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```
#import libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import tensorflow as tf
import numpy as np

from sklearn.preprocessing import LabelEncoder
from sklearn.preprocessing import OneHotEncoder
from sklearn.preprocessing import MinMaxScaler
from sklearn.preprocessing import StandardScaler
from imblearn import under_sampling, over_sampling
```

```
df = pd.read_excel('E Commerce Dataset.xlsx', sheet_name='E Comm')
df.head()
```

```
   CustomerID  Churn  Tenure PreferredLoginDevice  CityTier
WarehouseToHome  \
0       50001      1     4.0         Mobile Phone         3
6.0
1       50002      1     NaN                Phone         1
8.0
2       50003      1     NaN                Phone         1
30.0
3       50004      1     0.0                Phone         3
15.0
4       50005      1     0.0                Phone         1
12.0

  PreferredPaymentMode  Gender  HourSpendOnApp
NumberOfDeviceRegistered  \
0           Debit Card  Female             3.0
3
```

```
1                  UPI    Male             3.0
4
2           Debit Card    Male             2.0
4
3           Debit Card    Male             2.0
4
4                   CC    Male             NaN
3

     PreferedOrderCat  SatisfactionScore MaritalStatus
NumberOfAddress  \
0  Laptop & Accessory                  2        Single
9
1              Mobile                  3        Single
7
2              Mobile                  3        Single
6
3  Laptop & Accessory                  5        Single
8
4              Mobile                  5        Single
3

   Complain  OrderAmountHikeFromlastYear  CouponUsed  OrderCount  \
0         1                         11.0         1.0         1.0
1         1                         15.0         0.0         1.0
2         1                         14.0         0.0         1.0
3         0                         23.0         0.0         1.0
4         0                         11.0         1.0         1.0

   DaySinceLastOrder  CashbackAmount
0                5.0          159.93
1                0.0          120.90
2                3.0          120.28
3                3.0          134.07
4                3.0          129.60
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5630 entries, 0 to 5629
Data columns (total 20 columns):
 #   Column                       Non-Null Count  Dtype
---  ------                       --------------  -----
 0   CustomerID                   5630 non-null   int64
 1   Churn                        5630 non-null   int64
 2   Tenure                       5366 non-null   float64
 3   PreferredLoginDevice         5630 non-null   object
 4   CityTier                     5630 non-null   int64
 5   WarehouseToHome              5379 non-null   float64
 6   PreferredPaymentMode         5630 non-null   object
```

```
 7   Gender                       5630 non-null   object
 8   HourSpendOnApp               5375 non-null   float64
 9   NumberOfDeviceRegistered     5630 non-null   int64
 10  PreferedOrderCat             5630 non-null   object
 11  SatisfactionScore            5630 non-null   int64
 12  MaritalStatus                5630 non-null   object
 13  NumberOfAddress              5630 non-null   int64
 14  Complain                     5630 non-null   int64
 15  OrderAmountHikeFromlastYear  5365 non-null   float64
 16  CouponUsed                   5374 non-null   float64
 17  OrderCount                   5372 non-null   float64
 18  DaySinceLastOrder            5323 non-null   float64
 19  CashbackAmount               5630 non-null   float64
dtypes: float64(8), int64(7), object(5)
memory usage: 879.8+ KB
```

CLEANSING DATA

Handle Missing Value

```
#cek missing value
df.isnull().sum()
```

```
CustomerID                       0
Churn                            0
Tenure                         264
PreferredLoginDevice             0
CityTier                         0
WarehouseToHome                251
PreferredPaymentMode             0
Gender                           0
HourSpendOnApp                 255
NumberOfDeviceRegistered         0
PreferedOrderCat                 0
SatisfactionScore                0
MaritalStatus                    0
NumberOfAddress                  0
Complain                         0
OrderAmountHikeFromlastYear    265
CouponUsed                     256
OrderCount                     258
DaySinceLastOrder              307
CashbackAmount                   0
dtype: int64
```

