CS 474/574 Machine Learning
1. HW1

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Warm Up

- $F = m \cdot a$
- $E = m \cdot c^2$
- $\mathcal{O}(n \cdot log(n))$

1. Supervised
2. Unsupervised
3. Reinforcement

1x5

BONUS - Slide Show

The following url will take you to my Slideous Slide Show:
https://joshua-slagle.github.io/ComS474-HW1/

Supervised ML

- Given many pairs of inputs and outputs: $\{(\mathbf{X_1}, \mathbf{y_1}), (\mathbf{X_2}, \mathbf{y_2}), \ldots, (\mathbf{X_N}, \mathbf{y_N})\}$,
- that underline a "black-box" function $f : \mathbb{R}^n \mapsto \mathbb{R}^m$ such that $\forall i \in [1..n], f(\mathbf{X}_i) = \mathbf{y}_i$,
- construct a function $\hat{f}$ that approximates the function f.
- "approximate": usually $\min ||\hat{f}(x) - f(x)||^p$ where p is usually 1 or 2. See ℓ_p-norm .
- The process of finding the approximation function $\hat{f}$ is called **training** or **learning**.
- $\hat{f}$ is called a **model** or an **estimator**.
- $\mathbf{X_i}$: an **input** (especially when raw data is used as the input) or **feature vector** (if using feature engineering).
- $\mathbf{y_i}$, often $\in \mathbb{R}^1$ a **label** (in classification) or **target** (used more generally and lately).
- Classification vs. Regression: When y is continuous or discrete. In modern DL context, such division is usually no mentioned, expecially in generative tasks.