LAPORAN

PORTFOLIO ASSOCIATE DATA SCIENTIST

SUPERVISED LEARNING

Disusun Oleh:

Drs. Herwin, M.Pd.

FAKULTAS ILMU KEOLAHRAGAAN

UNIVERSITAS NEGERI YOGYAKARTA

18 DESEMBER 2021

Data Understanding

- Dataset ini merupakan informasi terkait pelanggan apakah ingin membeli atau tidak terhadap promo barang yang ditawarkan. Diambil beberapa informasi untuk menentukan pelanggan tersebut akan membeli atau tidak.
  X1 : Gender
  x2 : Age
  X3 : Estimated Salary
  Y : Purchased (0: Tidak Membeli, 1: Membeli)

Load Library

#library data manipulation

- import pandas as pd
- import numpy as np

#library data visualisasi

- import matplotlib.pyplot as plt
- import seaborn as sns

#library data modelling

- from sklearn.preprocessing import StandardScaler
- from sklearn.model_selection import train_test_split
- from sklearn.svm import SVC
- from sklearn.linear_model import LogisticRegression

#library data evaluasi

from sklearn.metrics import classification_report
from sklearn.metrics import confusion_matrix

#library export modelling

import pickle

Load Dataset

- import pandas as pd
- df = pd.read_csv('Dataset12_Social_Advertising.csv')
- df.head(5)

	User ID	Gender	Age	EstimatedSalary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

Validation Dataset

#dimension of dataset

- df.shape

```
(400, 5)
```

Validation Dataset

#deskriptif of dataset

- df.describe().T

count	mean	std	min	25%	50%	75%	max	
User ID	400.0	1.569154e+07	71658.321581	15566689.0	15626763.75	15694341.5	15750363.0	15815236.0
Age	400.0	3.765500e+01	10.482877	18.0	29.75	37.0	46.0	60.0
Estimated Salary	400.0	6.974250e+04	34096.960282	15000.0	43000.00	70000.0	88000.0	150000.0
Purchased	400.0	3.575000e-01	0.479864	0.0	0.00	0.0	1.0	1.0

Validation Dataset

#information of dataset

- df.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 400 entries, 0 to 399 Data
columns (total 5 columns): # Column Non-Null
Count Dtype --- ------ -------------- -----
0 User ID 400 non-null int64
1 Gender 400 non-null object
2 Age 400 non-null int64
3 EstimatedSalary 400 non-null int64
4 Purchased 400 non-null int64
dtypes: int64(4), object(1) memory usage:
15.8+ KB
```

Objective Dataset

- df.head(5)

	User ID	Gender	Age	Estimated Salary	Purchased
0	15624510	Male	19	19000	0
1	15810944	Male	35	20000	0
2	15668575	Female	26	43000	0
3	15603246	Female	27	57000	0
4	15804002	Male	19	76000	0

Objective Dataset

#drop user ID

- df = df.drop(['User ID'], axis=1)
- df.head(5)

	Gender	Age	EstimatedSalary	Purchased
0	Male	19	19000	0
1	Male	35	20000	0
2	Female	26	43000	0
3	Female	27	57000	0
4	Male	19	76000	0

Cleaning of Dataset

- df.isnull().sum()

```
Gender              0
Age                 0
EstimatedSalary     0
Purchased           0
dtype: int64
```

Objective Dataset

```
#option 1

# df = df.dropna()

# df.isnull().sum()

#option 2
```

- df['Gender'] = df['Gender'].fillna(df['Gender'].mode()[0])
- df['Age'] = df['Age'].fillna(int(df['Age'].mean()))
- df.isnull().sum()