```
#semua kolom yang terdapat missing value dilakukan impute menggunakan
median dari setiap kolomnya
df['Tenure'] = df['Tenure'].fillna(df['Tenure'].median())
df['WarehouseToHome'] =
```

```
df['WarehouseToHome'].fillna(df['WarehouseToHome'].median())
df['HourSpendOnApp'] =
df['HourSpendOnApp'].fillna(df['HourSpendOnApp'].median())
df['DaySinceLastOrder'] =
df['DaySinceLastOrder'].fillna(df['DaySinceLastOrder'].median())
df['OrderCount'] = df['OrderCount'].fillna(df['OrderCount'].median())
df['CouponUsed'] = df['CouponUsed'].fillna(df['CouponUsed'].median())
df['OrderAmountHikeFromlastYear'] =
df['OrderAmountHikeFromlastYear'].fillna(df['OrderAmountHikeFromlastYe
ar'].median())
```

```
df.isnull().sum()
```

```
CustomerID                     0
Churn                          0
Tenure                         0
PreferredLoginDevice           0
CityTier                       0
WarehouseToHome                0
PreferredPaymentMode           0
Gender                         0
HourSpendOnApp                 0
NumberOfDeviceRegistered       0
PreferedOrderCat               0
SatisfactionScore              0
MaritalStatus                  0
NumberOfAddress                0
Complain                       0
OrderAmountHikeFromlastYear    0
CouponUsed                     0
OrderCount                     0
DaySinceLastOrder              0
CashbackAmount                 0
dtype: int64
```

Handle Duplicate Data

```
df.duplicated().sum()
```

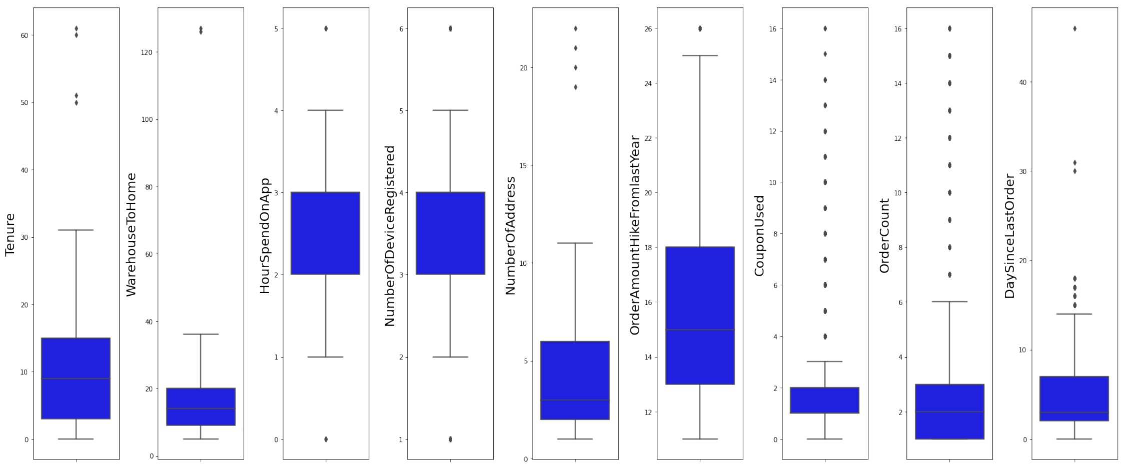
```
0
```

Tidak terdapat duplicate pada data

Handle Outlier

```
outlier_var = ['Tenure',
'WarehouseToHome','HourSpendOnApp','NumberOfDeviceRegistered',
'NumberOfAddress','OrderAmountHikeFromlastYear',
              'CouponUsed', 'OrderCount', 'DaySinceLastOrder']
```

