LAPORAN PRAKTIKUM

PEMBELAJARAN MESIN MINGGU 3

“Regresi”

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D4 TEKNIK INFORMATIKA

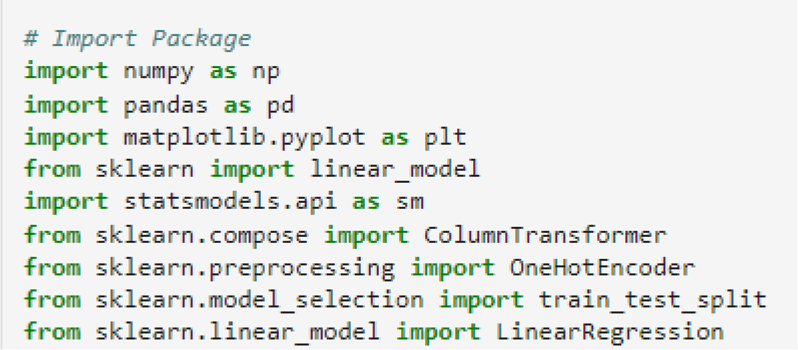
TEKNOLOGI INFORMASI

POLITEKNIK NEGERI MALANG

2022

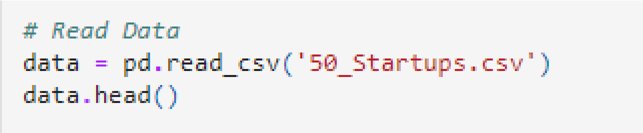
Laporan Jobsheet 2 – Regresi

1. Library yang dibutuhkan yaitu :



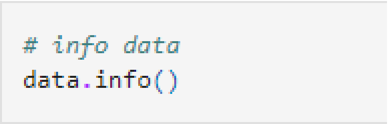
```
# Import Package
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn import linear_model
import statsmodels.api as sm
from sklearn.compose import ColumnTransformer
from sklearn.preprocessing import OneHotEncoder
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

2. Untuk read data, kita simpan pada variable data



```
# Read Data
data = pd.read_csv('50_Startups.csv')
data.head()
```

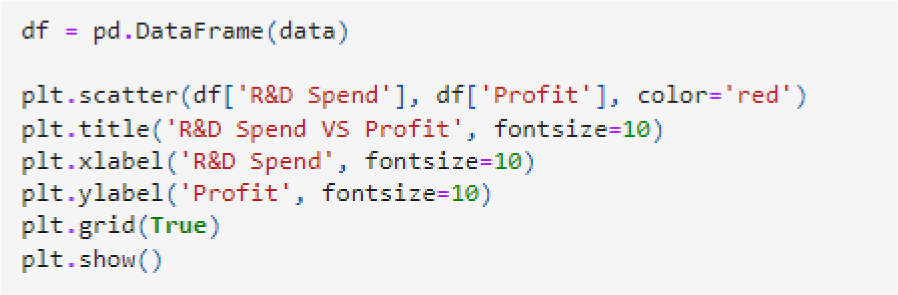
3. Kita bisa melihat apakah pada data kita ada kolom yang null menggunakan fungsi :



