Auto_ML_C 0.0.10

1. Illustrate：

　这是崔连山和小伙伴们的机器学习拓展包，代有浓厚的社会主义开源分享精神，极富创造力和战斗力。在这里让我们为他们鼓掌 👏

1.1 Spend

测试集数据位置：{Example}

配置如下：

	Windows	Windows	MacOS	Linux
型号	i7-9750H	i7-9750H	M1	E5-2640 V4
核心	6核心12线程	6核心12线程	8核心	20核心40线程
频率	2.67GHz	3.2GHz		2.40GHz

运行速度对比结果如下：

未集成	Windows1	Windows2	MacOS	Linux
ALL_FUNCTION	47.364	43.681	34.013	27.282
binary_ROC()	45.809	42.964	32.751	32.143
auto_model()	53.498	48.649	38.267	40.794
estimator_violion()	1.191	1.021	1.678	2.395

集成	Windows1	Windows2	MacOS	Linux
binary_ROC()	46.2 s	43.2 s	CPU times: user 4.82 s, sys: 365 ms, total: 5.18 s Wall time: 32.9s	CPU times: user 9.59 s, sys: 3.89 s, total: 13.5 s Wall time: 33.3 s
auto_model()	50.4 s	47.1 s	CPU times: user 9.75 s, sys: 247 ms, total: 10 s Wall time: 38.1 s	CPU times: user 15.1 s, sys: 1.68 s, total: 16.8 s Wall time: 41.1 s
estimator_violion()	1.16 s	Wall time: 1.01 s	CPU times: user 2.02 s, sys: 70.1 ms, total: 2.09 s Wall time: 1.69 s	CPU times: user 3.85 s, sys: 2.32 s, total: 6.17 s Wall time: 2.23 s

1.2 Request_install

可以参考学习当前目录下的环境备份：Auto_ML_C.yaml

主要是涉及到的软件如下：

Package	最低版本——待检测
python=3.8.10	
seaborn=0.11.2	
pandas=1.3.3	
matplotlib=3.4.2	
numpy=1.20.3	

2. Content:

该包是基于Sklearn，imblance等机器学习拓展包之上的Package，共计划分为两个部分，

- 分类任务
    1. binary_classfication.py

       内部可用函数如下

函数名	功能	返回值
cal_add_1(num1,num2)👌	简单的欢迎函数	num1,num2
LogisticRegressionCV_mdoel(X, Y,cv)		
SGDClassifier_model(X,Y,cv)		
LinearDiscriminantAnalysis_model(X, Y,cv)		
LinearSVC_model(X, Y,cv)		
SVC_model(X, Y,cv)		
DecisionTreeClassifier_model(X,Y,cv)		
AdaBoostClassifier_model(X,Y,cv)		
BaggingClassifier_model(X, Y,cv)		
GradientBoostingClassifier_model(X, Y,cv)		
RandomForestClassifier_model(X, Y,cv)		
KNeighborsClassifier_model(X, Y,cv)		
BernoulliNB_model(X, Y,cv)		
GaussianNB_model(X,Y,cv)		
下面是总函数		
binary_ROC(X,Y,k,fig_name)	绘制标量超参数搜索下最佳的ROC	fig
auto_model(X, Y, k)	模型的标量超参数搜索结果	Auc_data, Acc_data, Recall_data, Precision_data
estimator_violion(df1,df2,fig_name)	为auto_model结果的Dataframe绘制小提琴图	fig

