# 导入所需的包和库  
import pandas as pd  
from sklearn.linear\_model import LinearRegression  
from SALib.sample import saltelli  
from SALib.analyze import sobol  
import numpy as np  
import matplotlib.pyplot as plt  
import seaborn as sns  
  
# 加载数据  
data = pd.read\_csv(r"C:\Users\阿韩想养二哈\Desktop\stock\_prices.csv")  
  
# 分割数据  
X = data.drop(['Stock\_Price'], axis=1)  
y = data['Stock\_Price']  
  
# 定义模型  
model = LinearRegression()  
  
# 训练模型  
model.fit(X, y)  
  
# 设定输入参数  
problem = {  
 'num\_vars': 3,  
 'names': ['Interest\_Rate', 'Unemployment\_Rate', 'GDP'],  
 'bounds': [[0, 0.1], [0, 0.1], [16, 18]]  
}  
  
# 生成样本  
param\_values = saltelli.sample(problem, 1000)  
  
# 运行模型  
  
Y = np.zeros([param\_values.shape[0]])  
  
# label\_need=X.keys()[1:]  
# X1=X[label\_need].values  
  
for i, X1 in enumerate(param\_values):  
 Y[i] = model.predict([X1])[0]  
  
# 分析敏感性  
Si = sobol.analyze(problem, Y)  
  
# 输出结果  
print(Si['S1'])  
print(Si['ST'])  
Si.plot()  
  
# 绘制Sobol分析结果的条形图  
fig, ax = plt.subplots()  
ax.bar(problem['names'], Si['S1'], yerr=Si['S1\_conf'])  
ax.set\_ylabel('S1 sensitivity index')  
ax.set\_xticklabels(problem['names'])  
ax.set\_xticks(range(len(problem['names'])))  
plt.show()