

In [1]:

```

1 import pandas as pd
2 from sklearn.model_selection import train_test_split
3 from sklearn.preprocessing import LabelEncoder, StandardScaler
4 df = pd.read_csv("indian_food.csv")
5 df

```

Out[1]:

|     | name           | ingredients                                       | diet       | prep_time | cook_time | flavor_profile | course  | state           |
|-----|----------------|---|------------|-----------|-----------|----------------|---------|-----------------|
| 0   | Balu shahi     | Maida flour, yogurt, oil, sugar                   | vegetarian | 45        | 25        | sweet          | dessert | West Bengal     |
| 1   | Boondi         | Gram flour, ghee, sugar                           | vegetarian | 80        | 30        | sweet          | dessert | Rajasthan       |
| 2   | Gajar ka halwa | Carrots, milk, sugar, ghee, cashews, raisins      | vegetarian | 15        | 60        | sweet          | dessert | Punjab          |
| 3   | Ghevar         | Flour, ghee, kewra, milk, clarified butter, su... | vegetarian | 15        | 30        | sweet          | dessert | Rajasthan       |
| 4   | Gulab jamun    | Milk powder, plain flour, baking powder, ghee,... | vegetarian | 15        | 40        | sweet          | dessert | West Bengal     |
| ... | ...            | ...   | ...        | ...       | ...       | ...            | ...     | ...             |
| 250 | Til Pitha      | Glutinous rice, black sesame seeds, gur           | vegetarian | 5         | 30        | sweet          | dessert | Assam           |
| 251 | Bebinca        | Coconut milk, egg yolks, clarified butter, all... | vegetarian | 20        | 60        | sweet          | dessert | Goa             |
| 252 | Shufta         | Cottage cheese, dry dates, dried rose petals, ... | vegetarian | -1        | -1        | sweet          | dessert | Jammu & Kashmir |
| 253 | Mawa Bati      | Milk powder, dry fruits, arrowroot powder, all... | vegetarian | 20        | 45        | sweet          | dessert | Madhya Pradesh  |
| 254 | Pinaca         | Brown rice, fennel seeds, grated coconut, blac... | vegetarian | -1        | -1        | sweet          | dessert | Goa             |

255 rows × 9 columns



```
In [2]: 1 print(df.head())
```

```
      name ingredients \
0  Balu shahi  Maida flour, yogurt, oil, sugar
1    Boondi  Gram flour, ghee, sugar
2 Gajar ka halwa  Carrots, milk, sugar, ghee, cashews, raisins
3    Ghevar  Flour, ghee, kewra, milk, clarified butter, su...
4  Gulab jamun  Milk powder, plain flour, baking powder, ghee,...

      diet  prep_time  cook_time  flavor_profile  course  state
\
0  vegetarian      45      25      sweet  dessert  West Bengal
1  vegetarian      80      30      sweet  dessert  Rajasthan
2  vegetarian      15      60      sweet  dessert  Punjab
3  vegetarian      15      30      sweet  dessert  Rajasthan
4  vegetarian      15      40      sweet  dessert  West Bengal

      region
0    East
1    West
2  North
3    West
4    East
```

```
In [4]: 1 df.isnull().sum()
        2
        3
```

```
Out[4]: name      0
ingredients  0
diet         0
prep_time    0
cook_time    0
flavor_profile  0
course       0
state        0
region       1
dtype: int64
```

In [6]:

```
1 df['region'].fillna(df['prep_time'].median(), inplace=True)
2 df
```

Out[6]:

