week5

June 24, 2024

[4]:

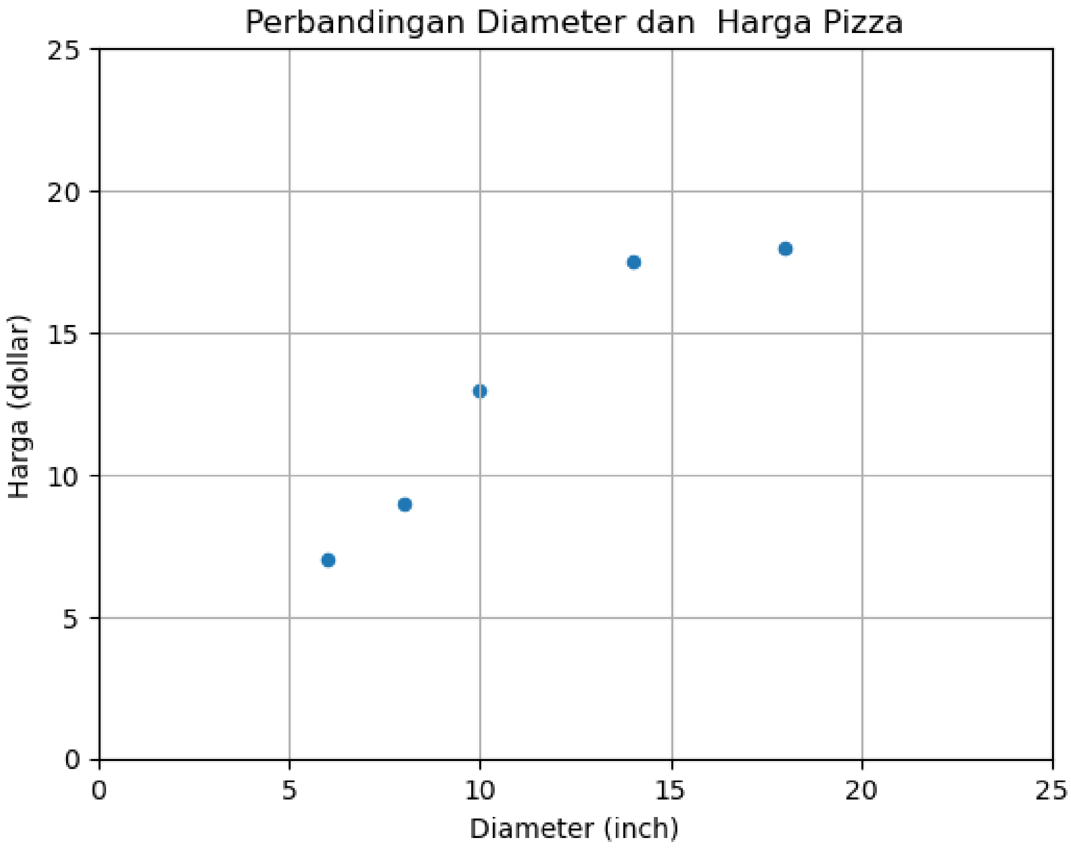
```
import pandas as pd

pizza = {'diameter': [6, 8, 10, 14, 18],
         'harga' : [7, 9, 13, 17.5, 18]}

pizza_df = pd.DataFrame (pizza)
pizza_df
```

[4]:

```
   diameter  harga
0         6    7.0
1         8    9.0
2        10   13.0
3        14   17.5
4        18   18.0
```

[12]:

```
import matplotlib.pyplot as plt

pizza_df.plot(kind='scatter', x='diameter', y='harga')

plt.title('Perbandingan Diameter dan  Harga Pizza')
plt.xlabel('Diameter (inch)')
plt.ylabel('Harga (dollar)')
plt.xlim(0, 25)
plt.ylim(0, 25)
plt.grid(True)
plt.show()
```



