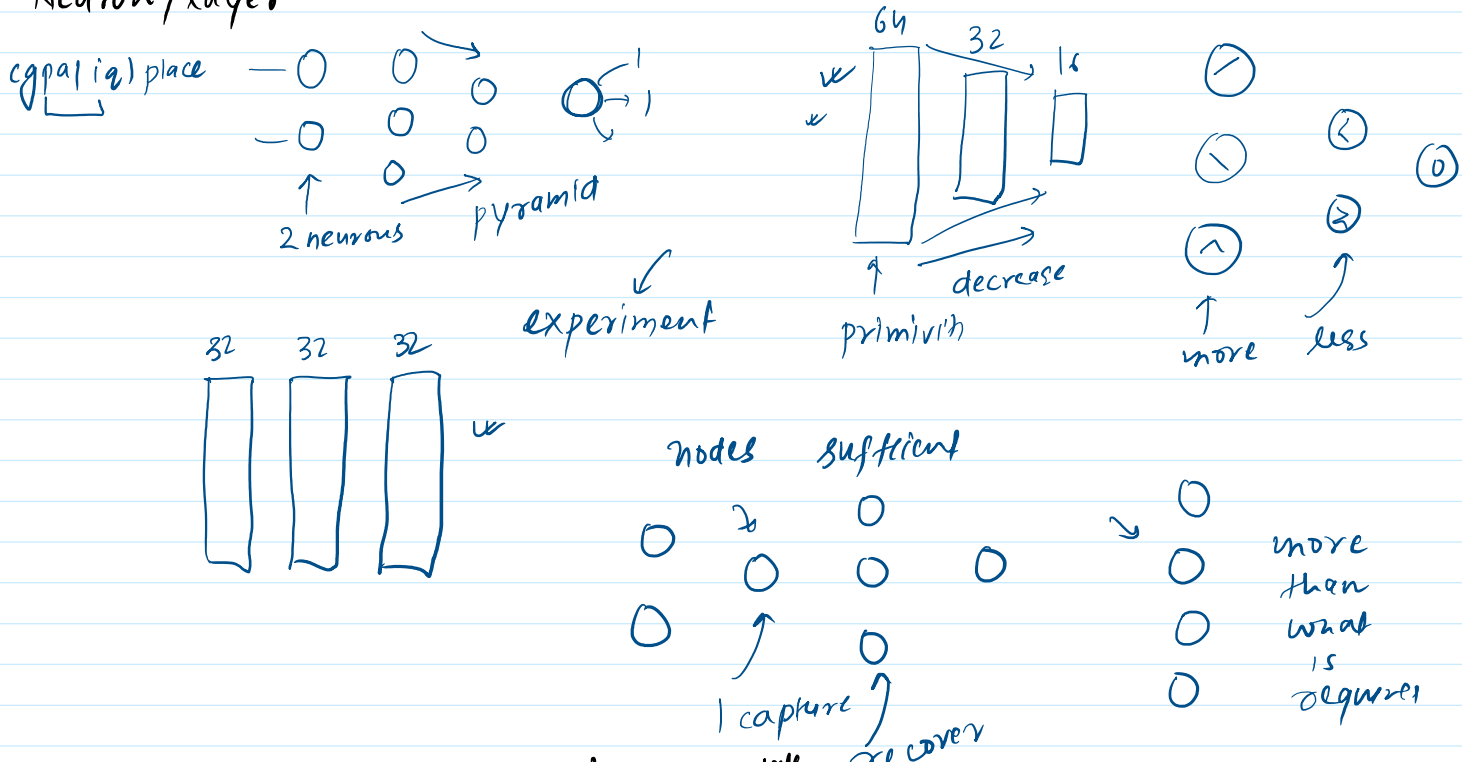
3 / 50 / 300

3 hidden → 32 neuron

deep neural network

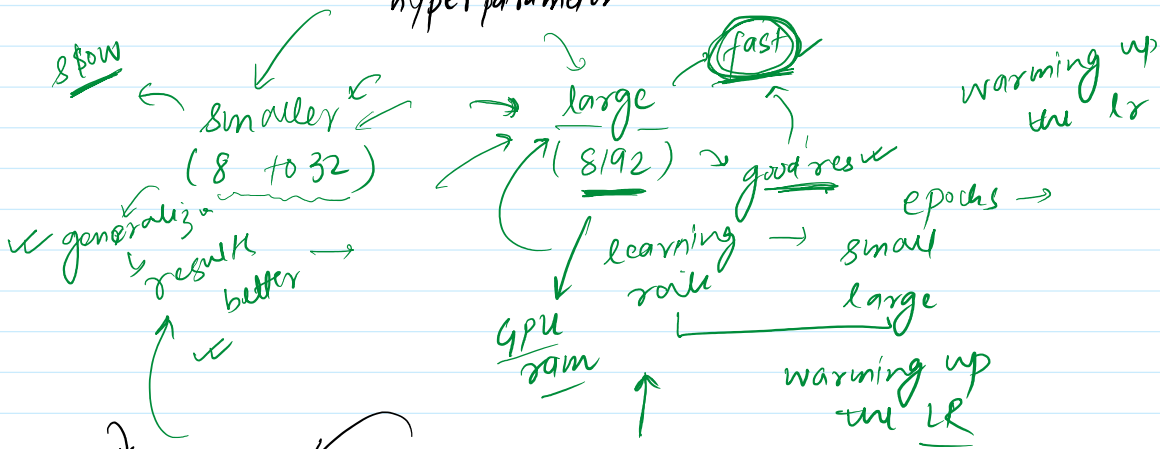
Overfitting

2. Neuron / layer



3. Batch size
- Batch → all row → weight update
- Stochastic → 1 row → weight
- Mini Batch → batch → 32 → row → update

hyper parameter

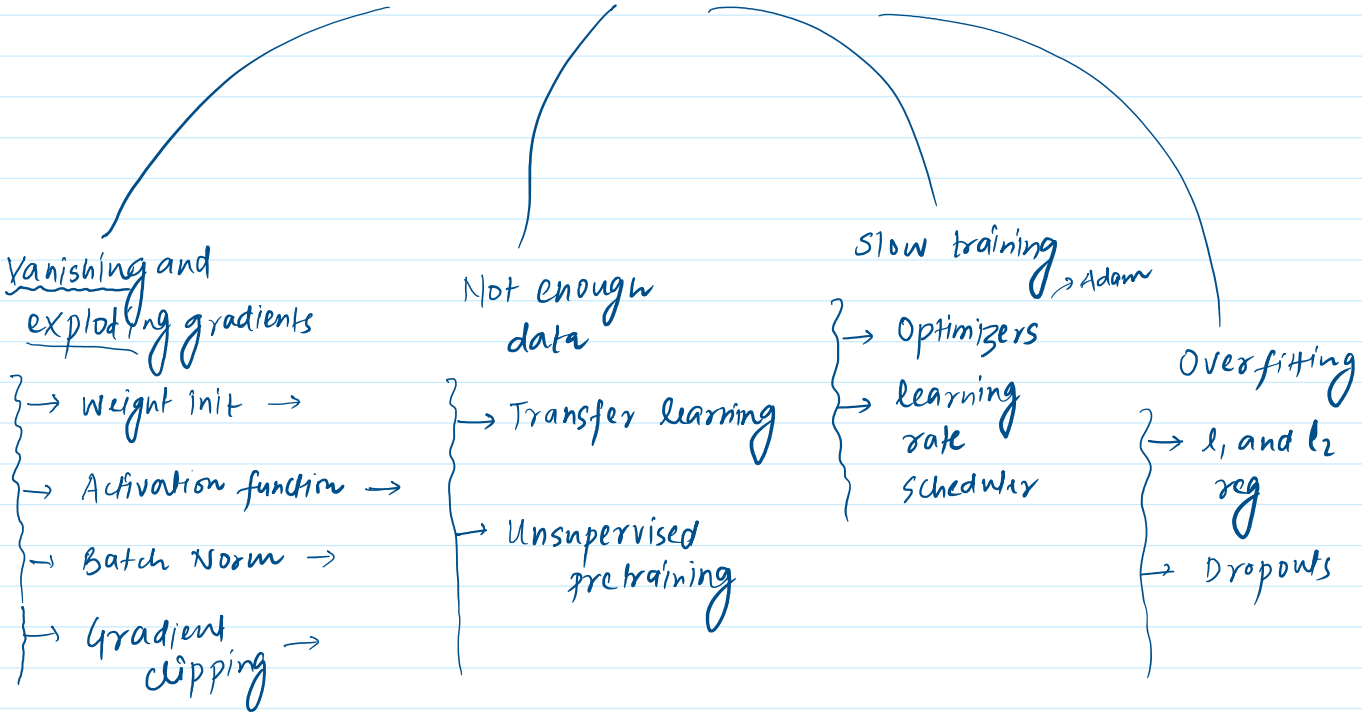


4. Epochs → 100 / 500 / 1000 → early stopping

Keras → callback

Keras → stable

Problems with Neural Networks


Vanishing and exploding gradients
→ Weight init →
→ Activation function →
→ Batch Norm →
→ Gradient clipping →
Not enough data
→ Transfer learning
→ Unsupervised pretraining
Slow training
→ Adam
→ Optimizers
→ learning rate schedular
Overfitting
→ l_1 and l_2 reg
→ Dropouts