```python
plt.figure(figsize=(24, 10))
for i in range(0, len(outlier_var)):
    plt.subplot(1, len(outlier_var), i+1)
    sns.boxplot(y=df[outlier_var[i]], color='blue', orient='v')
    plt.ylabel(outlier_var[i], fontsize=20)
    plt.tight_layout()
```




```python
#handling outlier
for i in outlier_var :
  q1=df[i].quantile(0.25)
  q3=df[i].quantile(0.75)
  iqr=q3-q1
  low_limit=q1-(iqr*1.5)
  high_limit=q3+(iqr*1.5)
  df = df[(df[i]>=low_limit) & (df[i]<=high_limit)]

df.shape
```

```
(3827, 20)
```

```python
df
```

```
      CustomerID  Churn  Tenure PreferredLoginDevice  CityTier  \
0          50001      1     4.0         Mobile Phone         3
1          50002      1     9.0                Phone         1
2          50003      1     9.0                Phone         1
3          50004      1     0.0                Phone         3
4          50005      1     0.0                Phone         1
...          ...    ...     ...                  ...       ...
5625       55626      0    10.0             Computer         1
5626       55627      0    13.0         Mobile Phone         1
5627       55628      0     1.0         Mobile Phone         1
5628       55629      0    23.0             Computer         3
5629       55630      0     8.0         Mobile Phone         1

      WarehouseToHome PreferredPaymentMode  Gender  HourSpendOnApp  \
0                 6.0           Debit Card  Female             3.0
```

```
1                 8.0                 UPI    Male             3.0
2                30.0          Debit Card    Male             2.0
3                15.0          Debit Card    Male             2.0
4                12.0                  CC    Male             3.0
...               ...                 ...     ...             ...
5625             30.0         Credit Card    Male             3.0
5626             13.0         Credit Card    Male             3.0
5627             11.0          Debit Card    Male             3.0
5628              9.0         Credit Card    Male             4.0
5629             15.0         Credit Card    Male             3.0

      NumberOfDeviceRegistered    PreferedOrderCat  SatisfactionScore
\
0                            3  Laptop & Accessory                  2

1                            4              Mobile                  3

2                            4              Mobile                  3

3                            4  Laptop & Accessory                  5

4                            3              Mobile                  5

...                        ...                 ...                ...

5625                         2  Laptop & Accessory                  1

5626                         5             Fashion                  5

5627                         2  Laptop & Accessory                  4

5628                         5  Laptop & Accessory                  4

5629                         2  Laptop & Accessory                  3


     MaritalStatus  NumberOfAddress  Complain
OrderAmountHikeFromlastYear  \
0           Single                9         1
11.0
1           Single                7         1
15.0
2           Single                6         1
14.0
3           Single                8         0
23.0
4           Single                3         0
11.0
...            ...              ...       ...
```

```
...
5625       Married                    6         0
18.0
5626       Married                    6         0
16.0
5627       Married                    3         1
21.0
5628       Married                    4         0
15.0
5629       Married                    4         0
13.0

      CouponUsed  OrderCount  DaySinceLastOrder  CashbackAmount
0            1.0         1.0                5.0          159.93
1            0.0         1.0                0.0          120.90
2            0.0         1.0                3.0          120.28
3            0.0         1.0                3.0          134.07
4            1.0         1.0                3.0          129.60
...          ...         ...                ...             ...
5625         1.0         2.0                4.0          150.71
5626         1.0         2.0                3.0          224.91
5627         1.0         2.0                4.0          186.42
5628         2.0         2.0                9.0          178.90
5629         2.0         2.0                3.0          169.04

[3827 rows x 20 columns]
```

Setelah dilakukan handling outlier, jumlah row data dari 5630 berkurang menjadi 3827

