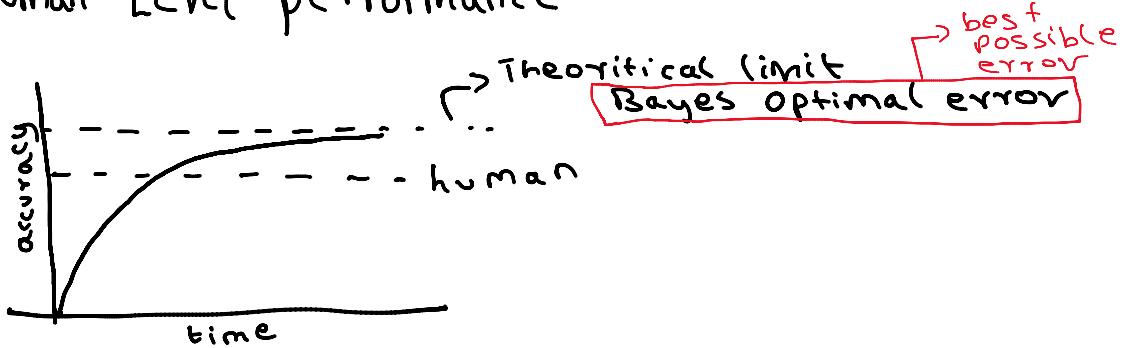


Comparing to human-level performance

Tuesday, September 1, 2020 9:22 PM

① Why Human Level performance



- Progress often slows down after reaching human level error
 - People are mostly close to bayesian error
 - No more effective tools after surpassing humans
- As long as model is worse than humans, we can
 - Get data from humans (labelled)
 - Gain insight from manual error analysis

② Avoidance bias

	Case 1	Case 2
Humans	1%	7.5%
Training error	8%	8%
Dev error	10%	10%

Focus on improving bias Focus on improving variance

not much headroom to improve without overfitting

available bias

- Human-level error can be a proxy for bayes error (assume they're pretty close)

③ Understanding human level performance

Human-level error as a proxy for Bayes error

Medical image classification example:



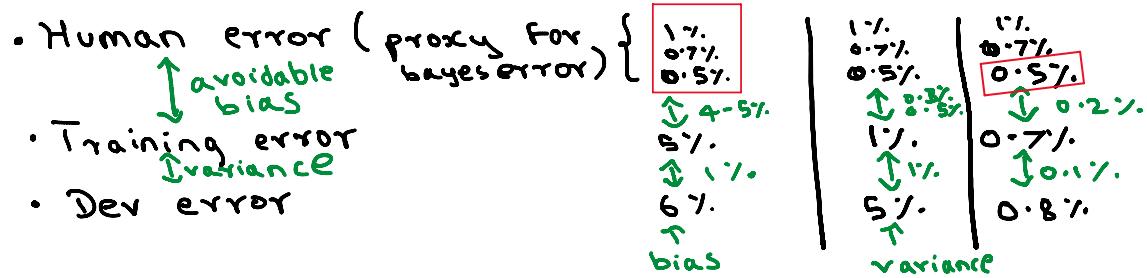
Suppose:

- (a) Typical human 3 % error
 - (b) Typical doctor 1 % error
 - (c) Experienced doctor 0.7 % error
 - (d) Team of experienced doctors .. 0.5 % error
- Baye error $\leq 0.5\%$

What is "human-level" error?

Andrew Ng

→ Error Analysis Example



④ Surpassing Human Level Performance

→ Problems where ML significantly surpasses human level performance

- Online advertising
 - Product recommendations
 - Logistics (predicting transit time)
 - Loan approvals
- } structured data tasks with a lot of data

→ Natural perception tasks are harder to surpass for ML
eg: Computer vision

→ Some cases even Natural perception tasks surpass human level performance
eg: speech recognition (some cases), Medical field (ECG & scans)

⑤ Improving your model performance

→ Two fundamental assumptions of supervised learning

- Two fundamental assumptions of supervised learning
1. You can fit the training set pretty well
 2. The training set performance generalizes pretty well to dev/test data

→ Reducing (avoidable) bias and variance

Reducing (avoidable) bias and variance

