

Coming Face-to-Face with Backpropagation of Errors

Alexander G. Ororbia II Introduction to Machine Learning CSCI-635 11/20/2023

Background

A Recipe for Machine Learning

- 1. Given training data: $\{m{x}_i,m{y}_i\}_{i=1}^N$
- 2. Choose each of these:
 - Decision function

$$\hat{\boldsymbol{y}} = f_{\boldsymbol{\theta}}(\boldsymbol{x}_i)$$

Loss function

 $\ell(\hat{oldsymbol{y}},oldsymbol{y}_i)\in\mathbb{R}$

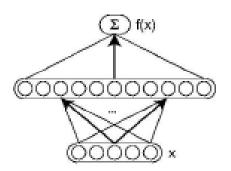
3. Define goal:

$$oldsymbol{ heta}^* = rg\min_{oldsymbol{ heta}} \sum_{i=1}^N \ell(f_{oldsymbol{ heta}}(oldsymbol{x}_i), oldsymbol{y}_i)$$

4. Train with SGD:(take small steps opposite the gradient)

 $\boldsymbol{\theta}^{(t+1)} = \boldsymbol{\theta}^{(t)} - \eta_t \nabla \ell(f_{\boldsymbol{\theta}}(\boldsymbol{x}_i), \boldsymbol{y}_i)$

White Board Time! (Backprop & Computational Graphs)





QUESTIONS?

