C what is stratification in machine learning k nearest neighbor algorithm?

In the K-nearest neighbor (KNN) algorithm, stratification is the process of dividing the data into groups or folds such that each group or fold has a roughly equal distribution of data points with respect to the target variable. This is done to ensure that the training and testing sets are representative of the entire dataset, which can help improve the accuracy of the model.

Stratification is particularly important when the data is imbalanced, meaning that one class (e.g. positive or negative examples) is much more prevalent than the other. Without stratification, the training and testing sets may be disproportionately skewed towards one class, which can lead to poor performance on the other class. Stratification helps to mitigate this issue by ensuring that each fold has a balanced distribution of data points from each class.

To stratify the data in KNN, you can use the `stratify` parameter in scikit-learn's `KFold` or `StratifiedKFold` cross-validation functions. These functions allow you to specify the target variable and will automatically stratify the data according to its distribution.

For example, the following code demonstrates how to use `StratifiedKFold` to split a dataset into 5 folds with stratification:

Copy code

```
from sklearn.model_selection import StratifiedKFold

X = ... # input data
```

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```
for train_index, test_index in skf.split(X, y):
    X_train, X_test = X[train_index], X[test_index]
    y_train, y_test = y[train_index], y[test_index]

    # fit model and make predictions on test set
```

I hope this helps! Let me know if you have any questions.

C why do we stratify when we use train test split ?

Stratification is used in train/test split to ensure that the training and testing sets are representative of the entire dataset. This is especially important when the data is imbalanced, meaning that one class (e.g. positive or negative examples) is much more prevalent than the other. Without stratification, the training and testing sets may be disproportionately skewed towards one class, which can lead to poor performance on the other class. Stratification helps to mitigate this issue by ensuring that each fold has a balanced distribution of data points from each class.

For example, suppose you have a dataset with 100 data points, 90 of which belong to class 0 and 10 of which belong to class 1. W possible that the training set might contain only a few (or even n ples, which could lead to poor

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each class.

To stratify the data in a train/test split, you can use the `stratify` parameter in scikit-learn's `train_test_split` function. This function allows you to specify the target variable and will automatically stratify the data according to its distribution.

For example, the following code demonstrates how to use `train_test_split` to split a dataset into training and testing sets with stratification:

Copy code

```
from sklearn.model_selection import train_test_split

X = ... # input data
y = ... # target variable
```

```
X_train, X_test, y_train, y_test = train_test_split(X, y, stratify=y,
test_size=0.2, random_state=42)
```

I hope this helps! Let me know if you have any questions.

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