```
# info data
data.info()
```

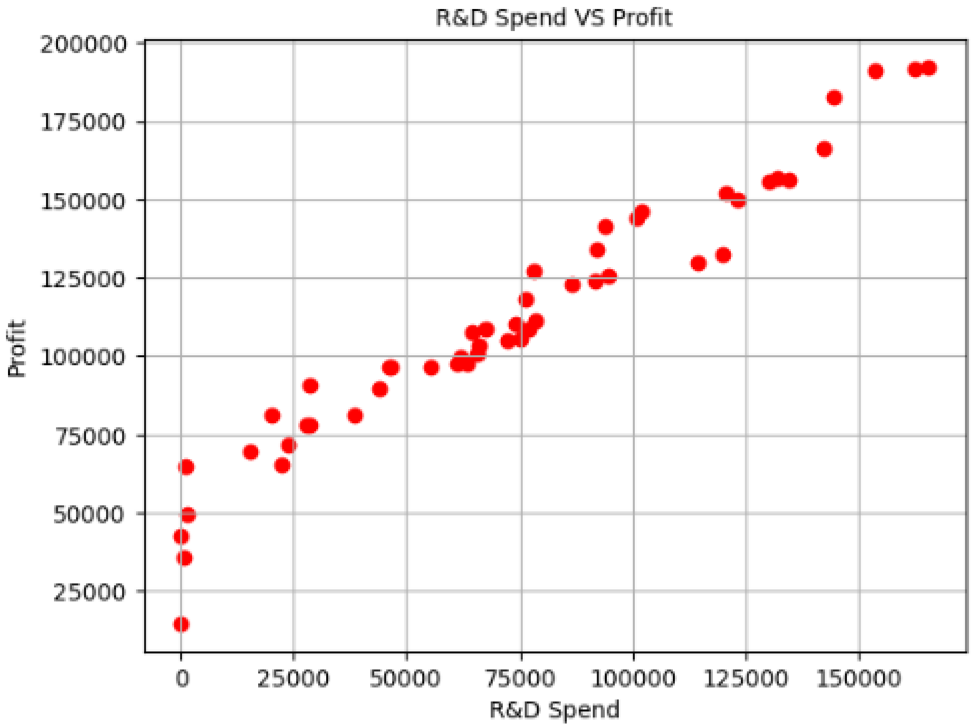
Mendapatkan Multiple Linear Regression Versi 1

1. Lihat dulu hubungan antar independent variable dan dependent variable
   Contoh :

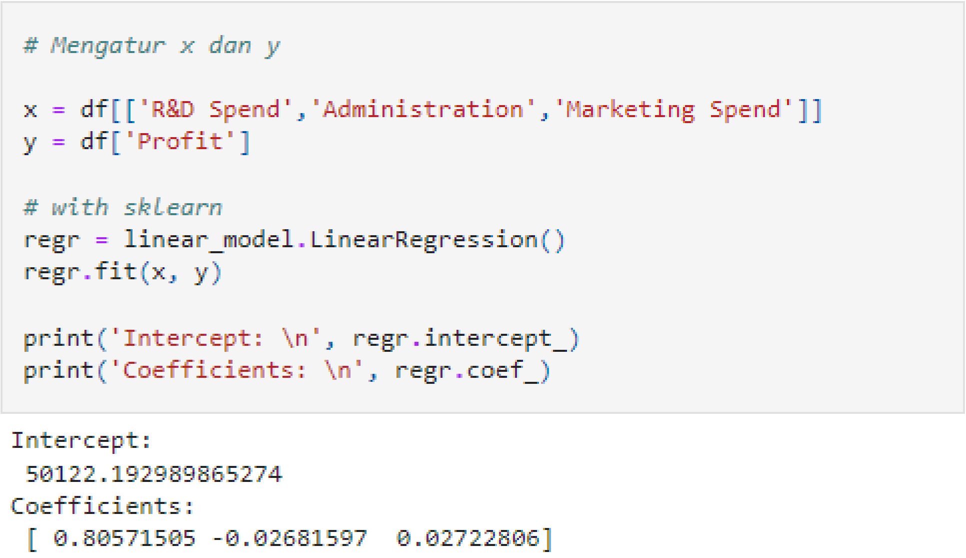


```
df = pd.DataFrame(data)

