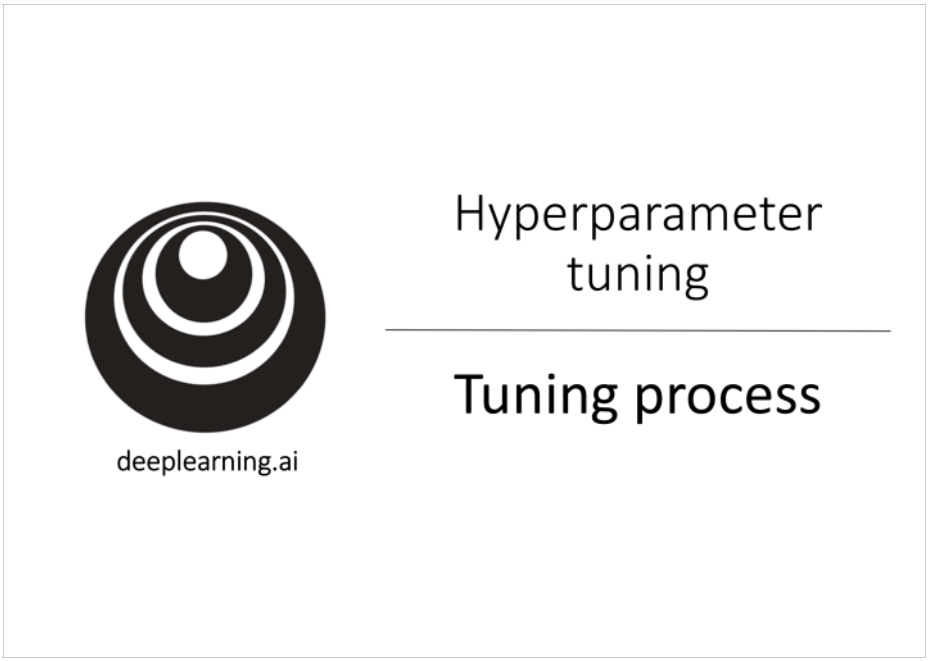
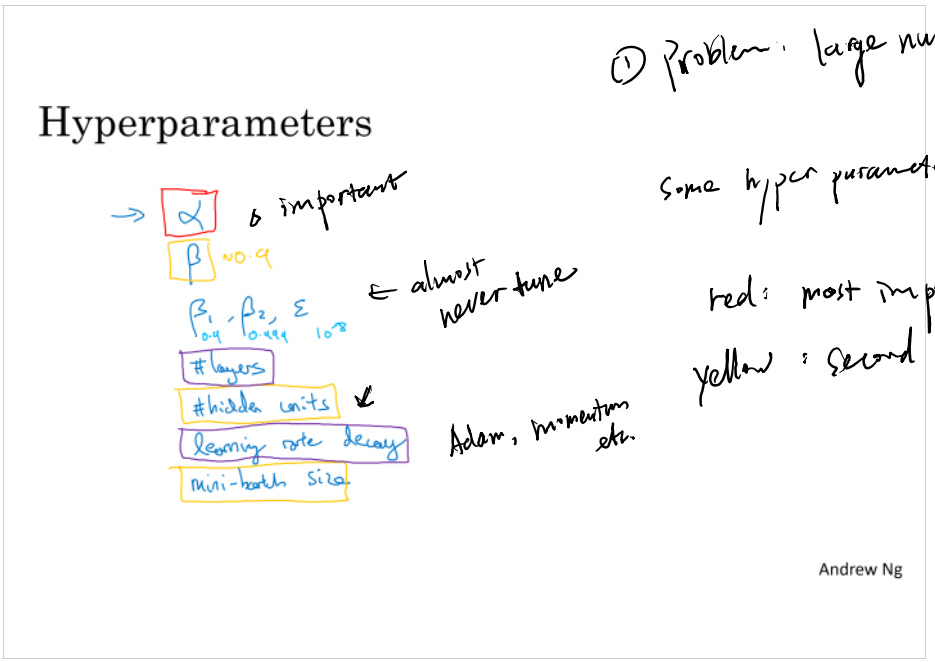
Tuning Hyper Parameters

