Final Exam:
- Similar to midterm
- Cumulative
- 2pm-4pm (class exam room at that time to answer questions)
- Exam posted at 12:01 am
- Accept submissions with no penalty until 11:59 pm.
How can we ensure that a model is safe to use?

Idea: Make sure loss is small.

$$\ell(W_k) = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2$$

Problem: False negative worse than false pos.

Soln: Change objective to place different weights on different kinds of errors.

e.g. $\sum_{i=1}^{n} 10 \mathbb{1}_{y_i = \text{malignant}} + 1 \mathbb{1}_{y_i = \text{benign}}$,

$$1_A = \begin{cases} 1 & \text{if } A \text{ is true} \\ 0 & \text{o otherwise} \end{cases}$$
Problem: \[ Y \rightarrow \text{LS fit.} \]

- Loss \( L(w_k) = 0 \) ⇒ perfect model?
- No- “overfit” to training data.
- Issue even with lots of data.

Idea: Split data into two sets.
- Training data: train model / learn weights
- Test data: used to check accuracy/performance after training.
Idea: Stop training when loss on test set increases.

Problem: You are using test data as part of model-training procedure! No longer have independent unbiased estimate of loss if model were to be used.
Solution:

Train
Used to train a model.

Validation
Used to set hyper-parameters, like when to stop training.

- Can be reshuffled.
- Leave one-out cross-validation.

Testing
Used to test accuracy of final model. (Never used when training model.)