**What is GridSearchCV and RandomizedSearchCV?**

**GridSearchCV** is suitable when you have a reasonably small set of hyperparameters to tune and you want to explore all possible combinations.

**RandomizedSearchCV** is an alternative to GridSearchCV. It is particularly useful when the hyperparameter space is extensive and searching all possible combinations would be time-consuming and resource-intensive.

**Why there is RCV when GSCV is already there?**

**RandomizedSearchCV** is advantageous when the hyperparameter space is extensive, and you want to quickly explore a subset of hyperparameter combinations efficiently. It's a more practical choice for high-dimensional spaces. On the other hand, **GridSearchCV** is suitable when you have a relatively small hyperparameter space and want to explore all possibilities. It provides an exhaustive search but can be computationally expensive when the hyperparameter space is large.

**When to Use What CV?**

* **GridSearchCV**: when you have a small hyperparameter space or when you want to perform an exhaustive search to ensure that no combination is missed. It's suitable for fine-tuning hyperparameters.
* **RandomizedSearchCV**: when the hyperparameter space is large, and you want to sample a subset of combinations efficiently. It's an excellent choice for an initial exploration of hyperparameters or when computational resources are limited.

**Can we use it together? If yes, in what order or in no order?**

Yes, you can use GridSearchCV and RandomizedSearchCV together in a hyperparameter tuning workflow, but the order in which you use them matters. Using them together allows you to strike a balance between efficient exploration and fine-tuning of hyperparameters

**Order:**

You can start with a **RandomizedSearchCV** to quickly explore a wide range of hyperparameter combinations. Once you have identified promising hyperparameters or a narrower search space, you can follow it up with a more fine-grained search using **GridSearchCV**.

**In No Order:**

You can run **RandomizedSearchCV** and **GridSearchCV** in parallel with different sets of hyperparameter combinations. This can help you explore a wide range of possibilities efficiently. However, it requires more computational resources.