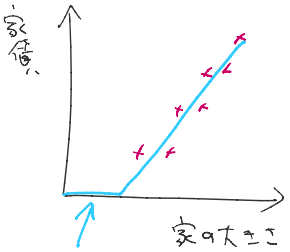
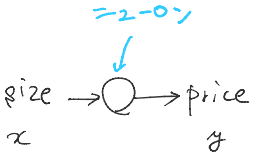
Course1 NN and DL

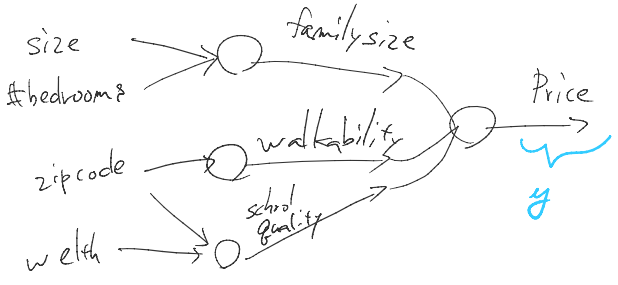
2019年12月4日　23:52

家賃予測



ニューロン

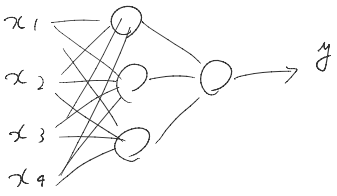




ReLU

Rectified Linear Unit

= max(0, val)



教師あり学習

CNN：画像

RNN：時系列、音声など

構造化データ：テーブル

非：音声 画像、Text

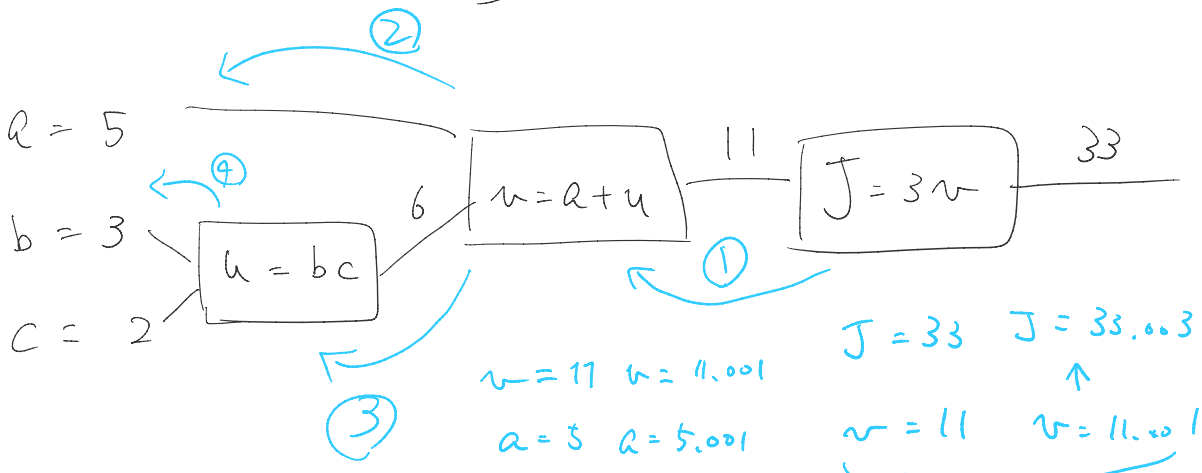
week1 ここまで

Computation Graph

$J(a,b,c) = 3(a+bc)$

$u = bc$

$v = a + u$



$v = 11 \quad v = 11.001$

$a = 5 \quad a = 5.001$

$J = 33 \quad J = 33.003$

$\frac{dJ}{da} = 3 = \frac{dJ}{dv}\frac{dv}{da}$

$\frac{dv}{da} = 1$ (2)

$J = 33 \quad J = 33.003$

$v = 11 \quad v = 11.001$

$\frac{dJ}{dv} = 3$ (1)

$v = 11 \quad v = 11.001$

$u = 6 \quad u = 6.001$

$J = 33 \quad J = 33.003$

$\frac{dJ}{da} = 3 = \frac{dJ}{dv}\frac{dv}{du}$ (3)

$\frac{dv}{du} = 1$

$u = 6 \quad u = 6.002$

$b = 3 \quad b = 3.001$

$v = 11 \quad v = 11.002$

$J = 33 \quad J = 33.006$

(4)

$\frac{du}{db} = 2$

$\frac{dv}{db} = \frac{dv}{du}\frac{du}{db} = 2$

$\frac{dJ}{db} = \frac{dJ}{dv}\frac{dv}{db} = 6$

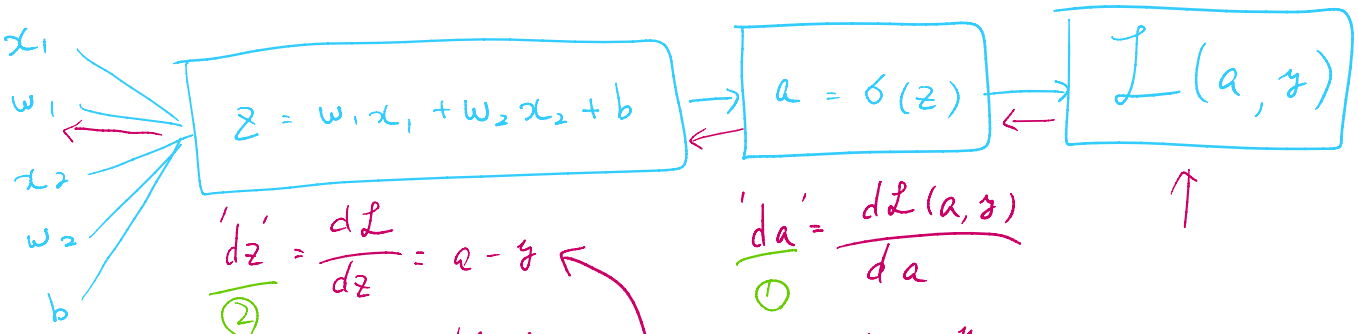
Logistic Regression

$z = w^T x + b$

$$z = w^T x + b$$

$$\hat{y} = \sigma(z) = a$$

$$\mathcal{L}(a, y) = -\left(y \log(\hat{y}) + (1-y)\log(1-\hat{y})\right)$$



$$'da' = \frac{d\mathcal{L}(a,y)}{da} \quad ①$$

$$= -\frac{y}{a} + \frac{y}{1-a}$$

$$'dz' = \frac{d\mathcal{L}}{dz} \quad ②$$

$$= \frac{d\mathcal{L}}{da}\frac{da}{dz}$$

$$= \left(-\frac{y}{a} + \frac{y}{1-a}\right) \cdot a(1-a)$$

$$= a - y$$

$$'dw_1' = \frac{\partial \mathcal{L}}{\partial w_1} = x_1 dz$$

$$'dw_2' = \frac{\partial \mathcal{L}}{\partial w_2} = x_2 dz$$

$$'db' = dz \quad ③$$

Repeat

$$\begin{cases} w_1 := w_1 - \alpha \frac{\partial \mathcal{L}}{\partial w_1} \\ w_2 := w_2 - \alpha \frac{\partial \mathcal{L}}{\partial w_2} \\ b := b - \alpha \frac{\partial \mathcal{L}}{\partial b} \end{cases}$$