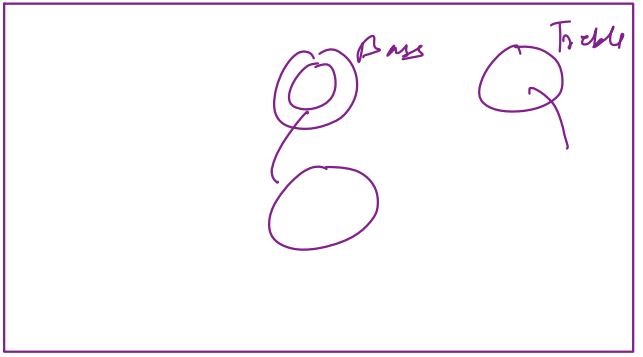
(*) How to increase NN performance

1) increase the no. of epochs
2) Regularization
3) Deeper NN
4) Batch normalization
5) Learning Rate
6) Drop out
7) choosing optimizer
8) Collection of Data

} orthogonalization

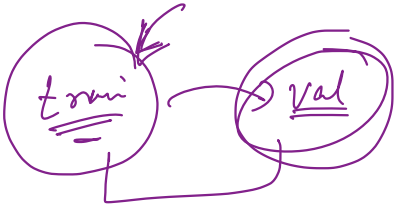


Q Bad train accuracy.

1. Deep Network ✓
2. epochs ↑
3. Optimizer
4. More data

Q Bad validation accuracy ?

1. Dropout
2. Regularization
3. Batch Normalization
4. Simpler NN
5. Diverse train samples

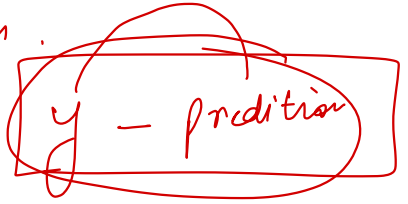


Q test accuracy is bad

→ Diverse

→ Bigger validation set. / cross validation

→ Loss function.



Q Why getting more data should not be your first choice?

1. Time consuming
2. hard to get
3. expensive

Q What are those main hyperparameters while designing your NN?

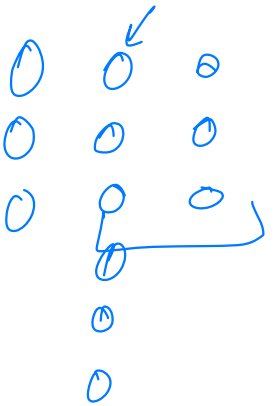
Ans LR ✓
Batch size ✓
epoch ✓
β GD with momentum. 0.9 $\frac{1}{1-0.9} \Rightarrow$ 10 days
β_1, β_2 Adam
↳ RMS prop. 0.9 0.999

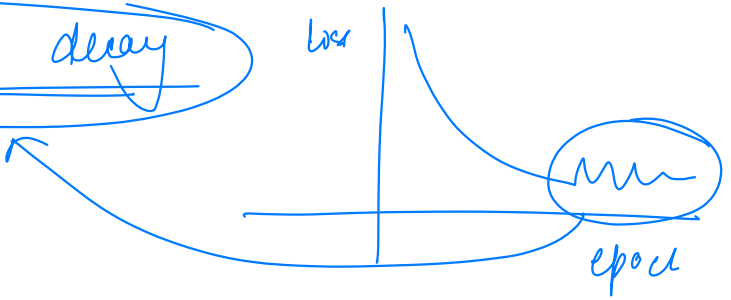
No. of layers ↓ → No. of neurons.

Dropout ratio ↓

Q Tuning order of hyperparameter.

1) LR
2) BS
3) No. of neurons
4) Batch size & epoch
5) layers
6) learning rate decay

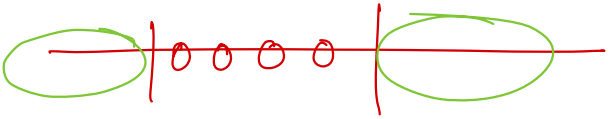




Q How to find the values of hyperparameter.

