In [1]:
```
# Assignment - A6  |  Name : Pratik Pingale  |  Roll No : 19CO056
```

In [2]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns

df = pd.read_csv('iris.csv')
df.head()
```

Out[2]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	setosa
1	2	4.9	3.0	1.4	0.2	setosa
2	3	4.7	3.2	1.3	0.2	setosa
3	4	4.6	3.1	1.5	0.2	setosa
4	5	5.0	3.6	1.4	0.2	setosa

In [3]:
```
X = df.iloc[:, :4].values
Y = df['Species'].values
```

In [4]:
```
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler

X_train, X_test, Y_train, Y_test = train_test_split(X, Y, test_size = 0.2, random_
sc_X = StandardScaler()
X_train = sc_X.fit_transform(X_train)
X_test = sc_X.transform(X_test)

print(f'Train Dataset Size - X: {X_train.shape}, Y: {Y_train.shape}')
print(f'Test  Dataset Size - X: {X_test.shape}, Y: {Y_test.shape}')
```

```
Train Dataset Size - X: (120, 4), Y: (120,)
Test  Dataset Size - X: (30, 4), Y: (30,)
```

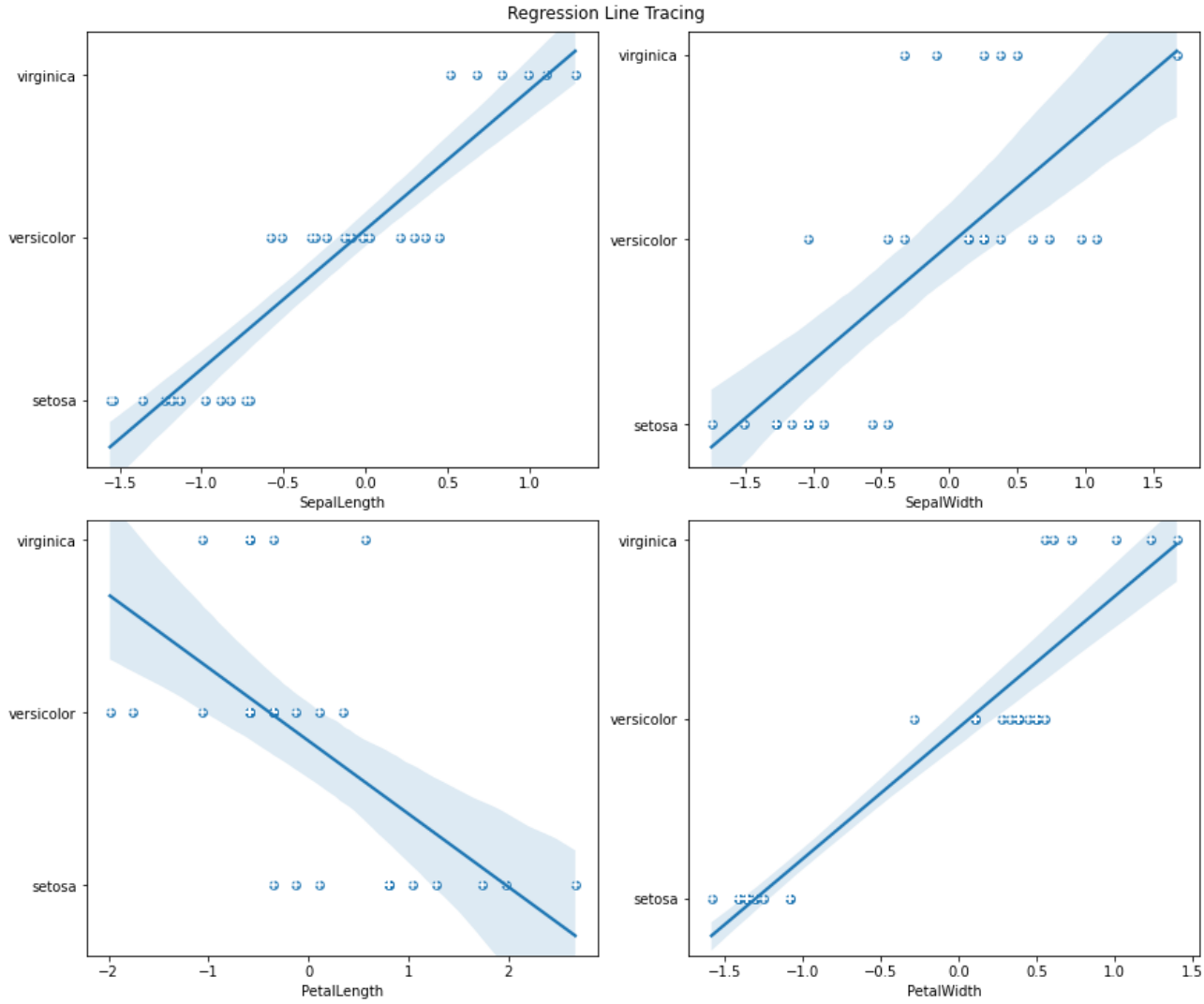
In [5]:
```
from sklearn.naive_bayes import GaussianNB

classifier = GaussianNB()
classifier.fit(X_train, Y_train)
predictions = classifier.predict(X_test)

mapper = {'setosa': 0, 'versicolor': 1, 'virginica': 2}
predictions_ = [mapper[i] for i in predictions]

fig, axs = plt.subplots(2, 2, figsize = (12, 10), constrained_layout = True)
fig.suptitle('Regression Line Tracing')

for i in range(4):
    x, y = i // 2, i % 2
    sns.regplot(x = X_test[:, i], y = predictions_, ax=axs[x, y])
    axs[x, y].scatter(X_test[:, i][::-1], Y_test[::-1], marker = '+', color="white
    axs[x, y].set_xlabel(df.columns[i + 1][:-2])
```



Confusion matrix

In [6]:
```
from sklearn.metrics import confusion_matrix
from sklearn.metrics import classification_report

cm = confusion_matrix(Y_test, predictions)
print(f'''Confusion matrix :\n
                | Positive Prediction\t| Negative Prediction
---------------+------------------------+---------------------
Positive Class | True Positive (TP) {cm[0, 0]}\t| False Negative (FN) {cm[0, 1]}
---------------+------------------------+---------------------
Negative Class | False Positive (FP) {cm[1, 0]}\t| True Negative (TN) {cm[1, 1]}\n

cm = classification_report(Y_test, predictions)
print('Classification report : \n', cm)
```

Confusion matrix :

	Positive Prediction	Negative Prediction
Positive Class	True Positive (TP) 11	False Negative (FN) 0
Negative Class	False Positive (FP) 0	True Negative (TN) 13

Classification report :

	precision	recall	f1-score	support
setosa	1.00	1.00	1.00	11
versicolor	1.00	1.00	1.00	13
virginica	1.00	1.00	1.00	6
accuracy			1.00	30
macro avg	1.00	1.00	1.00	30
weighted avg	1.00	1.00	1.00	30