

当参数有成千上万个时，可以使用Elastic Net Regression

Just like **Lasso** and **Ridge Regression**, **Elastic-Net Regression** starts with **Least Squares**...



the sum of the squared residuals

+

Lasso Regression Penalty

$\lambda_1 \times |\text{variable}_1| + \dots + |\text{variable}_x|$

+

Ridge Regression Penalty

$\lambda_2 \times \text{variable}_1^2 + \dots + \text{variable}_x^2$

注意，有两个不同的 $\lambda$ 。当 $\lambda_1$ 等于0， $\lambda_2$ 大于0时，就是ridge regression。反之为lasso regression。当 $\lambda_1$ 和 $\lambda_2$ 都等于0时，就是least square。

Elastic Net Regression的优点：

The hybrid **Elastic-Net Regression** is especially good at dealing with situations when there are correlations between parameters.

the sum of the squared residuals

+

$\lambda_1 \times |\text{variable}_1| + \dots + |\text{variable}_x|$

+

$\lambda_2 \times \text{variable}_1^2 + \dots + \text{variable}_x^2$

原因：

This is because on it's own, **Lasso Regression** tends to pick just one of the correlated terms and eliminates the others...

the sum of the squared residuals

+

$\lambda_1 \times |\text{variable}_1| + \dots + |\text{variable}_x|$

...whereas **Ridge Regression** tends to shrink all of the parameters for the correlated variables together.

the sum of the squared residuals

+

$\lambda_2 \times \text{variable}_1^2 + \dots + \text{variable}_x^2$