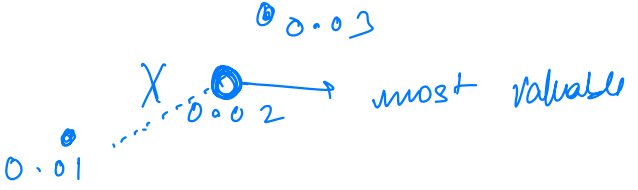
Grid search → All combination → computationally Expensive

GS, RS → [4,5,6,7]



Discrete search

lr = [0.01, 0.03, 0.04]



Bayesian optimization.

train error = 0.5% ✓

val error = 1.2% ✓

test = 2% ✓

↓ variance

1. Use drop out ✓
2. Use a complex model
3. Increase LR

	Precision	Recall
Model A	68%	35%
B	64%	40%

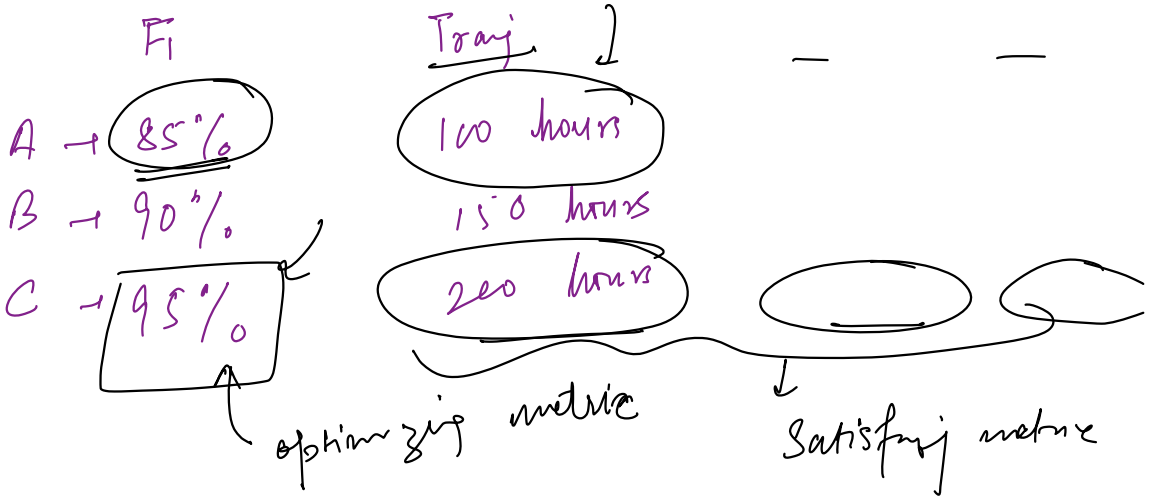
Can't say

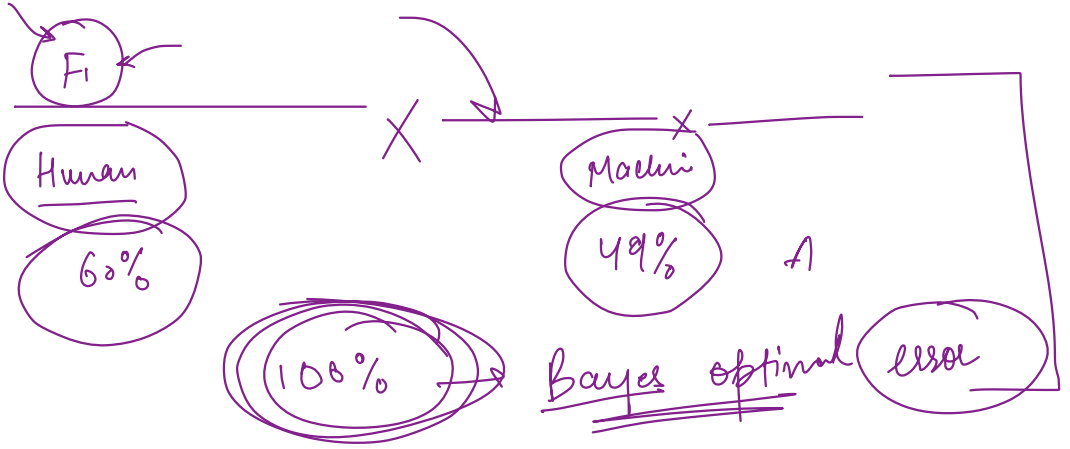
Single valuation Method

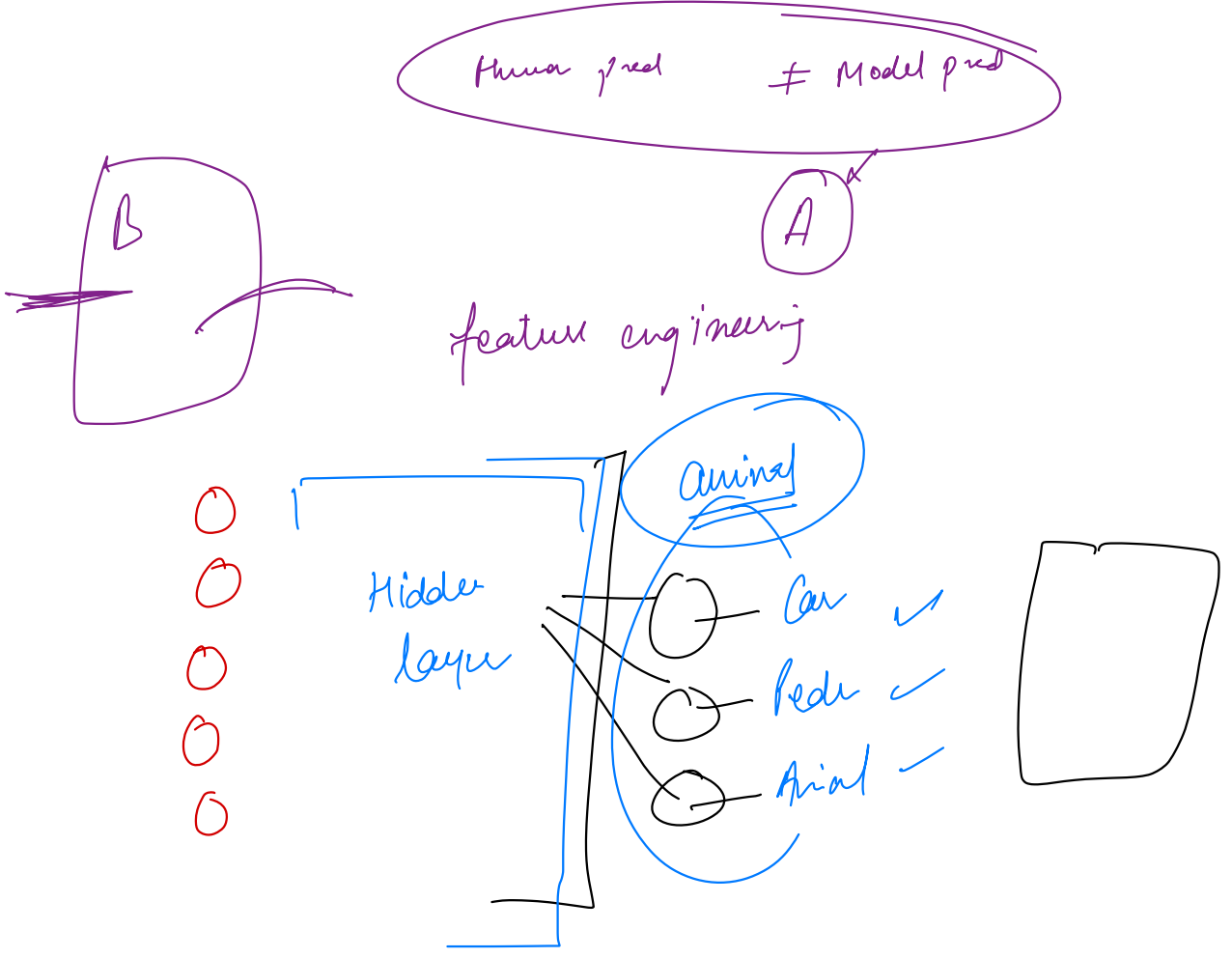