plt.scatter(df['R&D Spend'], df['Profit'], color='red')
plt.title('R&D Spend VS Profit', fontsize=10)
plt.xlabel('R&D Spend', fontsize=10)
plt.ylabel('Profit', fontsize=10)
plt.grid(True)
plt.show()
```

   Hasil :



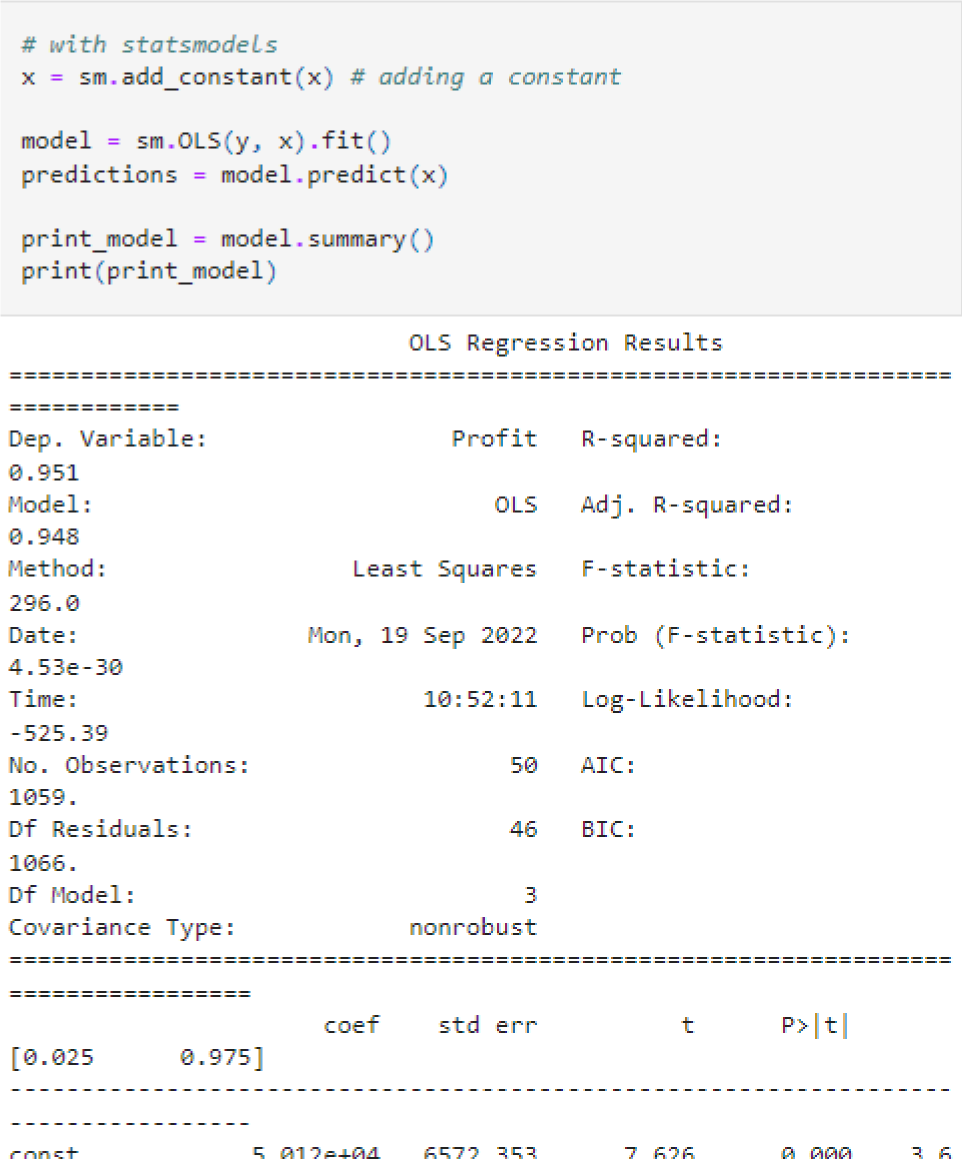
2. Menggunakan fungsi dari sklearn



```
# Mengatur x dan y

x = df[['R&D Spend','Administration','Marketing Spend']]
y = df['Profit']

# with sklearn
regr = linear_model.LinearRegression()
regr.fit(x, y)

print('Intercept: \n', regr.intercept_)
print('Coefficients: \n', regr.coef_)
```

```
Intercept:
 50122.192989865274
Coefficients:
 [ 0.80571505 -0.02681597  0.02722806]
```

3. Menggunakan fungsi dari statsmodel

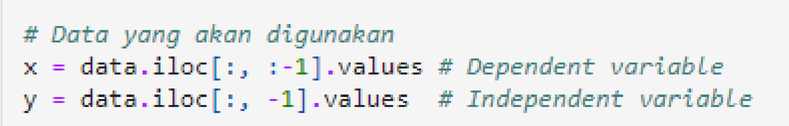


```
# with statsmodels
x = sm.add_constant(x) # adding a constant

model = sm.OLS(y, x).fit()
predictions = model.predict(x)

