Thanksgiving
Inductive learning method

- Construct/adjust \( h \) to agree with \( f \) on training set
- \((h \text{ is consistent if it agrees with } f \text{ on all examples})\)

- E.g., curve fitting:

![Graph showing curve fitting](image)
Inductive learning method

• Construct/adjust $h$ to agree with $f$ on training set
• ($h$ is consistent if it agrees with $f$ on all examples)
•
• E.g., curve fitting:

![Diagram of curve fitting]

$f(x)$

$x$
Inductive learning method

- Construct/adjust $h$ to agree with $f$ on training set
  - ($h$ is consistent if it agrees with $f$ on all examples)
- E.g., curve fitting:
Inductive learning method

- Construct/adjust $h$ to agree with $f$ on training set
- ($h$ is consistent if it agrees with $f$ on all examples)
- 
- E.g., curve fitting:
Inductive learning method

- Construct/adjust $h$ to agree with $f$ on training set
- ($h$ is consistent if it agrees with $f$ on all examples)

- E.g., curve fitting:
Inductive learning method

- Construct/adjust $h$ to agree with $f$ on training set
- ($h$ is consistent if it agrees with $f$ on all examples)
- E.g., curve fitting:
- Ockham’s razor: prefer the simplest hypothesis consistent with data
Learning: Binary Perceptron

• Start with weights = 0
• For each training instance:
  – Classify with current weights
    \[ y = \begin{cases} +1 & \text{if } w \cdot f(x) \geq 0 \\ -1 & \text{if } w \cdot f(x) < 0 \end{cases} \]
  – If correct (i.e., y=y*), no change!
  – If wrong: adjust the weight vector by adding or subtracting the feature vector. Subtract if y* is -1.
    \[ w = w + y^* \cdot f \]

Demo:
Review

- Output space for AND gate

\[ 1.5 = w_1 I_1 + w_2 I_2 \]
Review

- Output space for XOR gate
- Demonstrates need for hidden layer