Mismatched training
and dev/test data

Bias and Variance with
mismatched data
distributions

deeplearning.ai

Cat classifier example

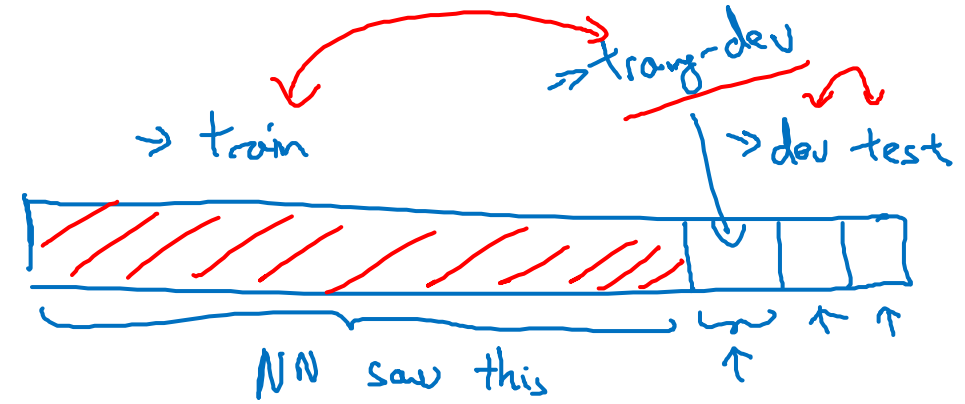Assume humans get ≈ 0% error.

Training error ····· 1% $\downarrow 9\%$
Dev error ······ ··· 10%

Two thing changed at a time.
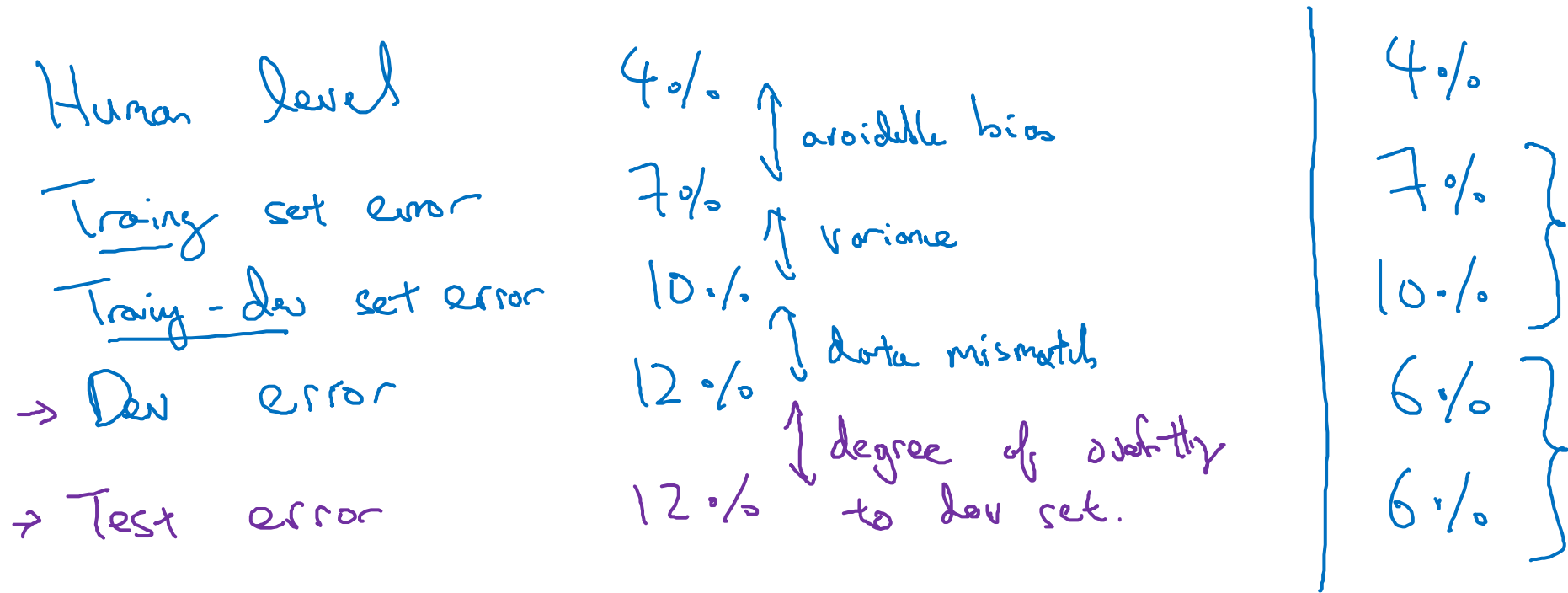One is that the algorithm saw data in the training set but not in the dev set.
Two the distribution of data in the dev set is different.

Training-dev set: Same distribution as training set, but not used for training

→ train   →train-dev →dev test

NN saw this

Training error	1% ↑	1% ↑
→ Train-dev error	9% ↓ Variance	1.5% ↑ data
→ Dev error	10%	10% ↓ mismatch

Variance

Human error ·····	0% ↑ Avoidable		↓ Avoidable bias
Training error	10% ↓ bias	10% ↑
Train-dev error	11%	11% ↓ Variance
Dev error	12%	20% ↑ Data mismatch
	Bias	Bias + Data mismatch

a large bias or avoidable bias problem as well as data mismatch

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Bias/variance on mismatched training and dev/test sets

Human level   4%   ⎱ avoidable bias   4%

<u>Traing</u> set error   7%   ⎱ variance   7% ⎱

<u>Traing - dev</u> set error   10%   ⎱ data mismatch   10% ⎰

→ Dev error   12%   ⎱ degree of overfitting   6% ⎱

→ Test error   12%   to dev set.   6% ⎰

More general formulation

Rearview Mirror

	General speech recognition	Rearview mirror speech data
Human level	"Human level" 4%	6%
Error on examples trained on	"Training error" 7%	6%
Error on examples not trained on	"Training-dev error" 10%	Dev/Test error 6%

Avoidable bias

Variance

data mismatch

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