[23]:
```
import numpy as np

x = np.array(pizza_df['diameter'])
y = np.array(pizza_df['harga'])

print(f'x: {x}')
print(f'y: {y}')
```

```
x: [ 6  8 10 14 18]
y: [ 7.   9.  13.  17.5 18. ]
```

[25]:
```
x = x.reshape(-1,1)
x.shape
```

[25]:
```
(5, 1)
```

[27]:
```
x
```

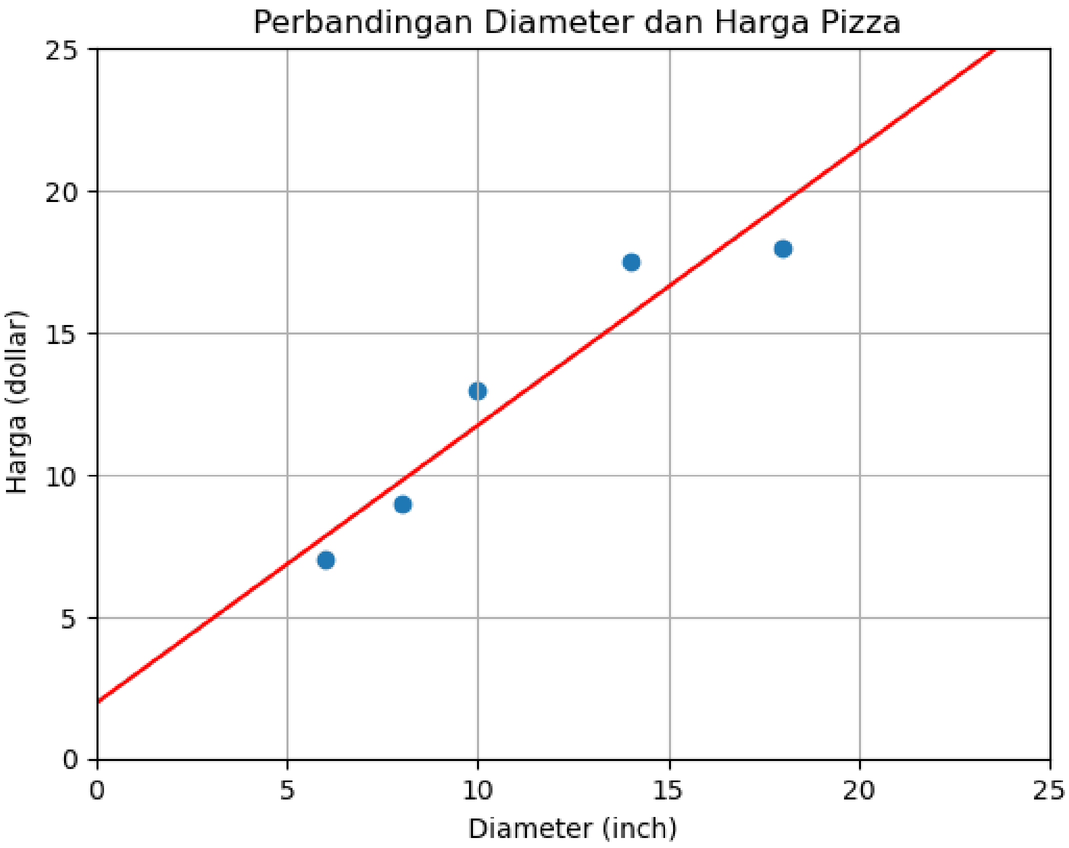
[27]:
```
array([[ 6],
       [ 8],
        [10],
        [14],
        [18]])
```

[29]:
```
from sklearn.linear_model import LinearRegression

model = LinearRegression()
model.fit(x,y)
```

[29]:
```
LinearRegression()
```

[32]:
```
X_vis = np.array ( [0, 25]) . reshape (-1 , 1)
y_vis = model.predict (X_vis)
```

