Machine Learning

OLEH:

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1. Hasil Praktikum Kelas

Dataset: 500_Person_Gender_Height_Weight_Index

a. Membaca dataset

Kode ini membaca file CSV menjadi DataFrame df dan menampilkan 5 baris pertama sebagai gambaran data.

```
[6]
✓ 2 d
# membaca file csv menggunakan pandas
import pandas as pd

df = pd.read_csv( '/content/gdrive/MyDrive/Praktikum2/Data/500_Person_Gender_Height_Weight_Index.csv')
df
```

	Gender	Height	Weight	Index
0	Male	174	96	4
1	Male	189	87	2
2	Female	185	110	4
3	Female	195	104	3
4	Male	149	61	3
...	...	...	...	...
495	Female	150	153	5

b. Informasi Dataset

Menampilkan jumlah baris, kolom, tipe data, dan jumlah nilai non-null.

```
# Mencari info data pada file (tipe datanya, non nul count data, nama kolom)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 500 entries, 0 to 499
Data columns (total 4 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   Gender  500 non-null    object
 1   Height  500 non-null    int64
 2   Weight  500 non-null    int64
 3   Index   500 non-null    int64
dtypes: int64(3), object(1)
memory usage: 15.8+ KB
```

c. Statistik Deskriptif

Menghitung Nilai nilai sentral (mean, median, modus)

```
# Menghitung mean semua kolom numerik
df['Height'].mean()
```

```
np.float64(169.944)
```

```
# Menghitung median semua kolom numerik
df['Height'].median()
```

```
170.5
```

```
# Mencari modus (hati-hati karena bisa lebih dari satu)
df['Height'].mode()
```

	Height
0	188

dtype: int64

```
# Menghitung Variansi & Standard Deviasi
df.var(numeric_only=True)
```

	0
Height	268.149162
Weight	1048.633267
Index	1.836168

dtype: float64

```
# Menghitung Standard Deviasi
df.std(numeric_only=True)
```

	0
Height	16.375261
Weight	32.382607
Index	1.355053

Menghitung Kuartil

```
# Hitung kuartil pertama (Q1)
q1 = df['Height'].quantile(0.25)
print("Q1 : ", q1)

# Hitung kuartil ketiga (Q3)
q3 = df['Height'].quantile(0.75)
print("Q3 : ", q3)

# Hitung IQR (Interquartile Range)
iqr = q3 - q1
print("IQR : ", iqr)
```

```
Q1 :  156.0
Q3 :  184.0
IQR :  28.0
```

Menghitung statistik Deskriptif Otomatis

```
# Untuk membuat statistika deskripsi pada type data int
df.describe()
```

	Height	Weight	Index
count	500.000000	500.000000	500.000000
mean	169.944000	106.000000	3.748000
std	16.375261	32.382607	1.355053
min	140.000000	50.000000	0.000000
25%	156.000000	80.000000	3.000000
50%	170.500000	106.000000	4.000000
75%	184.000000	136.000000	5.000000
max	199.000000	160.000000	5.000000

Menghitung Korelasi

```
# Menghitung matriks korelasi untuk semua kolom numerik
correlation_matrix = df.corr(numeric_only=True)

# Menampilkan matriks korelasi
print("Matriks Korelasi:")
print(correlation_matrix)
```

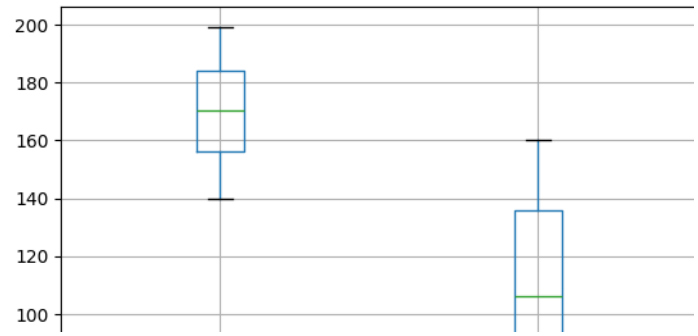
```
Matriks Korelasi:
          Height    Weight     Index
Height  1.000000  0.000446 -0.422223
Weight  0.000446  1.000000  0.804569
Index  -0.422223  0.804569  1.000000
```

d. Visualisasi Data

- Boxplot: menunjukkan distribusi dan outlier
- Histogram: distribusi frekuensi data
- Scatter plot: hubungan antar variabel

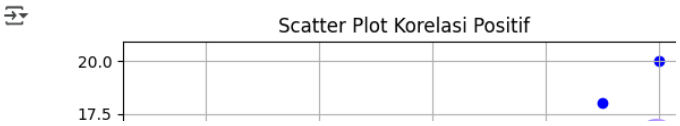
```
import pandas as pd
import numpy as np

df.boxplot(column=['Height','Weight'])
```

```
<Axes: >
```