```
#handling redundan value
df['PreferredPaymentMode'] = df['PreferredPaymentMode'].replace(['Cash
on Delivery','Credit Card'],['COD','CC'])

df.head()
```

```
   CustomerID  Churn  Tenure PreferredLoginDevice  CityTier
WarehouseToHome  \
0       50001      1     4.0         Mobile Phone         3
6.0
1       50002      1     9.0                Phone         1
8.0
2       50003      1     9.0                Phone         1
30.0
3       50004      1     0.0                Phone         3
15.0
4       50005      1     0.0                Phone         1
12.0

  PreferredPaymentMode  Gender  HourSpendOnApp
NumberOfDeviceRegistered  \
0           Debit Card  Female             3.0
```

```
3
1                  UPI    Male            3.0
4
2           Debit Card    Male            2.0
4
3           Debit Card    Male            2.0
4
4                   CC    Male            3.0
3

     PreferedOrderCat  SatisfactionScore MaritalStatus
NumberOfAddress  \
0  Laptop & Accessory                  2        Single
9
1              Mobile                  3        Single
7
2              Mobile                  3        Single
6
3  Laptop & Accessory                  5        Single
8
4              Mobile                  5        Single
3

   Complain  OrderAmountHikeFromlastYear  CouponUsed  OrderCount  \
0         1                         11.0         1.0         1.0
1         1                         15.0         0.0         1.0
2         1                         14.0         0.0         1.0
3         0                         23.0         0.0         1.0
4         0                         11.0         1.0         1.0

   DaySinceLastOrder  CashbackAmount
0                5.0          159.93
1                0.0          120.90
2                3.0          120.28
3                3.0          134.07
4                3.0          129.60
```

Feature Transformation

```
#One Hot Encoding
one_hot_var = ['PreferredPaymentMode', 'PreferredLoginDevice',
'PreferedOrderCat', 'MaritalStatus']

for i in one_hot_var :
    onehots = pd.get_dummies(df[i], prefix=i)
    df = df.join(onehots)

df.head()
```

```
   CustomerID  Churn  Tenure PreferredLoginDevice  CityTier
WarehouseToHome  \
0       50001      1     4.0         Mobile Phone         3
6.0
1       50002      1     9.0                Phone         1
8.0
2       50003      1     9.0                Phone         1
30.0
3       50004      1     0.0                Phone         3
15.0
4       50005      1     0.0                Phone         1
12.0

  PreferredPaymentMode  Gender  HourSpendOnApp
NumberOfDeviceRegistered  ...  \
0           Debit Card  Female             3.0
3  ...
1                  UPI    Male             3.0
4  ...
2           Debit Card    Male             2.0
4  ...
3           Debit Card    Male             2.0
4  ...
4                   CC    Male             3.0
3  ...

  PreferredLoginDevice_Phone  PreferedOrderCat_Fashion  \
0                          0                         0
1                          1                         0
2                          1                         0
3                          1                         0
4                          1                         0

  PreferedOrderCat_Grocery  PreferedOrderCat_Laptop & Accessory  \
0                        0                                    1
1                        0                                    0
2                        0                                    0
3                        0                                    1
4                        0                                    0

   PreferedOrderCat_Mobile  PreferedOrderCat_Mobile Phone  \
0                        0                              0
1                        1                              0
2                        1                              0
3                        0                              0
4                        1                              0

   PreferedOrderCat_Others  MaritalStatus_Divorced
MaritalStatus_Married  \
0                        0                       0
```

```
0
1                         0                       0
0
2                         0                       0
0
3                         0                       0
0
4                         0                       0
0

   MaritalStatus_Single
0                     1
1                     1
2                     1
3                     1
4                     1

[5 rows x 37 columns]
```

```python
df = df.drop(columns=['PreferredPaymentMode', 'PreferredLoginDevice',
'PreferedOrderCat', 'MaritalStatus'])

df.head()
```

```
   CustomerID  Churn  Tenure  CityTier  WarehouseToHome  Gender  \
0       50001      1     4.0         3              6.0  Female
1       50002      1     9.0         1              8.0    Male
2       50003      1     9.0         1             30.0    Male
3       50004      1     0.0         3             15.0    Male
4       50005      1     0.0         1             12.0    Male