$$F_1 \text{ Score} = 2\frac{(\text{Prec} \times \text{Recall})}{\text{Prec} + \text{Recall}}$$

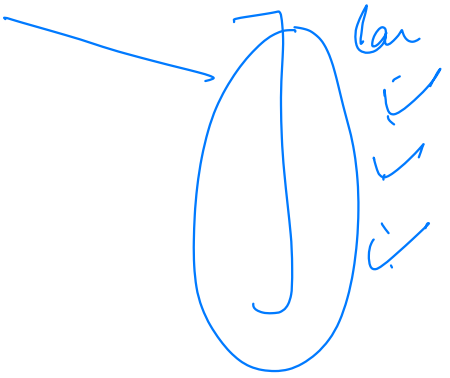
$$\text{Model A} = \frac{2 \times (0.68 \times 0.35)}{0.68 + 0.35}$$

$$\text{Model B} = 2 \times (0.64 \times 0.4) / 0.64 + 0.4$$


F1
Traj.
A → 85%
B → 90%
C → 95%
100 hours
150 hours
200 hours
optimizing metric
Satisfying metric


F1
Human
60%
Machine
49%
100%
Bayes optimal
error


Human pred ≠ Model pred
A
B
feature engineering
Animal
Hidden layer
Car
Pedestrian
Animal



Multi task using