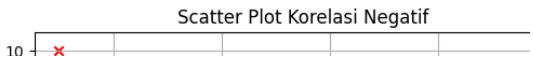



```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

# Ambil data Height
data_height = df["Height"]

# Buat histogram
n, bins, patches = plt.hist(data_height, bins=5, color='pink', edgecolor='black')

# Tambahkan label
plt.title('Histogram Nilai')
plt.xlabel('Height')
plt.ylabel('Frekuensi')

# Tampilkan rentang frekuensi di sumbu x
bin_centers = 0.5 * (bins[:-1] + bins[1:])
plt.xticks(bin_centers, ['{:.0f}-{:.0f}'.format(bins[i], bins[i+1]) for i in range(len(bins)-1)])

# Tampilkan histogram
plt.show()
```

```
df2 = pd.DataFrame(data)

# Buat scatter plot
plt.scatter(df2['Nilai1'], df2['Nilai2'], color='blue', marker='o')

# Tambahkan label
plt.title('Scatter Plot Korelasi Positif')
plt.xlabel('Nilai1')
plt.ylabel('Nilai2')

# Tambahkan grid
plt.grid(True)

# Tampilkan plot
plt.show()
```




```
}

df3 = pd.DataFrame(data)

# Buat scatter plot
plt.scatter(df3['Nilai1'], df3['Nilai2'], color='red', marker='x')

# Tambahkan label
plt.title('Scatter Plot Korelasi Negatif')
plt.xlabel('Nilai1')
plt.ylabel('Nilai2')

# Tambahkan grid
plt.grid(True)

# Tampilkan plot
plt.show()
```



2. Tugas Praktikum Mandiri

Dataset: day.csv

a. Membaca dataset

Membaca dataset day.csv untuk dianalisis.

```
import pandas as pd

path = "/content/drive/MyDrive/Pekan2 ML/Tugas Praktikum Mandiri/data/day.csv"

df = pd.read_csv(path)
df.head()
```

	instant	dteday	season	yr	mnth	holiday	weekday	workingday	weathersit	temp	atemp	hum	wi
0	1	2011-01-01	1	0	1	0	6	0	2	0.344167	0.363625	0.805833	
1	2	2011-01-02	1	0	1	0	0	0	2	0.363478	0.353739	0.696087	
2	3	2011-01-03	1	0	1	0	1	1	1	0.196364	0.189405	0.437273	
3	4	2011-01-04	1	0	1	0	2	1	1	0.200000	0.212122	0.590435	
4	5	2011-01-05	1	0	1	0	3	1	1	0.226957	0.229270	0.436957	

b. Membagi dataset

- Train: 80% data untuk melatih model
- Validation: 10% dari train untuk evaluasi saat training
- Test: 20% untuk uji performa model

```
from sklearn.model_selection import train_test_split

# Split pertama: Train 80% - Test 20%
train, test = train_test_split(df, test_size=0.2, random_state=42)

# Split kedua: dari Train → Validation 10%
train, val = train_test_split(train, test_size=0.1, random_state=42)

# Jumlah data tiap set
print("Jumlah Data Training:", len(train))
print("Jumlah Data Validation:", len(val))
print("Jumlah Data Testing:", len(test))

# 5 baris pertama
print("\nTraining Data:\n", train.head())
print("\nValidation Data:\n", val.head())
print("\nTesting Data:\n", test.head())
```

```
Jumlah Data Training: 525
Jumlah Data Validation: 59
Jumlah Data Testing: 147

Training Data:
      instant      dteday  season  yr  mnth  holiday  weekday  workingday  \
657       658  2012-10-19       4   1    10        0        5           1
163       164  2011-06-13       2   0     6        0        1           1
305       306  2011-11-02       4   0    11        0        3           1
111       112  2011-04-22       2   0     4        0        5           1
538       539  2012-06-22       3   1     6        0        5           1

     weathersit      temp     atemp       hum  windspeed  casual  registered  \
657           2  0.563333  0.537896  0.815000   0.134954     753        4671
163           1  0.635000  0.601654  0.494583   0.305350     863        4157
305           1  0.377500  0.390133  0.718750   0.082092     370        3816
111           2  0.336667  0.321954  0.729583   0.219521     177        1506
538           1  0.777500  0.724121  0.573750   0.182842     964        4859

      cnt
657  5424
163  5020
305  4186
111  1683
538  5823
```

```
Validation Data:
      instant      dteday  season  yr  mnth  holiday  weekday  workingday  \
325       326  2011-11-22       4   0    11        0        2           1
410       411  2012-02-15       1   1     2        0        3           1
92         93  2011-04-03       2   0     4        0        0           0
47         48  2011-02-17       1   0     2        0        4           1
508       509  2012-05-23       2   1     5        0        3           1

     weathersit      temp     atemp       hum  windspeed  casual  registered
325           3  0.416667  0.421696  0.962500   0.118792      69        1538
410           1  0.348333  0.351629  0.531250   0.181600     141        4028
92            1  0.378333  0.378767  0.480000   0.182213    1651        1598
47            1  0.435833  0.428658  0.505000   0.230104     259        2216
508           2  0.621667  0.584612  0.774583   0.102000     766        4494

      cnt
325  1607
410  4169
92   3249
47   2475
508  5260
```

3. Kesimpulan

Dari praktikum ini, saya belajar bahwa statistik deskriptif membantu memahami data melalui angka angka penting seperti rata-rata, median, dll. Visualisasi seperti boxplot, histogram, dan scatter plot memudahkan saya melihat pola dan hubungan antar variabel. Sedangkan pembagian dataset menjadi training, validation, dan testing penting agar model Machine Learning bisa dilatih dengan baik dan diuji secara adil.