   HourSpendOnApp  NumberOfDeviceRegistered  SatisfactionScore  \
0             3.0                         3                  2
1             3.0                         4                  3
2             2.0                         4                  3
3             2.0                         4                  5
4             3.0                         3                  5

   NumberOfAddress  ...  PreferredLoginDevice_Phone
PreferedOrderCat_Fashion  \
0                9  ...                           0
0
1                7  ...                           1
0
2                6  ...                           1
0
3                8  ...                           1
0
4                3  ...                           1
0
```

```
   PreferedOrderCat_Grocery  PreferedOrderCat_Laptop & Accessory  \
0                         0                                    1
1                         0                                    0
2                         0                                    0
3                         0                                    1
4                         0                                    0

   PreferedOrderCat_Mobile  PreferedOrderCat_Mobile Phone  \
0                        0                              0
1                        1                              0
2                        1                              0
3                        0                              0
4                        1                              0

   PreferedOrderCat_Others  MaritalStatus_Divorced
MaritalStatus_Married  \
0                        0                       0
0
1                        0                       0
0
2                        0                       0
0
3                        0                       0
0
4                        0                       0
0

   MaritalStatus_Single
0                     1
1                     1
2                     1
3                     1
4                     1

[5 rows x 33 columns]
```

```
#Label encoding
mapping_gender = {
    'Female' : 0,
    'Male' : 1
    }

df['Gender'] = df['Gender'].map(mapping_gender)

df.head()
```

```
   CustomerID  Churn  Tenure  CityTier  WarehouseToHome  Gender  \
0       50001      1     4.0         3              6.0       0
1       50002      1     9.0         1              8.0       1
```

```
2       50003      1     9.0         1             30.0       1
3       50004      1     0.0         3             15.0       1
4       50005      1     0.0         1             12.0       1

   HourSpendOnApp  NumberOfDeviceRegistered  SatisfactionScore  \
0             3.0                         3                  2
1             3.0                         4                  3
2             2.0                         4                  3
3             2.0                         4                  5
4             3.0                         3                  5

   NumberOfAddress  ...  PreferredLoginDevice_Phone
PreferedOrderCat_Fashion  \
0                9  ...                           0
0
1                7  ...                           1
0
2                6  ...                           1
0
3                8  ...                           1
0
4                3  ...                           1
0

   PreferedOrderCat_Grocery  PreferedOrderCat_Laptop & Accessory  \
0                         0                                    1
1                         0                                    0
2                         0                                    0
3                         0                                    1
4                         0                                    0

   PreferedOrderCat_Mobile  PreferedOrderCat_Mobile Phone  \
0                        0                              0
1                        1                              0
2                        1                              0
3                        0                              0
4                        1                              0

   PreferedOrderCat_Others  MaritalStatus_Divorced
MaritalStatus_Married  \
0                        0                       0
0
1                        0                       0
0
2                        0                       0
0
3                        0                       0
0
4                        0                       0
0
```

```
   MaritalStatus_Single
0                     1
1                     1
2                     1
3                     1
4                     1

[5 rows x 33 columns]
```

Feature Transformation

```python
#Normalization
minmax = df[['HourSpendOnApp','SatisfactionScore']]
minmax_features = MinMaxScaler().fit_transform(minmax.values)
minmax_features_df = pd.DataFrame(minmax_features, index=minmax.index,
columns=minmax.columns)

for i in minmax_features_df.columns:
  df[i]=minmax_features_df[i]