print_model = model.summary()
print(print_model)
```

```
                            OLS Regression Results                            
==================================================================
============
Dep. Variable:                 Profit   R-squared:                       
0.951
Model:                            OLS   Adj. R-squared:                  
0.948
Method:                 Least Squares   F-statistic:                     
296.0
Date:                Mon, 19 Sep 2022   Prob (F-statistic):           
4.53e-30
Time:                        10:52:11   Log-Likelihood:                
-525.39
No. Observations:                  50   AIC:                             
1059.
Df Residuals:                      46   BIC:                             
1066.
Df Model:                           3                                         
Covariance Type:            nonrobust                                         
==================================================================
=================
                      coef    std err          t      P>|t|      
[0.025      0.975]
------------------------------------------------------------------
-----------------
const            5.012e+04   6572.353      7.626      0.000      3.6
```

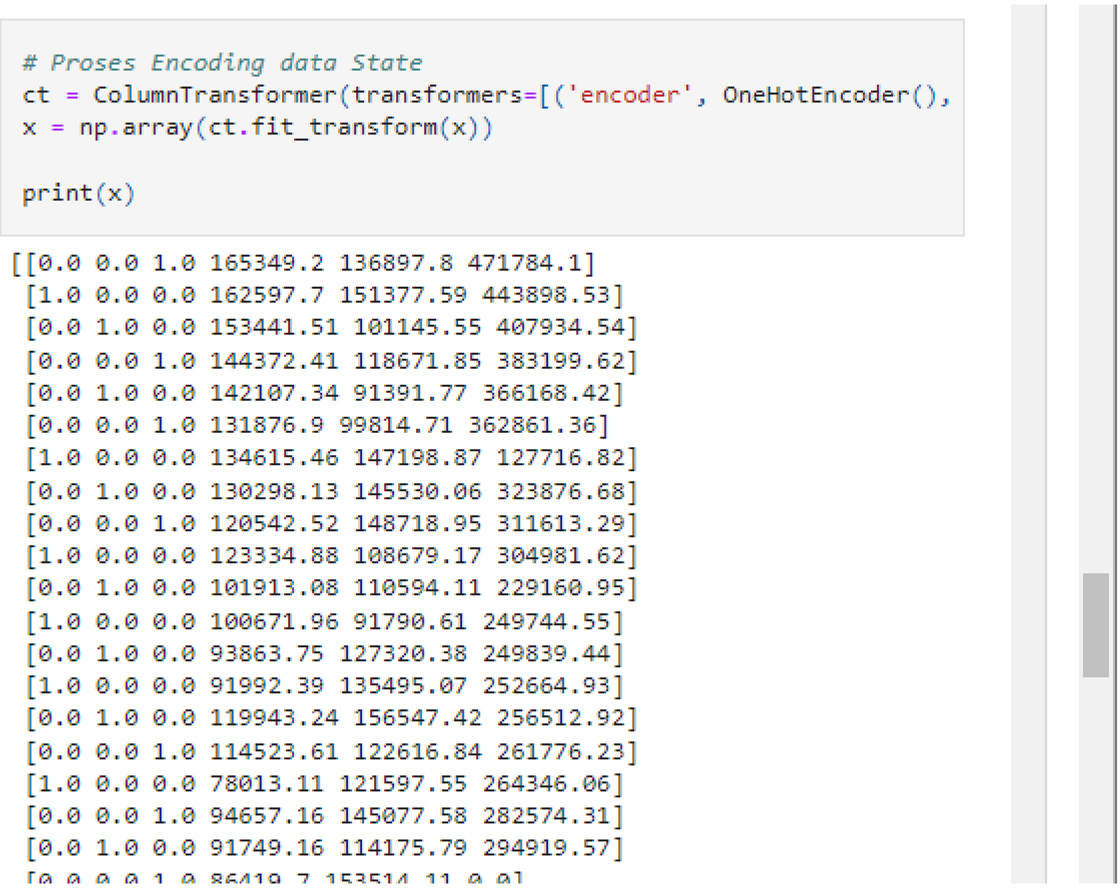
Mendapatkan Multiple Linear Regression Versi 2

1. Definisikan dependent dan independent variable



```
# Data yang akan digunakan
x = data.iloc[:, :-1].values # Dependent variable
y = data.iloc[:, -1].values  # Independent variable
```

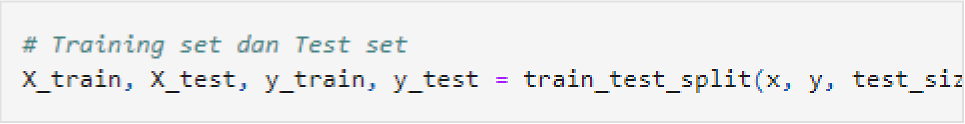
2. Lakukan encoding pada data state



