The fruit data is stored in the fruit\_data DataFrame, which has the following structure:

| **fruit** | **color** | **diameter** | **weight** |
| --- | --- | --- | --- |
| apple | red | 3 | 150 |
| banana | yellow | 2 | 100 |
| orange | orange | 3 | 125 |
| pear | green | 2 | 95 |
| peach | orange | 3 | 120 |
| kiwi | green | 2 | 90 |
| watermelon | green | 4 | 200 |
| strawberry | red | 1 | 50 |
| raspberry | red | 1 | 55 |
| blueberry | blue | 1 | 60 |
| Zeytuna | green | 2 | 70 |
| mango | orange | 4 | 150 |
| papaya | orange | 4 | 145 |
| pineapple | yellow | 5 | 250 |
| coconut | brown | 5 | 300 |
| durian | brown | 5 | 275 |
| avocado | green | 3 | 115 |
| fig | brown | 2 | 75 |
| guava | green | 2 | 80 |
| lemon | yellow | 3 | 110 |
| lime | green | 2 | 65 |
| pomegranate | red | 4 | 180 |
| tangerine | orange | 2 | 70 |

The fruit characteristics (color, diameter, weight) are extracted from the DataFrame and stored in the X variable, while the fruit labels (fruit type) are stored in the y variable. The data is then standardized using the StandardScaler class, and then the KMeans clustering model is trained on the standardized data. The model is then used to predict the cluster assignments for each fruit, and the fruit labels and

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The silhouette score is a measure of how well each sample has been assigned to its own cluster, with a higher score indicating a better assignment. It ranges from -1 to 1, with values closer to 1 indicating a better assignment. The silhouette\_score function from the sklearn.metrics module is used to calculate the silhouette score for the given data and predictions. You can use this function or any other appropriate performance metric in the evaluate\_model function to evaluate the performance of the model.