#Standardization
ssv=df[['Tenure','WarehouseToHome','NumberOfDeviceRegistered','NumberO
fAddress','OrderAmountHikeFromlastYear','CouponUsed','OrderCount','Day
SinceLastOrder','CashbackAmount']]
scaled_features = StandardScaler().fit_transform(ssv.values)
scaled_features_df = pd.DataFrame(scaled_features, index=ssv.index,
columns=ssv.columns)

for i in scaled_features_df.columns:
  df[i]=scaled_features_df[i]

df.head()
```

```
   CustomerID  Churn    Tenure  CityTier  WarehouseToHome  Gender  \
0       50001      1 -0.647125         3        -1.189416       0
1       50002      1 -0.033419         1        -0.936189       1
2       50003      1 -0.033419         1         1.849317       1
3       50004      1 -1.138089         3        -0.049891       1
4       50005      1 -1.138089         1        -0.429733       1

   HourSpendOnApp  NumberOfDeviceRegistered  SatisfactionScore  \
0        0.666667                 -0.903938               0.25
1        0.666667                  0.346286               0.50
2        0.333333                  0.346286               0.50
3        0.333333                  0.346286               1.00
4        0.666667                 -0.903938               1.00

   NumberOfAddress  ...  PreferredLoginDevice_Phone
```

```
PreferedOrderCat_Fashion  \
0         1.816800  ...                          0
0
1         1.040287  ...                          1
0
2         0.652031  ...                          1
0
3         1.428543  ...                          1
0
4        -0.512738  ...                          1
0

   PreferedOrderCat_Grocery  PreferedOrderCat_Laptop & Accessory  \
0                         0                                    1
1                         0                                    0
2                         0                                    0
3                         0                                    1
4                         0                                    0

   PreferedOrderCat_Mobile  PreferedOrderCat_Mobile Phone  \
0                        0                              0
1                        1                              0
2                        1                              0
3                        0                              0
4                        1                              0

   PreferedOrderCat_Others  MaritalStatus_Divorced
MaritalStatus_Married  \
0                        0                       0
0
1                        0                       0
0
2                        0                       0
0
3                        0                       0
0
4                        0                       0
0

   MaritalStatus_Single
0                     1
1                     1
2                     1
3                     1
4                     1

[5 rows x 33 columns]
```

```python
# pemisahan features dan target
X = df[[col for col in df.columns if (str(df[col].dtype) != 'object')
```

```
and col not in ['Churn', 'CustomerID']]]
X = df.drop('Churn',1)
y = df['Churn'].values
print(X.shape)
print(y.shape)
```

```
(3827, 32)
(3827,)

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:3:
FutureWarning: In a future version of pandas all arguments of
DataFrame.drop except for the argument 'labels' will be keyword-only
  This is separate from the ipykernel package so we can avoid doing
imports until
```

#**Handle Data Imbalance**

```
# checking jumlah tiap label pada kolom target
df['Churn'].value_counts()
```

```
0    3133
1     694
Name: Churn, dtype: int64
```

```
X_under, y_under =
under_sampling.RandomUnderSampler(0.5).fit_resample(X, y)
X_over, y_over = over_sampling.RandomOverSampler(0.5).fit_resample(X,
y)
X_over_SMOTE, y_over_SMOTE = over_sampling.SMOTE().fit_resample(X, y)

print('Original')
print(pd.Series(y).value_counts())
print('\n')
print('UNDERSAMPLING')
print(pd.Series(y_under).value_counts())
print('\n')
print('OVERSAMPLING')
print(pd.Series(y_over).value_counts())
print('\n')
print('SMOTE')
print(pd.Series(y_over_SMOTE).value_counts())
```

```
/usr/local/lib/python3.7/dist-packages/imblearn/utils/
_validation.py:591: FutureWarning: Pass sampling_strategy=0.5 as
keyword args. From version 0.9 passing these as positional arguments
will result in an error
  FutureWarning,
/usr/local/lib/python3.7/dist-packages/imblearn/utils/_validation.py:5
91: FutureWarning: Pass sampling_strategy=0.5 as keyword args. From
version 0.9 passing these as positional arguments will result in an
error
  FutureWarning,
```