```
# Proses Encoding data State
ct = ColumnTransformer(transformers=[('encoder', OneHotEncoder(),
x = np.array(ct.fit_transform(x))

print(x)
```

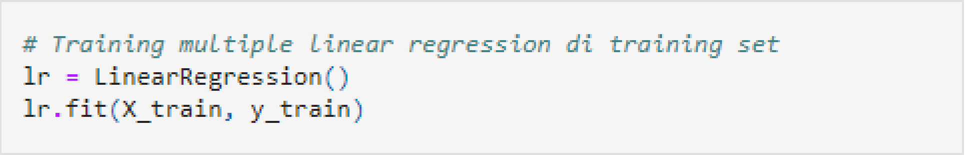
```
[[0.0 0.0 1.0 165349.2 136897.8 471784.1]
 [1.0 0.0 0.0 162597.7 151377.59 443898.53]
 [0.0 1.0 0.0 153441.51 101145.55 407934.54]
 [0.0 0.0 1.0 144372.41 118671.85 383199.62]
 [0.0 1.0 0.0 142107.34 91391.77 366168.42]
 [0.0 0.0 1.0 131876.9 99814.71 362861.36]
 [1.0 0.0 0.0 134615.46 147198.87 127716.82]
 [0.0 1.0 0.0 130298.13 145530.06 323876.68]
 [0.0 0.0 1.0 120542.52 148718.95 311613.29]
 [1.0 0.0 0.0 123334.88 108679.17 304981.62]
 [0.0 1.0 0.0 101913.08 110594.11 229160.95]
 [1.0 0.0 0.0 100671.96 91790.61 249744.55]
 [0.0 1.0 0.0 93863.75 127320.38 249839.44]
 [1.0 0.0 0.0 91992.39 135495.07 252664.93]
 [0.0 1.0 0.0 119943.24 156547.42 256512.92]
 [0.0 0.0 1.0 114523.61 122616.84 261776.23]
 [1.0 0.0 0.0 78013.11 121597.55 264346.06]
 [0.0 0.0 1.0 94657.16 145077.58 282574.31]
 [0.0 1.0 0.0 91749.16 114175.79 294919.57]
 [0.0 0.0 1.0 86419.7 153514.11 0.0]
```

3. Definisikan training set dan test set



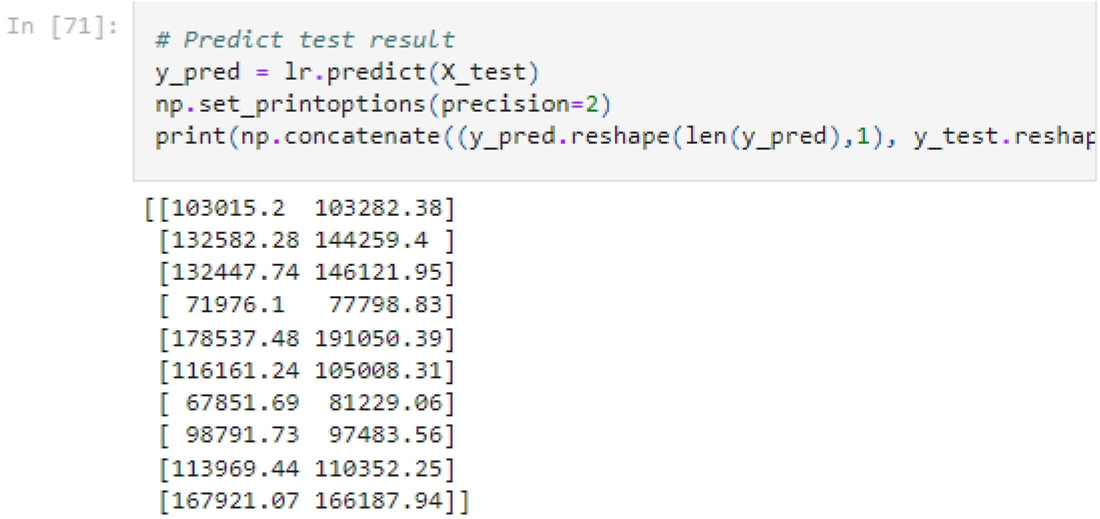
```
# Training set dan Test set
X_train, X_test, y_train, y_test = train_test_split(x, y, test_siz
```

4. Training multiple linear regression di training set



```
# Training multiple linear regression di training set
lr = LinearRegression()
lr.fit(X_train, y_train)
```

5. Memprediksi hasil



In [71]:

```python
# Predict test result
y_pred = lr.predict(X_test)
np.set_printoptions(precision=2)
print(np.concatenate((y_pred.reshape(len(y_pred),1), y_test.reshap
```

```
[[103015.2  103282.38]
 [132582.28 144259.4 ]
 [132447.74 146121.95]
 [ 71976.1   77798.83]
 [178537.48 191050.39]
 [116161.24 105008.31]
 [ 67851.69  81229.06]
 [ 98791.73  97483.56]
 [113969.44 110352.25]
 [167921.07 166187.94]]
```