Graphic User Interface (GUI) for Stock Value Prediction

We will use multiple linear regression to predict the stock index price (i.e., the dependent variable) of a fictitious economy by using 2 independent/input variables:

- Interest Rate
- Unemployment Rate

The basic assumptions of linear regression has been validated before you applying linear regression models.

- Linear relationship
- Multivariate normality
- No or little multicollinearity
- No auto-correlation
- Homoscedasticity

To check for linearity between the variables i.e

- The Stock_Index_Price (dependent variable) and the Interest_Rate (independent variable); and
- The Stock_Index_Price (dependent variable) and the Unemployment_Rate (independent variable)

We will get the following diagrams

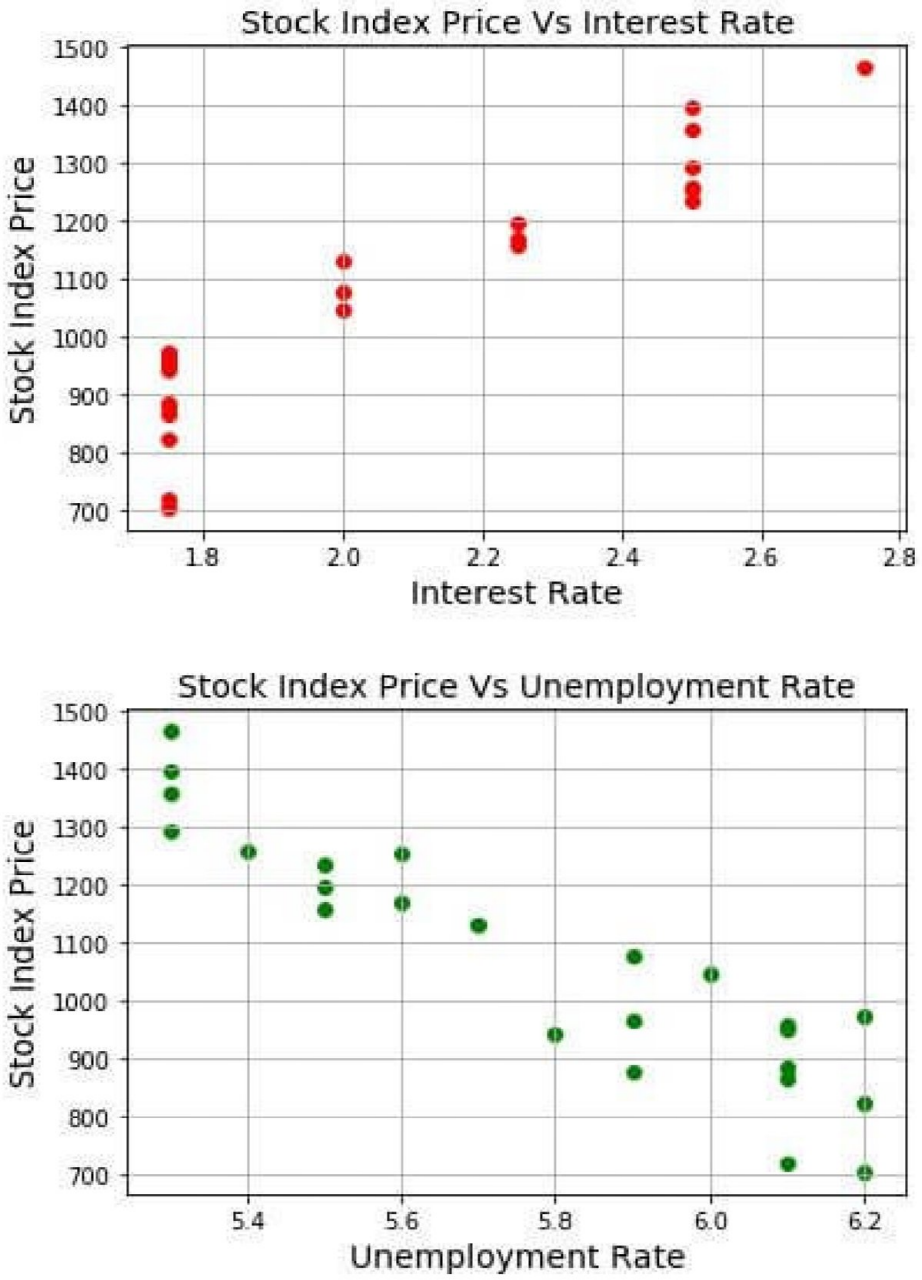

Fig. 11

A GUI can be prepared to see the scatter diagram that we use to check for linearity.