```
Original
0    3133
1     694
dtype: int64


UNDERSAMPLING
0    1388
1     694
dtype: int64


OVERSAMPLING
0    3133
1    1566
dtype: int64


SMOTE
1    3133
0    3133
dtype: int64
```

```
newX=X_over_SMOTE
newX
```

```
      CustomerID    Tenure  CityTier  WarehouseToHome  Gender  
HourSpendOnApp  \
0          50001 -0.647125         3        -1.189416       0   
0.666667   
1          50002 -0.033419         1        -0.936189       1   
0.666667   
2          50003 -0.033419         1         1.849317       1   
0.333333   
3          50004 -1.138089         3        -0.049891       1   
0.333333   
4          50005 -1.138089         1        -0.429733       1   
0.666667   
...          ...       ...       ...              ...     ...   
...   
6261       55450 -1.015348         1         0.187361       0   
0.687695   
6262       54585 -1.015348         1        -0.781836       1   
0.703181   
6263       50233 -0.060094         3        -1.088522       0   
0.345407   
6264       53374 -1.015348         2         1.243140       1   
0.666667   
6265       53705 -1.015348         1         0.380744       0   
0.723353   
```

```
      NumberOfDeviceRegistered  SatisfactionScore  NumberOfAddress
Complain  \
0                    -0.903938           0.250000         1.816800
1
1                     0.346286           0.500000         1.040287
1
2                     0.346286           0.500000         0.652031
1
3                     0.346286           1.000000         1.428543
0
4                    -0.903938           1.000000        -0.512738
0
...                        ...                ...              ...
...
6261                  0.346286           1.000000        -0.512738
0
6262                  1.596510           0.054771        -0.342616
0
6263                  0.346286           0.740945        -0.886931
1
6264                  1.530865           0.763127        -0.512738
0
6265                  1.596510           0.792515        -0.380685
0

      ...  PreferredLoginDevice_Phone  PreferedOrderCat_Fashion  \
0     ...                           0                         0
1     ...                           1                         0
2     ...                           1                         0
3     ...                           1                         0
4     ...                           1                         0
...   ...                         ...                       ...
6261  ...                           0                         0
6262  ...                           0                         0
6263  ...                           0                         0
6264  ...                           0                         0
6265  ...                           0                         0

      PreferedOrderCat_Grocery  PreferedOrderCat_Laptop & Accessory  \
0                            0                                    1
1                            0                                    0
2                            0                                    0
3                            0                                    1
4                            0                                    0
...                        ...                                  ...
6261                         0                                    0
6262                         0                                    0
6263                         0                                    0
6264                         0                                    0
```

```
6265                         0                                    0

      PreferedOrderCat_Mobile  PreferedOrderCat_Mobile Phone  \
0                           0                              0
1                           1                              0
2                           1                              0
3                           0                              0
4                           1                              0
...                       ...                            ...
6261                        0                              0
6262                        0                              1
6263                        0                              0
6264                        0                              1
6265                        0                              0

      PreferedOrderCat_Others  MaritalStatus_Divorced
MaritalStatus_Married  \
0                           0                       0
0
1                           0                       0
0
2                           0                       0
0
3                           0                       0
0
4                           0                       0
0
...                       ...                     ...
...
6261                        0                       0
0
6262                        0                       0
0
6263                        0                       0
0
6264                        0                       0
0
6265                        0                       0
0

      MaritalStatus_Single
0                        1
1                        1
2                        1
3                        1
4                        1
...                    ...
6261                     0
6262                     1
6263                     0
```

```
6264                      0
6265                      1

[6266 rows x 32 columns]
```

FEATURE ENGINEERING

Feature Selection

Pada tahap ini, kami tidak menghapus suatu feature sebagai pertimbangan penggunaan semua feature pada tahap modelling

Feature Extraction

Pada feature extraction ini kami menambahkan kolom avg_totalbelanja, aov dan gmv, dengan penjelasan sebegai berikut:

avg_totalbelanja = rata-rata total uang belanja yang harus dibayarkan sebelum coupon/voucher digunakan

aov (average order value)= rata-rata jumlah uang yang dibelanjakan setiap customer tiap bulan

gmv (gross merchandise value)= total pembelian yg terjadi tiap bulan

Pada case ini kamu mengamsumsikan voucher/coupun yang diberikan ecommerce sebesar 10%