Monday, June 4, 2018 9:08 PM

tuning1





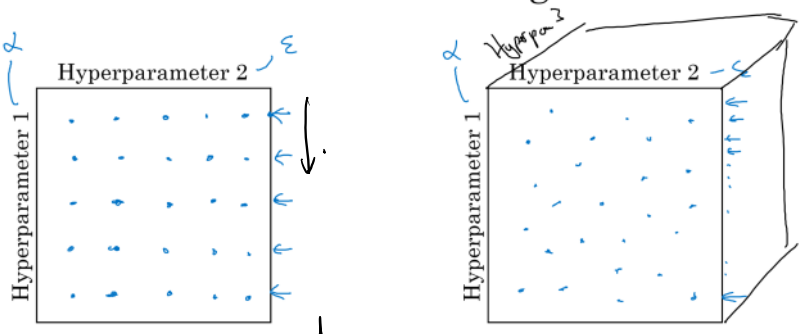
① Problem: large number of parameters.

Some hyper parameters are more important than others

red: most important

yellow: second important.

Try random values: Don't use a grid



previous: sample from a grid
ex. 25 points ⇒ pick whichever works best.

Δ DL choose the points at random.

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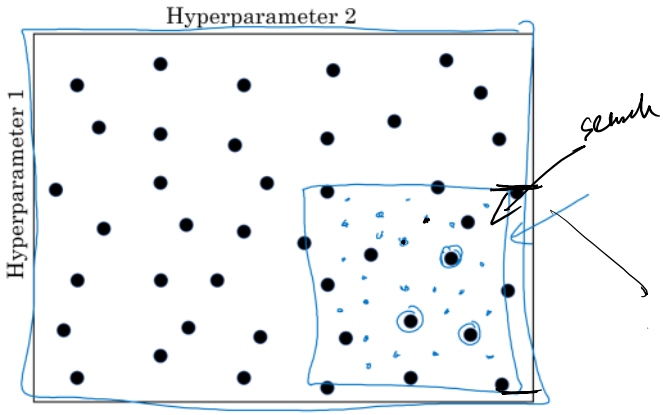
Coarse to fine



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Sometimes it's hard to know which hyperparameter is more important

ZOOM IN, sample more densely in some area you suspect to contain the optimal hyperparam.

TAKE AWAY: ① Don't search by grid — use random search
② Coarsed define searching

tuning2

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Hyperparameter tuning

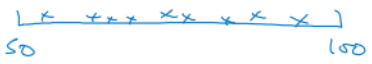
Using an appropriate scale to pick hyperparameters

Not searching randomly uniformly

pick the scale!

Picking hyperparameters at random

→ $n^{[l]}$ = 50, ..., 100



→ #layers L: 2 – 4

2, 3, 4

Scale easier to choose for these hyperparam

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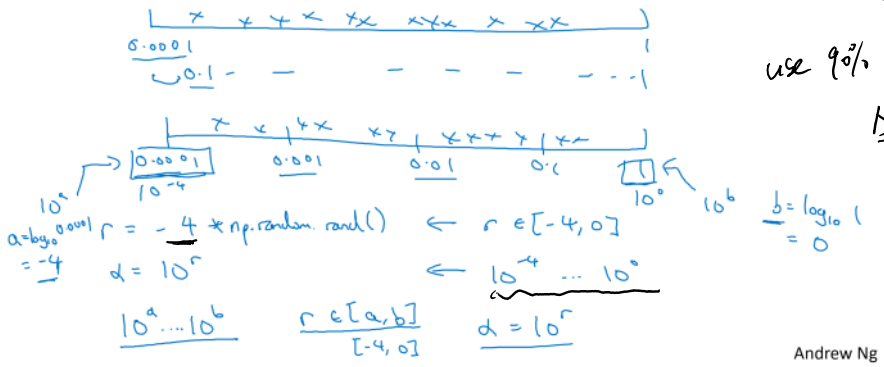
Appropriate scale for hyperparameters

$\alpha = 0.0001 \ldots, 1$



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How to 取值? 在 [Xmin, Xmax]

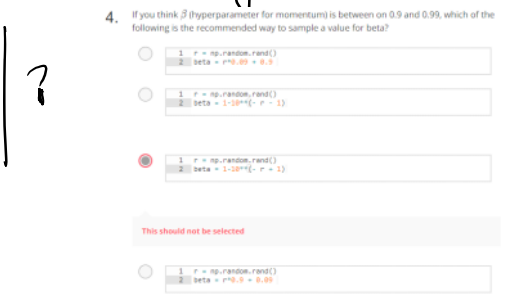
[log Xmin, log Xmax]

⇒ take random sample ⇒ take exp of the sample

use 90% resource to search between 0.1 to 1.

