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ElasticNet Regression

- it is the combination of Ridge Regression and lasso Regression.

$$L = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2 + \lambda \|w\|^2$$

Ridge Regression

$$\lambda(w_1^2 + w_2^2 + \dots w_n^2)$$

- here $\lambda \uparrow$ then w approaches 0
- here all column are important.

$$L = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2 + \lambda \|w\|$$

lasso Regression.

$$\lambda(|w_1| + |w_2| + |w_3| + \dots |w_n|)$$

- here $\lambda \uparrow$ then some w become zero.
- here may be all columns are not important

- elasticNet Regression use when we can't predict which is we use lasso or Ridge.
- here loss function for ElasticNet is:

$$L = \sum (y_i - \hat{y}_i)^2 + a\|w\|^2 + b\|w\|$$

in Scikilcam $\lambda = a + b$

$$l1\text{-ratio} = \frac{a}{a+b} \quad \& \quad l1 = \frac{a}{\lambda}$$

Default value $\lambda = 1$ and $l1\text{-ratio} = 0.5$

hence $a = 0.5$ and $b = 0.5$

$l1$-ratio = 0.9 means 90% Ridge and 10% lasso

- if n input column multi-colinearity. then here use elasticNet