L1 Regularization (Lasso) vs. L2 Regularization (Ridge)

Aspect	L1 (Lasso)	L2 (Ridge)
Penalty Type	Adds a penalty based on the **absolute** values of the weights	Adds a penalty based on the **squared** values of the weights
Effect on Weights	Makes some weights **zero** (removes features)	Shrinks the weights but **keeps** them
Feature Selection	**Removes** unnecessary features	**Keeps** all features but reduces their impact
Use Case	Best when you want to **remove** unimportant features	Best when you want to **reduce** the effect of all features
Overfitting	Helps prevent overfitting by **removing** irrelevant features	Prevents overfitting by **shrinking** weights

Key Differences

- **Feature Removal**:
  - **L1 (Lasso)** can **remove** unimportant features entirely by making their weights zero.
  - **L2 (Ridge)** keeps all features but **shrinks** their weights, making them less impactful.
- **When to Use**:
  - **Use L1** when you think some features are **unimportant** and want to get rid of them.
  - **Use L2** when all features are important but you want to **reduce their influence** to avoid overfitting.

In Summary

- **L1 (Lasso)** is like selecting only the most important ingredients for a recipe.
- **L2 (Ridge)** is like balancing the size of all ingredients so none of them dominates the recipe.

Both methods help your model avoid overfitting, but in different ways!