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import pandas as pd
from sklearn.linear_model import LogisticRegression
from sklearn.semi_supervised import SelfTrainingClassifier
from sklearn.preprocessing import LabelEncoder
import numpy as np

df = pd.read_csv("titanic.csv")

df = df[["Survived", "Pclass", "Sex", "Age", "Fare"]].dropna()

le = LabelEncoder()
df["Sex"] = le.fit_transform(df["Sex"])

np.random.seed(42)
mask = np.random.rand(len(df)) < 0.5
df.loc[mask, "Survived"] = -1

X = df.drop("Survived", axis=1)
y = df["Survived"]

base_model = LogisticRegression()

self_training_model = SelfTrainingClassifier(base_model,
criterion='k_best')

self_training_model.fit(X, y)

SelfTrainingClassifier(criterion='k_best',
estimator=LogisticRegression())

df["Predicted_Label"] = self_training_model.predict(X)

print(df.head(20))

```

	Survived	Pclass	Sex	Age	Fare	Predicted_Label
0	-1	3	1	34.5	7.8292	0
1	1	3	0	47.0	7.0000	1
2	0	2	1	62.0	9.6875	0
3	0	3	1	27.0	8.6625	0
4	-1	3	0	22.0	12.2875	1
5	-1	3	1	14.0	9.2250	0
6	-1	3	0	30.0	7.6292	1
7	0	2	1	26.0	29.0000	0
8	1	3	0	18.0	7.2292	1
9	0	3	1	21.0	24.1500	0
11	-1	1	1	46.0	26.0000	0
12	1	1	0	23.0	82.2667	1
13	0	2	1	63.0	26.0000	0
14	-1	1	0	47.0	61.1750	1
15	-1	2	0	24.0	27.7208	1
16	-1	2	1	35.0	12.3500	0
17	-1	3	1	21.0	7.2250	0

18	1	3	0	27.0	7.9250	1
19	-1	3	0	45.0	7.2250	1
20	-1	1	1	55.0	59.4000	0