2. 多分类函数

   等待

3. 特征筛选函数Feature_struction

4. waited

3. How to Use

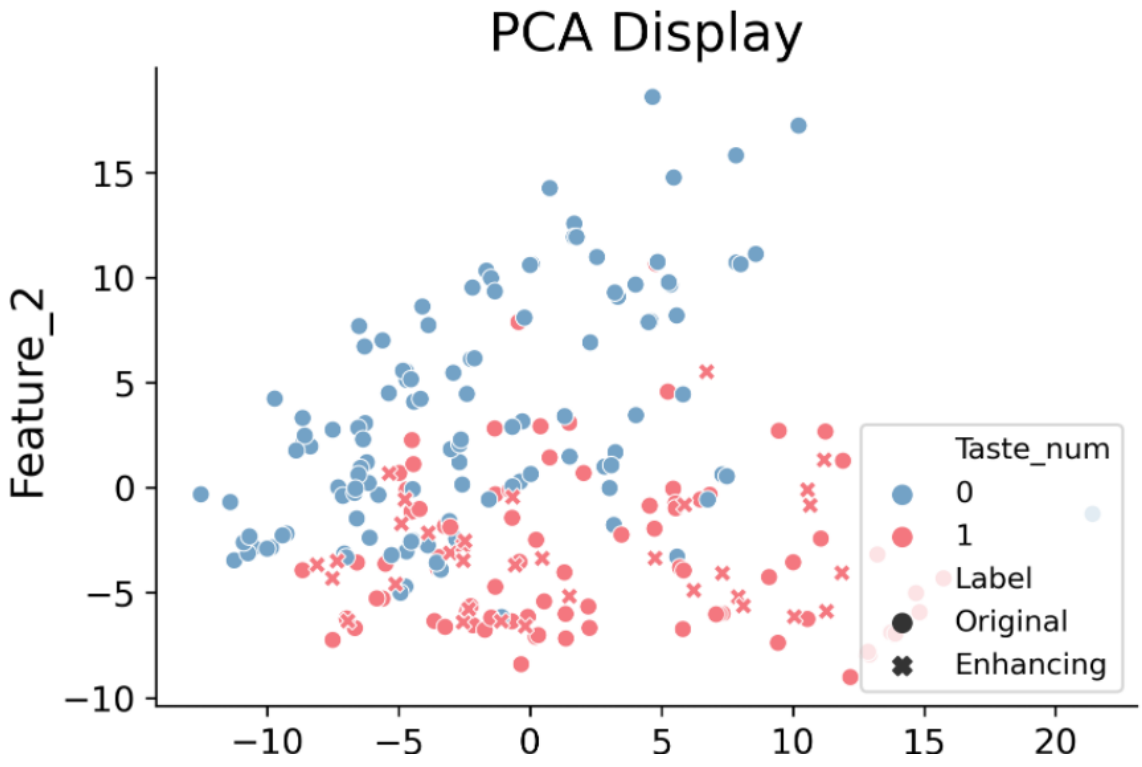
3.1 Installation

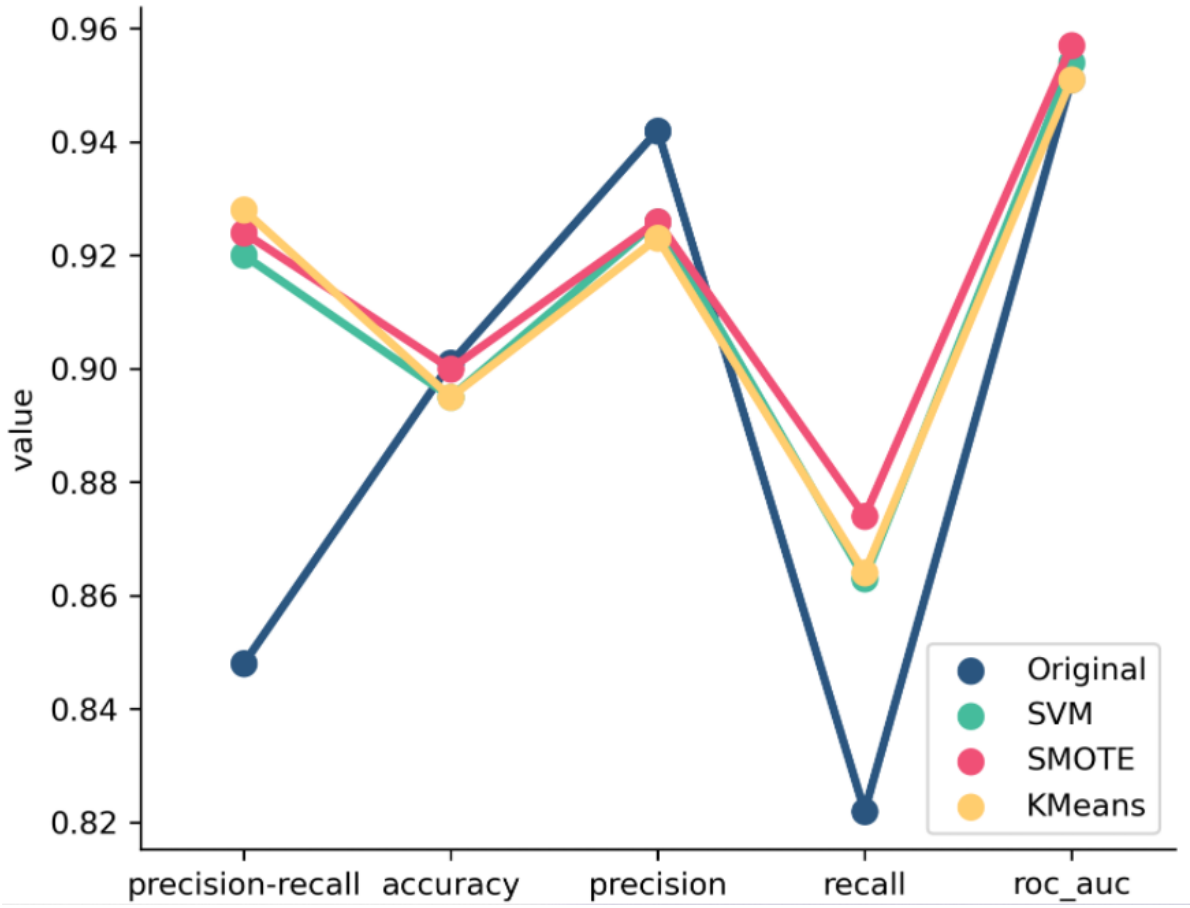
```
# Method 1
# Create a new environment, here is conda as an example
conda create --name Auto_ML_C python=3.8.10

# Activate the newly created environment
conda activate Auto_ML_C

# Installation package
pip install Auto_ML_C==0.0.11
pip install imblearn

# Suggest the pipeline of Jupyter notebook [optional, recommended]
conda install jupyter notebook
conda install ipykernel
python -m ipykernel install --user --name Auto_ML_C --display-name
"Auto_ML_C"
# Install Sklearn 0.6.  this will fixed next version
conda install -c conda-forge sklearn-contrib-lightning

# Method2
# Use the yaml environment file on the GitHub homepage to directly copy the
current environment
conda env create -n Auto_ML_C -f Auto_ML_C.yaml

# Activate the newly created environment
conda activate

# Suggest the pipeline of Jupyter notebook [optional, recommended]
conda install jupyter notebook
conda install ipykernel
python -m ipykernel install --user --name Auto_ML_C --display-name
"Auto_ML_C"
```

3.2 Feature_struction

```
import auto_ml_c.Feature_structure as fs
import pandas as pd
df = pd.read_csv("1_23肽全部的构效数据.csv")
X = df.iloc[:,2:]
Y = df[["Taste"]]
Y["Taste_num"] = 10
for i in range(Y.shape[0]):
    if Y["Taste"].iloc[i] == "Umami":
        Y["Taste_num"].iloc[i] = 1
    elif Y["Taste"].iloc[i] == "Bitter":
        Y["Taste_num"].iloc[i] = 0

# Function 1: Use a variety of visualization methods to reduce
dimensionality to visualize the data to be enhanced
```