|     | name           | ingredients                                       | diet       | prep_time | cook_time | flavor_profile | course  | state           |
|-----|----------------|---|------------|-----------|-----------|----------------|---------|-----------------|
| 0   | Balu shahi     | Maida flour, yogurt, oil, sugar                   | vegetarian | 45        | 25        | sweet          | dessert | West Bengal     |
| 1   | Boondi         | Gram flour, ghee, sugar                           | vegetarian | 80        | 30        | sweet          | dessert | Rajasthan       |
| 2   | Gajar ka halwa | Carrots, milk, sugar, ghee, cashews, raisins      | vegetarian | 15        | 60        | sweet          | dessert | Punjab          |
| 3   | Ghevar         | Flour, ghee, kewra, milk, clarified butter, su... | vegetarian | 15        | 30        | sweet          | dessert | Rajasthan       |
| 4   | Gulab jamun    | Milk powder, plain flour, baking powder, ghee,... | vegetarian | 15        | 40        | sweet          | dessert | West Bengal     |
| ... | ...            | ...   | ...        | ...       | ...       | ...            | ...     | ...             |
| 250 | Til Pitha      | Glutinous rice, black sesame seeds, gur           | vegetarian | 5         | 30        | sweet          | dessert | Assam           |
| 251 | Bebinca        | Coconut milk, egg yolks, clarified butter, all... | vegetarian | 20        | 60        | sweet          | dessert | Goa             |
| 252 | Shufta         | Cottage cheese, dry dates, dried rose petals, ... | vegetarian | -1        | -1        | sweet          | dessert | Jammu & Kashmir |
| 253 | Mawa Bati      | Milk powder, dry fruits, arrowroot powder, all... | vegetarian | 20        | 45        | sweet          | dessert | Madhya Pradesh  |
| 254 | Pinaca         | Brown rice, fennel seeds, grated coconut, blac... | vegetarian | -1        | -1        | sweet          | dessert | Goa             |

255 rows × 9 columns



```
In [7]: 1 df.isnull().sum()
```

```
Out[7]: name          0
         ingredients   0
         diet         0
         prep_time     0
         cook_time     0
         flavor_profile 0
         course        0
         state         0
         region        0
         dtype: int64
```

```
In [12]: 1 label_encoder = LabelEncoder()
2 df['flavor_profile'] = label_encoder.fit_transform(df['flavor_profile'])
3 df['diet'] = label_encoder.fit_transform(df['diet'])
4 X = df[['prep_time', 'cook_time', 'flavor_profile']]
5 y = df['diet']
6 X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3)
7 scaler = StandardScaler()
8 X_train = scaler.fit_transform(X_train)
9 X_test = scaler.transform(X_test)
10 df
```

Out[12]:

|     | name           | ingredients                                       | diet | prep_time | cook_time | flavor_profile | course  | state           | region     |
|-----|----------------|---|------|-----------|-----------|----------------|---------|-----------------|------------|
| 0   | Balu shahi     | Maida flour, yogurt, oil, sugar                   | 1    | 45        | 25        | 4              | dessert | West Bengal     | East       |
| 1   | Boondi         | Gram flour, ghee, sugar                           | 1    | 80        | 30        | 4              | dessert | Rajasthan       | West       |
| 2   | Gajar ka halwa | Carrots, milk, sugar, ghee, cashews, raisins      | 1    | 15        | 60        | 4              | dessert | Punjab          | North      |
| 3   | Ghevar         | Flour, ghee, kewra, milk, clarified butter, su... | 1    | 15        | 30        | 4              | dessert | Rajasthan       | West       |
| 4   | Gulab jamun    | Milk powder, plain flour, baking powder, ghee,... | 1    | 15        | 40        | 4              | dessert | West Bengal     | East       |
| ... | ...            | ...   | ...  | ...       | ...       | ...            | ...     | ...             | ...        |
| 250 | Til Pitha      | Glutinous rice, black sesame seeds, gur           | 1    | 5         | 30        | 4              | dessert | Assam           | North East |
| 251 | Bebinca        | Coconut milk, egg yolks, clarified butter, all... | 1    | 20        | 60        | 4              | dessert | Goa             | West       |
| 252 | Shufta         | Cottage cheese, dry dates, dried rose petals, ... | 1    | -1        | -1        | 4              | dessert | Jammu & Kashmir | North      |
| 253 | Mawa Bati      | Milk powder, dry fruits, arrowroot powder, all... | 1    | 20        | 45        | 4              | dessert | Madhya Pradesh  | Central    |
| 254 | Pinaca         | Brown rice, fennel seeds, grated coconut, blac... | 1    | -1        | -1        | 4              | dessert | Goa             | West       |

255 rows × 9 columns



```
In [20]: 1 # Initialize the KNN classifier using scikit-learn
2 from sklearn.neighbors import KNeighborsClassifier
3 from sklearn.metrics import accuracy_score
4
5 knn = KNeighborsClassifier(n_neighbors=3) # Use k=3
6
7 # Fit the model
8 knn.fit(X_train, y_train)
9
10 # Make predictions
11 y_pred = knn.predict(X_test)
12
13 # Evaluate the model
14 accuracy = accuracy_score(y_test, y_pred)
15 print(f"Accuracy: {accuracy * 100:.2f}%")
```

Accuracy: 88.31%

```
In [ ]: 1
```