```
newX['avg_totalbelanja']=newX['CashbackAmount']*10
newX['aov']=newX['avg_totalbelanja']*0.9
newX['gmv']=newX['aov']*newX['OrderCount']
newX
```

```
      CustomerID    Tenure  CityTier  WarehouseToHome  Gender  
HourSpendOnApp  \
0          50001 -0.647125         3        -1.189416       0  
0.666667
1          50002 -0.033419         1        -0.936189       1  
0.666667
2          50003 -0.033419         1         1.849317       1  
0.333333
3          50004 -1.138089         3        -0.049891       1  
0.333333
4          50005 -1.138089         1        -0.429733       1  
0.666667
...          ...       ...       ...              ...     ...  
...
```

```
6261       55450 -1.015348         1         0.187361       0
0.687695
6262       54585 -1.015348         1        -0.781836       1
0.703181
6263       50233 -0.060094         3        -1.088522       0
0.345407
6264       53374 -1.015348         2         1.243140       1
0.666667
6265       53705 -1.015348         1         0.380744       0
0.723353

      NumberOfDeviceRegistered  SatisfactionScore  NumberOfAddress
Complain  \
0                    -0.903938           0.250000         1.816800
1
1                     0.346286           0.500000         1.040287
1
2                     0.346286           0.500000         0.652031
1
3                     0.346286           1.000000         1.428543
0
4                    -0.903938           1.000000        -0.512738
0
...                        ...                ...              ...
...
6261                  0.346286           1.000000        -0.512738
0
6262                  1.596510           0.054771        -0.342616
0
6263                  0.346286           0.740945        -0.886931
1
6264                  1.530865           0.763127        -0.512738
0
6265                  1.596510           0.792515        -0.380685
0

      ...  PreferedOrderCat_Laptop & Accessory
PreferedOrderCat_Mobile  \
0     ...                                    1
0
1     ...                                    0
1
2     ...                                    0
1
3     ...                                    1
0
4     ...                                    0
1
...   ...                                  ...                        ..
.
```

```
6261  ...                                   0
0
6262  ...                                   0
0
6263  ...                                   0
0
6264  ...                                   0
0
6265  ...                                   0
0

      PreferedOrderCat_Mobile Phone  PreferedOrderCat_Others  \
0                                 0                        0
1                                 0                        0
2                                 0                        0
3                                 0                        0
4                                 0                        0
...                             ...                      ...
6261                              0                        0
6262                              1                        0
6263                              0                        0
6264                              1                        0
6265                              0                        0

      MaritalStatus_Divorced  MaritalStatus_Married
MaritalStatus_Single  \
0                          0                      0
1
1                          0                      0
1
2                          0                      0
1
3                          0                      0
1
4                          0                      0
1
...                      ...                    ...
...
6261                       0                      0
0
6262                       0                      0
1
6263                       0                      0
0
6264                       0                      0
0
6265                       0                      0
1

      avg_totalbelanja        aov        gmv
```

0	-1.848515	-1.663664	1.797703
1	-11.044724	-9.940251	10.741126
2	-11.190807	-10.071727	10.883194
3	-7.941622	-7.147460	7.723322
4	-8.994839	-8.095355	8.747588
...	...	...	...
6261	-0.421845	-0.379661	-0.201607
6262	-3.694140	-3.324726	-1.765496
6263	-10.487847	-9.439062	10.199557
6264	-4.323919	-3.891527	-2.066479
6265	-5.896246	-5.306621	-2.817922

[6266 rows x 35 columns]