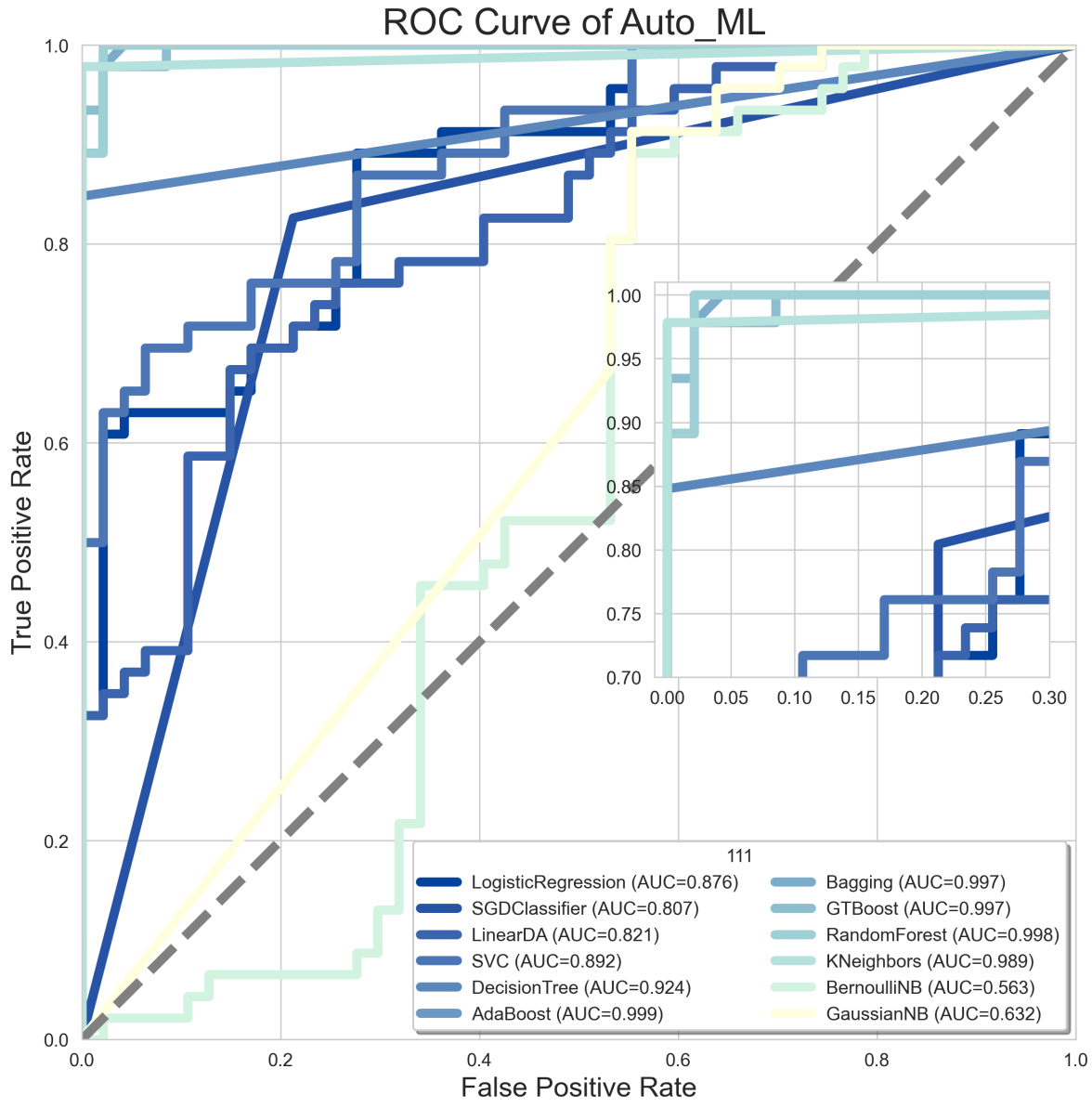
```
# 函数1： 采用多种可视化方法进行降维可视化待增强数据
location = ""
tmp = fs.data_enhance_show(X,Y[["Taste_num"]],location,kind="SMOTE")
tmp

# Function 2: Using multiple indicators to evaluate the results of different enhancement methods
# 函数2： 采用多指标评价不同增强方法后的结果
tmp1 = fs.data_enhance(X.iloc[:,:-1],Y[["Taste_num"]])
tmp1

# Function 3: Visualize the return result of function 2
# 函数3：可视化函数2的返回结果
location = ""
name="Test"
tmp2 = fs.data_enhance_compare(tmp1,location,name)
tmp2
```

