Weekly Report
02/15/2015

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This Week

- Adjust weights by using stochastic gradient descent.

Stochastic Gradient Descent

- Let z=(x,y) be the data input/output pair
- Let loss(ŷ,y) be the loss function
    - In our model, we use least squares function
- Let $f_w(x)$ be the function parameterized by a weight vector w
- We seek the function $f_w(x)$ that minimizes loss($f_w(x)$,y) on the sample

Stochastic Gradient Descent

- At first, let w_0 = [1/n, 1/n, …] where n is the number of trees
- For each sample $z_t = (x_t, y_t)$ in the new coming data, update weights vector:
  - $w_{t+1} = w_t - \alpha \nabla_w \text{loss}(f_w(x_t), y_t)$
  - $w_{t+1} = w_t + 2\alpha (y_t - f_w(x_t)) [g(x_t) \cdot w_t]$
    - $g(x_t)$ is the vector consisting of outputs from each tree

Functions

- update(X, y, alpha)
    - X is the data input
    - y is the data output
    - alpha is the constant learning rate
    - this function iterates each data point and adjusts the weight vector by stochastic gradient descent method.

Next Step

- Test the synthetical data