```
Gender              0
Age                 0
EstimatedSalary     0
Purchased           0
dtype: int64
```

Kontruksi Prediktor Dataset

- df.head(5)

	Gender	Age	EstimatedSalary	Purchased
0	Male	19	19000	0
1	Male	35	20000	0
2	Female	26	43000	0
3	Female	27	57000	0
4	Male	19	76000	0

Kontruksi Prediktor Dataset

- df['Gender'] = df['Gender'].map({'Male': 1, 'Female':0})
- scaler = StandardScaler()
- df.iloc[:,1:3] = scaler.fit_transform(df.iloc[:,1:3])
- df.head(5)

	Gender	Age	EstimatedSalary	Purchased
0	1	-1.781797	-1.490046	0
1	1	-0.253587	-1.460681	0
2	0	-1.113206	-0.785290	0
3	0	-1.017692	-0.374182	0
4	1	-1.781797	0.183751	0

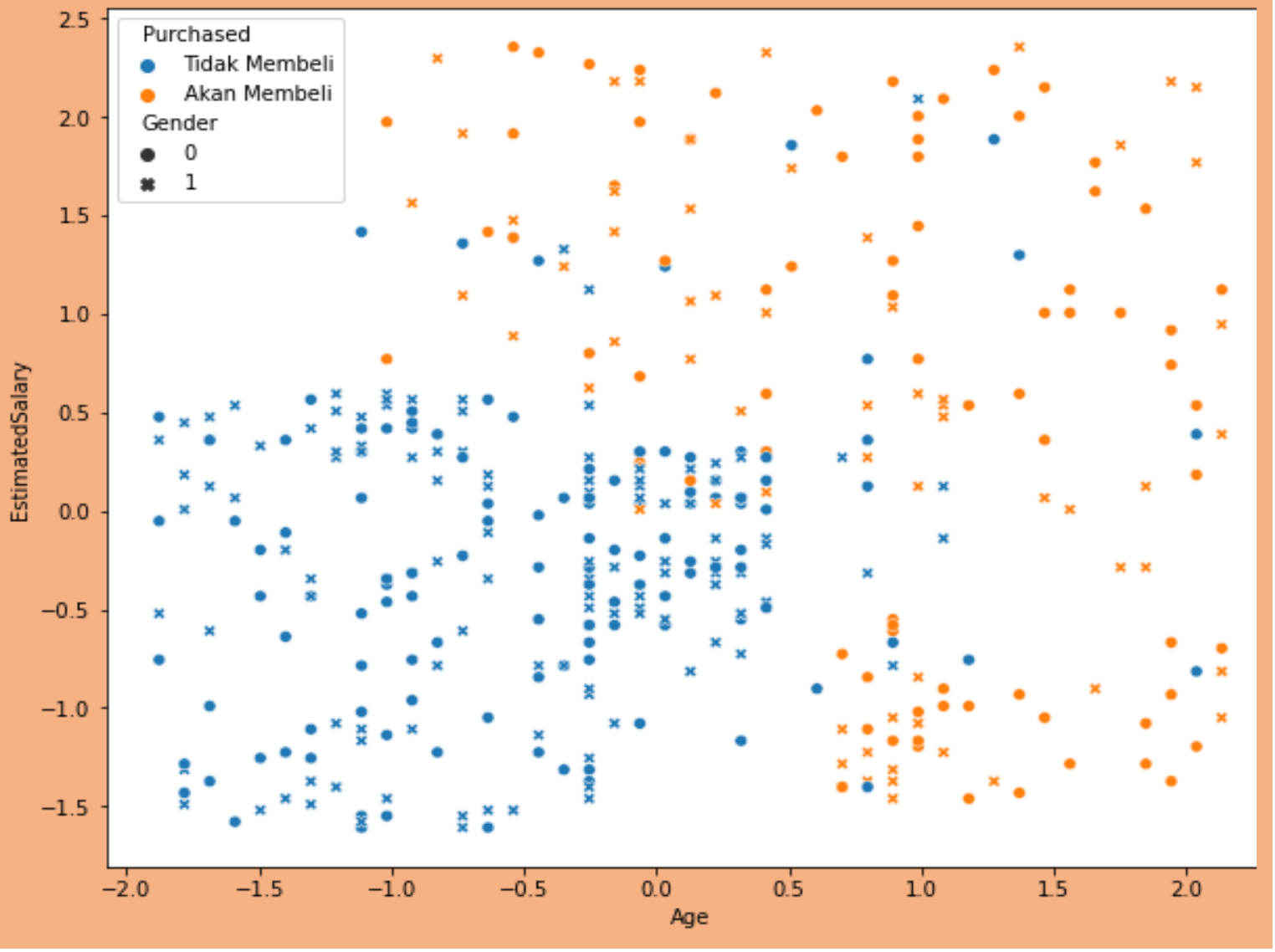
Labelling of Dataset

- df['Purchased'].unique()
- array([0, 1])
- df['Purchased'] = df['Purchased'].map({0:'Tidak Membeli', 1:'Akan Membeli'})
- df.head(5)

	Gender	Age	EstimatedSalary	Purchased
0	1	-1.781797	-1.490046	Tidak Membeli
1	1	-0.253587	-1.460681	Tidak Membeli
2	0	-1.113206	-0.785290	Tidak Membeli
3	0	-1.017692	-0.374182	Tidak Membeli
4	1	-1.781797	0.183751	Tidak Membeli

Visualization of Dataset

- fig, axes = plt.subplots(figsize=(10,8))
- sns.scatterplot(data=df, x='Age', y='EstimatedSalary', hue='Purchased', style='Gender')
- plt.show()



Modelling of Dataset

Model SVM

- X = df[['Gender','Age','EstimatedSalary']]
- y = df['Purchased']
- x_train, x_test, y_train, y_test = train_test_split(X,y, test_size=0.2, random_state=14)
- model_svm = SVC(kernel='rbf')
- model_svm.fit(x_train, y_train)
- with open('model_svm.pkl', 'wb') as file:
  pickle.dump(model_svm, file)

Model LogisticRegression

- X = df[['Gender','Age','EstimatedSalary']]
- y = df['Purchased']
- x_train, x_test, y_train, y_test = train_test_split(X,y, test_size=0.2, random_state=14)
- model_lr = LogisticRegression()
- model_lr.fit(x_train, y_train)
- with open('model_lr.pkl', 'wb') as file:
  pickle.dump(model_lr, file)

Evaluation of Modelling

- y_predict = model_svm.predict(x_test)
- print(f"Classification Report \n {classification_report(y_test, y_predict)}")

```
Classification Report
                precision    recall  f1-score   support

Akan Membeli       0.81      0.91      0.85        32
Tidak Membeli      0.93      0.85      0.89        48

accuracy                             0.88        80
macro avg          0.87      0.88      0.87        80
weighted avg       0.88      0.88      0.88        80
```

- y_predict = model_lr.predict(x_test)
- print(f"Classification Report \n {classification_report(y_test, y_predict)}")

```
Classification Report
                precision    recall  f1-score   support

Akan Membeli       0.89      0.75      0.81        32
Tidak Membeli      0.85      0.94      0.89        48

accuracy                             0.86        80
macro avg          0.87      0.84      0.85        80
weighted avg       0.86      0.86      0.86        80
```

Evaluation of Modelling

Visualisasi *Confusion Matrix*

- print(f"Confusion Matrix Report \n {confusion_matrix(y_test, y_predict)}")

```
Confusion Matrix Report
[[ 29  3]
[ 7  41]]
```

Visualisasi *Confusion Matrix*

- import seaborn as sns
- import matplotlib.pyplot as plt
- f, ax = plt.subplots(figsize=(8,5))
- sns.heatmap(confusion_matrix(y_test, y_predict), annot=True, fmt=".0f", ax=ax)
- plt.xlabel("y_head")
- plt.ylabel("y_true")
- plt.show()