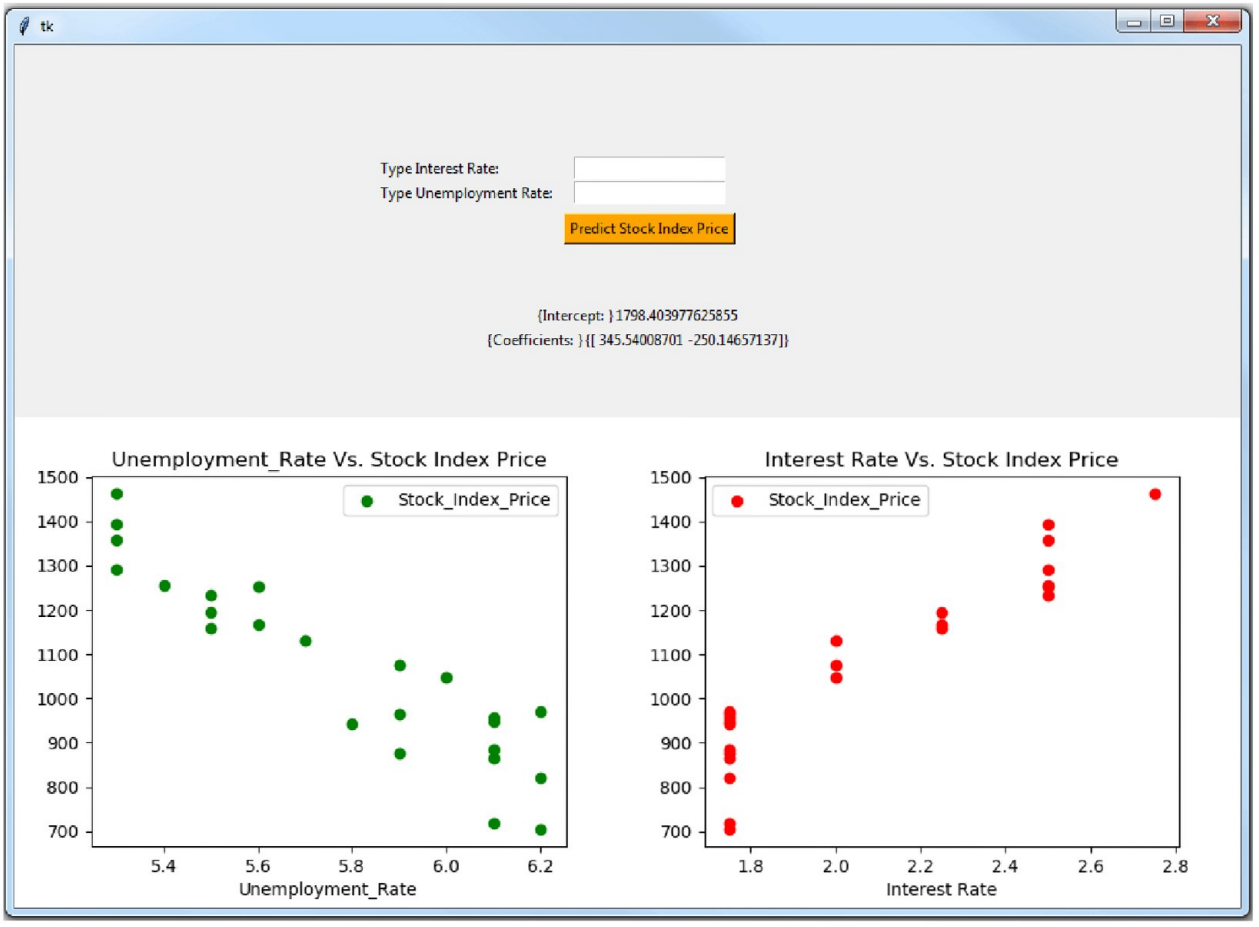

Fig. 12

Applying linear Regression model we can have a model:

Stock_Index_Price = (Intercept) + (Interest_Rate coef)*X_1 + (Unemployment_Rate coef)*X_2

We have the coefficients as :

```
Intercept:
 1798.40397763
Coefficients:
 [ 345.54008701 -250.14657137]
```

And We obtain a table of comprehensive statistical model based on linear regression as follows:

OLS Regression Results

Dep. Variable:	Stock_Index_Price	R-squared:	0.898
Model:	OLS	Adj. R-squared:	0.888
Method:	Least Squares	F-statistic:	92.07
Date:	Sun, 27 May 2018	Prob (F-statistic):	4.04e-11
Time:	18:51:40	Log-Likelihood:	-134.61
No. Observations:	24	AIC:	275.2
Df Residuals:	21	BIC:	278.8
Df Model:	2		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1798.4040	899.248	2.000	0.059	-71.685	3668.493
Interest_Rate	345.5401	111.367	3.103	0.005	113.940	577.140
Unemployment_Rate	-250.1466	117.950	-2.121	0.046	-495.437	-4.856

Omnibus:	2.691	Durbin-Watson:	0.530
Prob(Omnibus):	0.260	Jarque-Bera (JB):	1.551
Skew:	-0.612	Prob(JB):	0.461
Kurtosis:	3.226	Cond. No.	394.

Fig. 13

We will create a GUI that will allow users input the independent variables in order to get the predicted result.