Not good.

What should do: log scale ?



Hyperparameters for exponentially weighted averages

$\beta = 0.9 \ldots 0.999$

10 1000

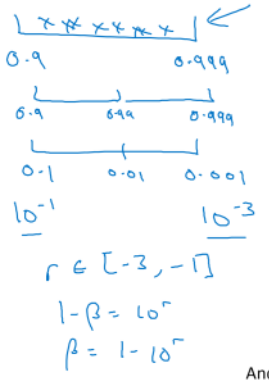
$1-\beta = 0.1 \ldots 0.001$

β: 0.9000 → 0.9005 } ≈10

β: 0.999 → 0.9995

≈1000 ≈2000

$\frac{1}{1-\beta}$



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β 越接近 1 sensitive 越高 β → 0.999.

⇒ 取 1-β.

Why bad idea to sample linearly.

when beta close to 1.

e.g. 0.999 → 0.9995, the model is sensitive to the small change of β

⇒ So. we want to sample densely for β close to 1, because in that area, small β change makes big difference

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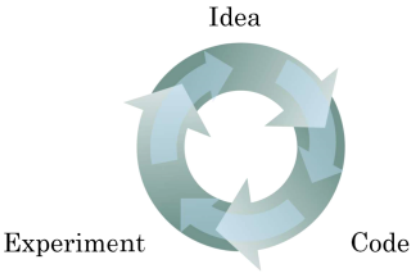
Hyperparameters tuning

Hyperparameters tuning in practice: Pandas vs. Caviar

Re-test hyperparameters occasionally



- NLP, Vision, Speech, Ads, logistics, ...
- Intuitions do get stale. Re-evaluate occasionally.

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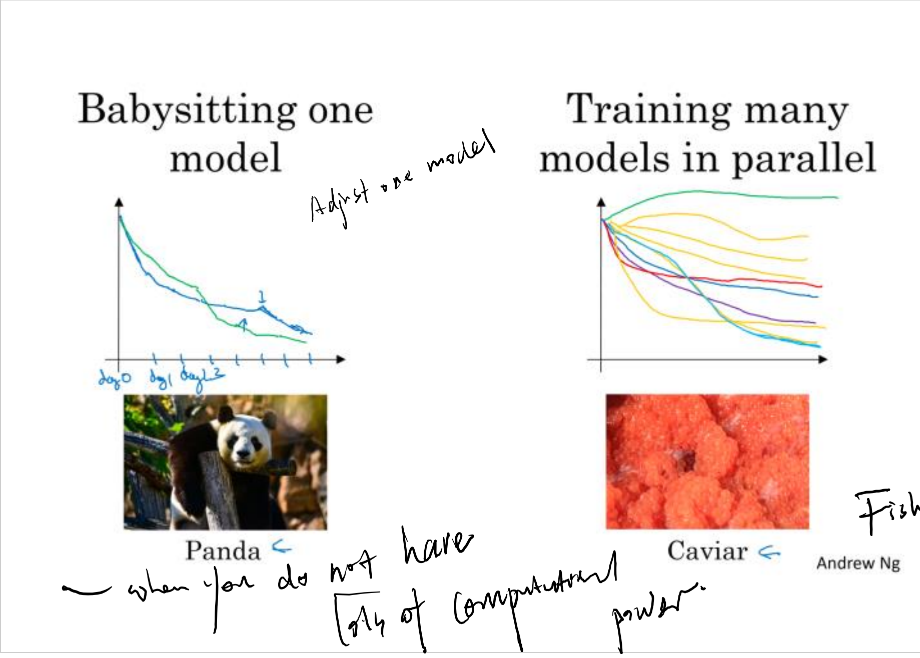
- People from different domains read works of those from other domains.
- Models developed in one domain work in other domains.



努力调一个模型
细致地调参.

⇕

同时调不同模型.

A function of computational resources

Fish ... — lots of computational power. Caviar

— many data, limited computational power

Panda!

e.g. online advertisement.

Another way to make your DL model more robust

⇓.