Decision Trees
(Part I)
Big Ideas

1. How to formalize a learning problem
2. How to learn an expert system (i.e. Decision Tree)
3. Importance of inductive bias for generalization
4. Overfitting
FUNCTION APPROXIMATION
Function Approximation

**Quiz:** Implement a simple function which returns sin(x).

A few constraints are imposed:

1. You can’t call any other trigonometric functions
2. You *can* call an existing implementation of sin(x) a few times (e.g. 100) to test your solution
3. You only need to evaluate it for x in [0, 2*pi]
Medical Diagnosis

- Setting:
  - Doctor must decide whether or not to prescribe a treatment
  - Looks at attributes of a patient to make a medical diagnosis
  - Prescribes treatment if diagnosis is positive
- Key problem area for Machine Learning
- Potential to reshape health care
ML as Function Approximation

Chalkboard

– ML as Function Approximation
  • Problem setting
  • Input space
  • Output space
  • Unknown target function
  • Hypothesis space
  • Training examples
DECISION TREES
Decision Trees

Chalkboard

– Example: Medical Diagnosis
– Does memorization = learning?
– Decision Tree as a hypothesis
– Function approximation for DTs