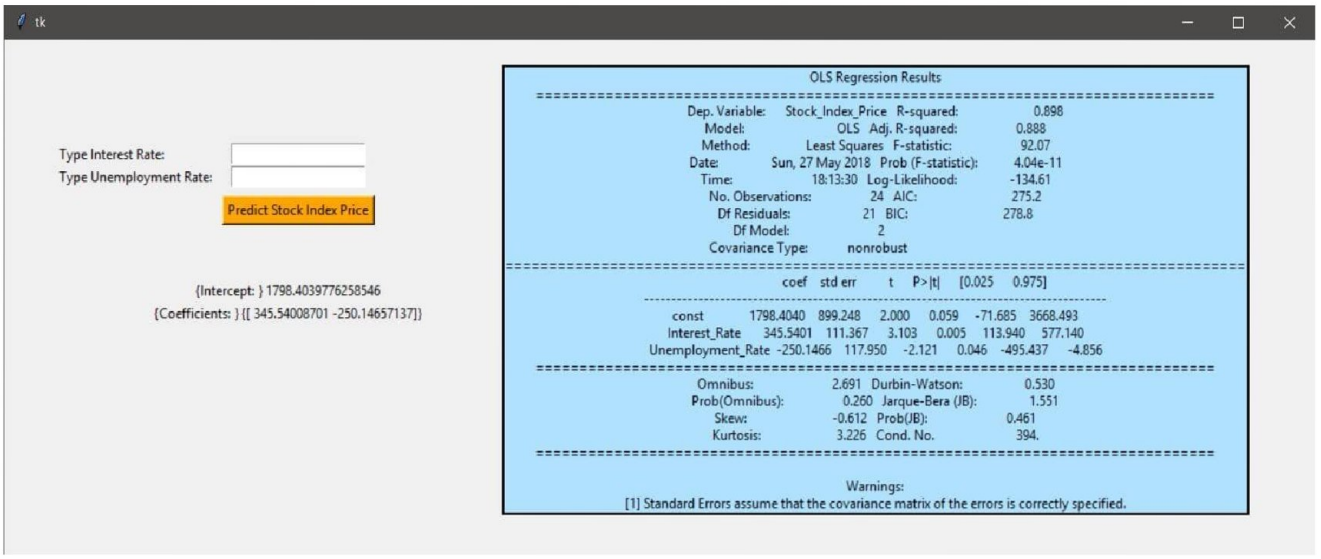

Fig. 14

The *left-hand-side* of the GUI displays the output generated by sklearn:

- It includes 2 input boxes, so that the user may type values for the interest and unemployment rates to get the predicted result.
- It also includes the intercept and coefficients generated by sklearn.

While, the *right-hand side* of the GUI displays the output generated by statsmodels.

Recall that earlier we made a prediction by using the following values:

- Interest Rate = 2.75
- Unemployment Rate = 5.3

Type those values in the input boxes, and then click on the button 'Predict Stock Index Price:'

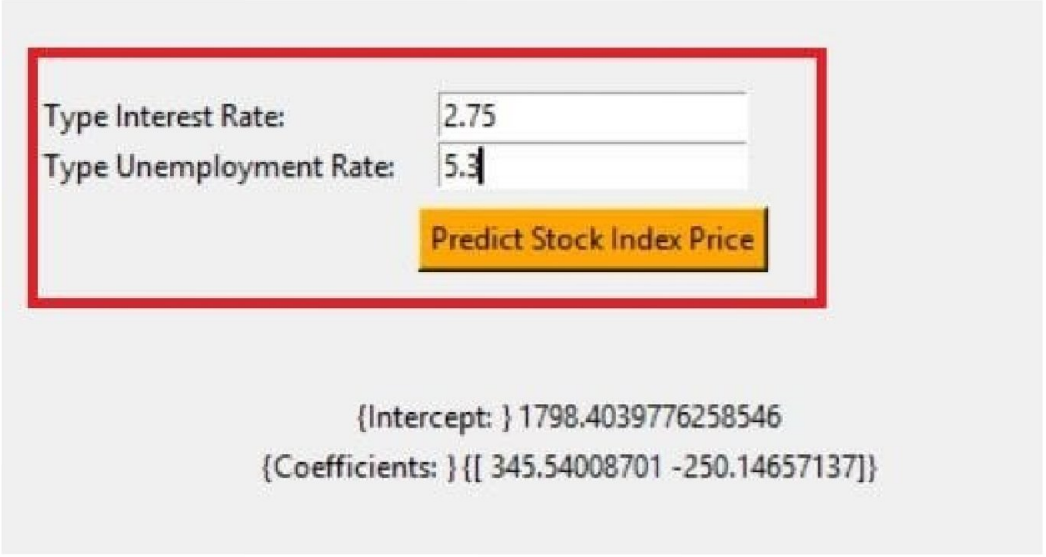
Type Interest Rate:
2.75
Type Unemployment Rate:
5.3
Predict Stock Index Price
{Intercept: } 1798.4039776258546
{Coefficients: } {[345.54008701 -250.14657137]}

Fig. 15