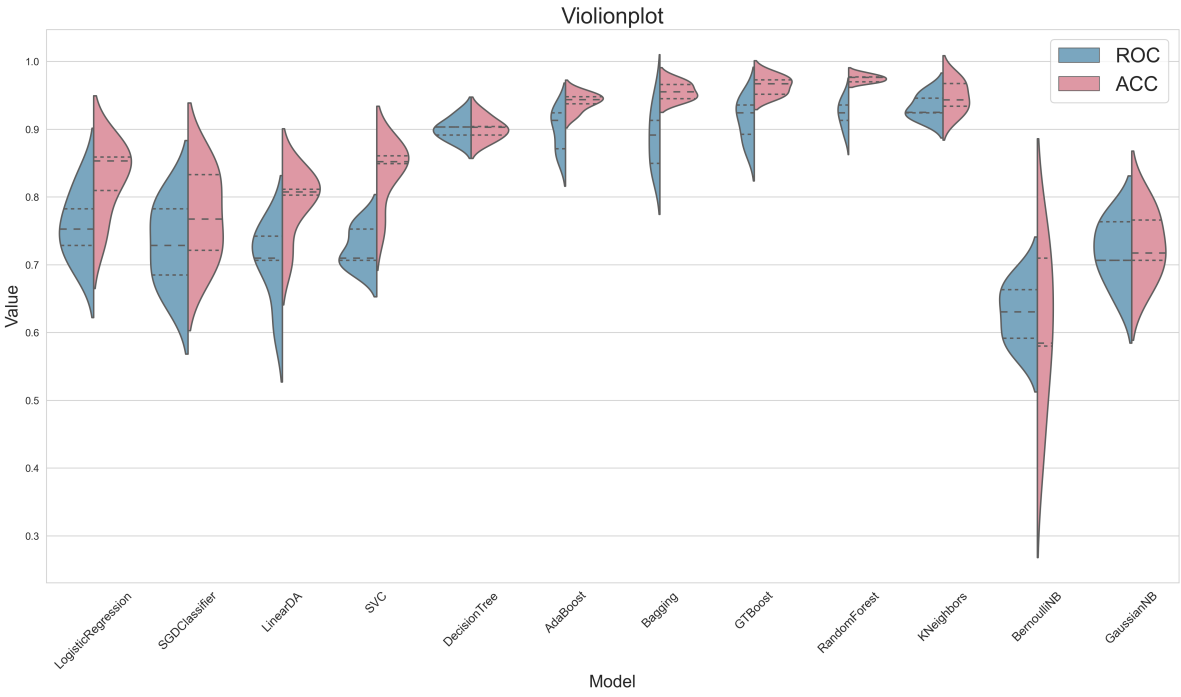




3.3 Binary Classication

```python
# Here is an example of the function binary_classfication_ws
# 这里以函数binary_classfication_ws举例

# 开始加载环境
import pandas as pd
import numpy as np
import auto_ml_c.binary_classfication as abc

# 读取测试数据
df = pd.read_csv("2_data_deal_smote.csv")
X = df.iloc[:,:-1]
Y = df["label"]
score = 'accuracy'

# The first function, draw ROC image
tmp_a = abc.binary_ROC(X,Y,cv,"111","accuracy")

# The second function, get Auc_data, Acc_data, Recall_data, Precision_data
tmp_b1,tmp_b2,tmp_b3,tmp_b4 = abc.auto_model(X,Y,cv,"accuracy")

# The third function, draw the evaluation graph obtained by function 2 auto_model
tmp_c = abc.estimator_violion(tmp_b1,tmp_b2,"Violionplot")
```


ROC Curve of Auto_ML
True Positive Rate
False Positive Rate
111
LogisticRegression (AUC=0.876)
SGDClassifier (AUC=0.807)
LinearDA (AUC=0.821)
SVC (AUC=0.892)
DecisionTree (AUC=0.924)
AdaBoost (AUC=0.999)
Bagging (AUC=0.997)
GTBoost (AUC=0.997)
RandomForest (AUC=0.998)
KNeighbors (AUC=0.989)
BernoulliNB (AUC=0.563)
GaussianNB (AUC=0.632)


Violionplot
ROC
ACC
Value
Model
LogisticRegression
SGDClassifier
LinearDA
SVC
DecisionTree
AdaBoost
Bagging
GTBoost
RandomForest
KNeighbors
BernoulliNB
GaussianNB

4. ConTact

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