[36]:
```
plt.scatter(x,y)
plt.plot (X_vis, y_vis, '-r')

plt.title (' Perbandingan Diameter dan Harga Pizza')
plt.xlabel (' Diameter (inch) ')
plt.ylabel (' Harga (dollar)')
plt.xlim (0, 25)
plt.ylim(0, 25)
plt.grid (True)
plt.show ()
```



[46]:

```
print (f'intercept: {model.intercept_}')
print (f'slope: {model. coef_}')
```

```
intercept: 1.965517241379315
slope: [0.9762931]
```

[50]:

```
print(f'x:\n{x}\n')
print (f'x flatten: {x.flatten()}\n')
print (f'y: {y}')
```

```
x:
[[ 6]
 [ 8]
 [10]
 [14]
 [18]]

x flatten: [ 6  8 10 14 18]

y: [ 7.   9.  13.  17.5 18. ]
```

[62]:

```
variance_x = np.var(x.flatten(), ddof=1)

print(f'variance: {variance_x}')
```

```
variance: 23.2
```

[64]:

```
np.cov(x.flatten(),y)
```

[64]:

```
array([[23.2 , 22.65],
       [22.65, 24.3 ]])
```

[66]:

```
covariance_xy = np.cov(x.transpose(), y)[0][1]

print(f'covariance: {covariance_xy}')
```

```
covariance: 22.650000000000002
```

[68]:

```
slope = covariance_xy / variance_x

print(f'slope:{slope}')
```

```
slope:0.976293103448276
```

[70]:

```
intercept = np.mean(y) - slope * np.mean(x)

print(f'intercept: {intercept}')
```

```
intercept: 1.9655172413793096
```

[75]:

```
diameter_pizza = np.array ( [12, 20, 23]).reshape(-1, 1)
diameter_pizza
```

[75]:

```
array([[12],
       [20],
       [23]])
```

[77]:

```
prediksi_harga = model.predict (diameter_pizza)
prediksi_harga
```

[77]:

```
array([13.68103448, 21.49137931, 24.42025862])
```

[91]:

```
for dmtr, hrg in zip(diameter_pizza, prediksi_harga):
    print(f'Diameter:{dmtr} predilsi harga: {hrg}')
```

```
Diameter:[12] predilsi harga: 13.681034482758621
Diameter:[20] predilsi harga: 21.491379310344826
Diameter:[23] predilsi harga: 24.42025862068965
```

[98]:

```
X_train = np.array ( [6, 8, 10, 14, 18]) .reshape (-1, 1)
y_train = np.array( [7, 9, 13, 17.5, 18])

X_test = np.array( [8, 9, 11, 16, 12]).reshape(-1, 1)
y_test = np.array ( [11, 8.5, 15, 18, 11])
```

[102]:

```
model = LinearRegression()
model.fit(X_train, y_train)
```

[102]:

```
LinearRegression()
```

[104]:

```
from sklearn.metrics import r2_score
y_pred = model.predict (X_test)

r_squared = r2_score(y_test, y_pred)
print(f'R-squared: {r_squared}')
```

```
R-squared: 0.6620052929422553
```

[108]:

```
ss_res=sum([(y_i-model.predict(x_i.reshape(-1,1))[0])**2
            for x_i, y_i in zip(X_test, y_test)])

print(f'ss_res: {ss_res}')
```

```
ss_res: 19.1980993608799
```

[120]:

```
mean_y = np.mean(y_test)
ss_tot = sum=([(y_i-mean_y)**2 for y_i in y_test])

print(f'ss_tot: {ss_tot}')
```

```
ss_tot: [2.8899999999999975, 17.639999999999993, 5.290000000000004,
28.090000000000007, 2.8899999999999975]
```

[122]:

```
r_squared = 1- (ss_res/ss_tot)

print(f'R-squared: {r_squared}')
```

```
R-squared: [-5.64294096 -0.08832763 -2.62913031  0.3165504  -5.64294096]
```