Introduction to Machine Learning
CSE474/574: Lecture 1

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Outline

1. Warmup

2. Human Learning

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2. Human Learning

Warmup Exercise

A fair coin

- Probability of heads?
- 5 heads in a row?
- 5th head after seen 4 heads in a row?
- *Gambler's Fallacy*
- *If I know that probability of two people bringing a bomb on a plane is very low, should I bring a bomb along to make myself safer?*
- *Inverse Gambler's Fallacy*

Matrix Vector Products

- Let $[3, 4]$ denote a vector in a 2D space
- Multiply with a number?

$$2 \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

- Multiply with a matrix?

$$\begin{bmatrix} 2 & 1 \\ -2 & 3 \end{bmatrix} \begin{bmatrix} 3 \\ 4 \end{bmatrix}$$

- For a matrix, find a vector such that matrix-vector product $\equiv$ scalar-vector product.

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Human Learning?

- What do we learn?
    - Concepts (this is a chair, that is not a chair)
    - Distinguishing concepts (this is a chair, that is a table)
    - Other things (language, juggling, using a remote)
- How do we learn?
    1. Teaching (Passive).
    2. Experience (Active).
        1. Examples.
        2. Queries.
        3. Experimentation.

Malignant vs. Benign Tumor

Malignant vs. Benign Tumor

Malicious

Malicious

Benign

Malicious

- A large irregularly shaped dark reddish blob.
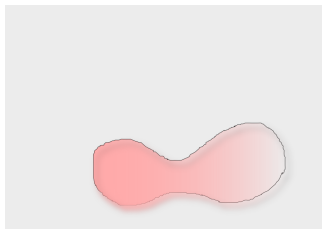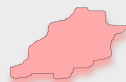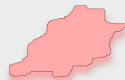
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