Math 342W/642/742W

Recitation – Day #3 (2.6.25)

I. Nomenclature/Terminology Review

Provide the definition/description for each of the symbols seen below.

- $z_1, \ldots, z_t$:
- t:
- $x_1, \ldots, x_p$:
- n:
- p:
- f:
- $\mathbb{D}$:
- $\mathcal{H}$:
- h^*:
- $\mathcal{A}$:
- g:
- g_0:
- X:
- $\mathcal{X}$:
- $x_{\cdot 1}, \ldots, x_{\cdot p}$:
- $x_{1\cdot}, \ldots, x_{n\cdot}$:
- y:
- $\boldsymbol{y}$:
- $\mathcal{Y}$:
- $\mathbb{1}_a$:
- $\boldsymbol{w}$:

II. Three Ingredients of Supervised Learning

(i) List the **three** ingredients that comprises *supervised learning*.

(ii) Draw a schematic diagram/visual of this learning process.

III. Types of Errors

List and mathematically express the **errors** we take into account in *supervised learning*.

IV. The Perceptron Learning Algorithm (PLA)

(i) Who is credited for being the first to successfully implement the *perceptron* and when/where was it developed?

(ii) What is the underlying assumption in order to successfully implement PLA?

(iii) What are the steps/components to PLA and what is the desired result?

(iv) What are the limitiations/drawbacks of PLA?

Notable Publications on PLA: (1) "New Navy Device Learns By Doing", *New York Times* (1958), (2) "Rival", *The New Yorker* (1958), (3) "The Design of an Intelligent Automaton", *Research Trends* (1958)