

Tensorflow Poisson

The data provided for the homework is generated by a Poisson regression model. In particular, there is an unknown parameter vector \vec{w} and for each row there is an unknown poisson mean given by a product of the vector and the data (along with a bias term):

$$\lambda_i = \exp(w_1 \cdot x_1 + \dots + w_5 \cdot x_5 + w_6).$$

The labels y_i are generated according to a poisson random variable with that mean:

$$y_i \sim \text{Pois}(\lambda_i)$$

The likelihood (probability of observing the data given \vec{w}) is then,

$$\prod_{i=1}^N \frac{\exp(-\lambda_i) \lambda_i^{y_i}}{y_i!}$$

and the log-likelihood is (neglecting terms that don't involve \vec{w}),

$$\sum_{i=1}^N [y_i(w_1 \cdot x_1 + \dots + w_5 \cdot x_5 + w_6) - \lambda_i]$$

Use tensorflow and stochastic gradient descent to find the optimal vector \vec{w} .