1. Dataset

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

%matplotlib inline

from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).
```

```
import pandas as pd
df=pd.read_csv('/content/drive/MyDrive/Colab Notebooks/praktikum_BDPA/online_gaming_behavior_dataset.csv')
df.head(10)
```

	PlayerID	Age	Gender	Location	GameGenre	PlayTimeHours	InGamePurchases	GameDifficulty	SessionsPerWeek	AvgSessionDurationMinutes	Player
0	9000	43	Male	Other	Strategy	16.271119	0	Medium	6	108	
1	9001	29	Female	USA	Strategy	5.525961	0	Medium	5	144	
2	9002	22	Female	USA	Sports	8.223755	0	Easy	16	142	
3	9003	35	Male	USA	Action	5.265351	1	Easy	9	85	
4	9004	33	Male	Europe	Action	15.531945	0	Medium	2	131	
5	9005	37	Male	Europe	RPG	20.561855	0	Easy	2	81	
6	9006	25	Male	USA	Action	9.752716	0	Hard	1	50	
7	9007	25	Female	Asia	RPG	4.401729	0	Medium	10	48	
8	9008	38	Female	Europe	Simulation	18.152733	0	Easy	5	101	
9	9009	38	Female	Other	Sports	23.942772	0	Easy	13	95	

2. Analisis dan visualisasi data

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 40034 entries, 0 to 40033
Data columns (total 13 columns):
 #   Column                     Non-Null Count  Dtype  
---  ------                     --------------  -----  
 0   PlayerID                   40034 non-null  int64  
 1   Age                        40034 non-null  int64  
 2   Gender                     40034 non-null  object 
 3   Location                   40034 non-null  object 
 4   GameGenre                  40034 non-null  object 
 5   PlayTimeHours              40034 non-null  float64
 6   InGamePurchases            40034 non-null  int64  
 7   GameDifficulty             40034 non-null  object 
 8   SessionsPerWeek            40034 non-null  int64  
 9   AvgSessionDurationMinutes  40034 non-null  int64  
 10  PlayerLevel                40034 non-null  int64  
 11  AchievementsUnlocked       40034 non-null  int64  
 12  EngagementLevel            40034 non-null  object 
dtypes: float64(1), int64(7), object(5)
memory usage: 4.0+ MB
```

```
df.describe()
```

	PlayerID	Age	PlayTimeHours	InGamePurchases	SessionsPerWeek	AvgSessionDurationMinutes	PlayerLevel	AchievementsUnlocked
count	40034.000000	40034.000000	40034.000000	40034.000000	40034.000000	40034.000000	40034.000000	40034.000000
mean	29016.500000	31.992531	12.024365	0.200854	9.471774	94.792252	49.655568	24.526477
std	11556.964675	10.043227	6.914638	0.400644	5.763667	49.011375	28.588379	14.430726
min	9000.000000	15.000000	0.000115	0.000000	0.000000	10.000000	1.000000	0.000000
25%	19008.250000	23.000000	6.067501	0.000000	4.000000	52.000000	25.000000	12.000000
50%	29016.500000	32.000000	12.008002	0.000000	9.000000	95.000000	49.000000	25.000000
75%	39024.750000	41.000000	17.963831	0.000000	14.000000	137.000000	74.000000	37.000000
max	49033.000000	49.000000	23.999592	1.000000	19.000000	179.000000	99.000000	49.000000

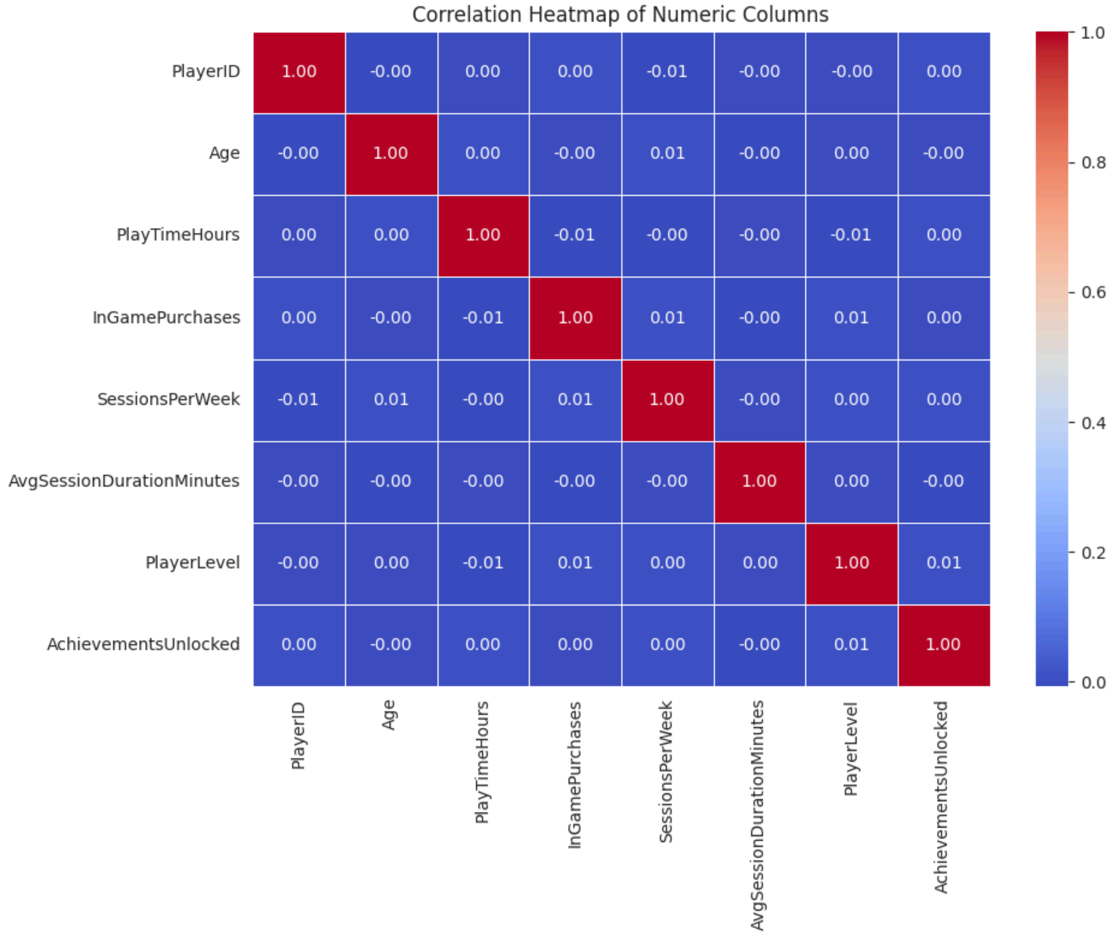
```
df.isnull().sum()
```

```
                          0
PlayerID                  0
Age                       0
Gender                    0
Location                  0
GameGenre                 0
PlayTimeHours             0
InGamePurchases           0
GameDifficulty            0
SessionsPerWeek           0
AvgSessionDurationMinutes 0
PlayerLevel               0
AchievementsUnlocked      0
EngagementLevel           0

dtype: int64
```

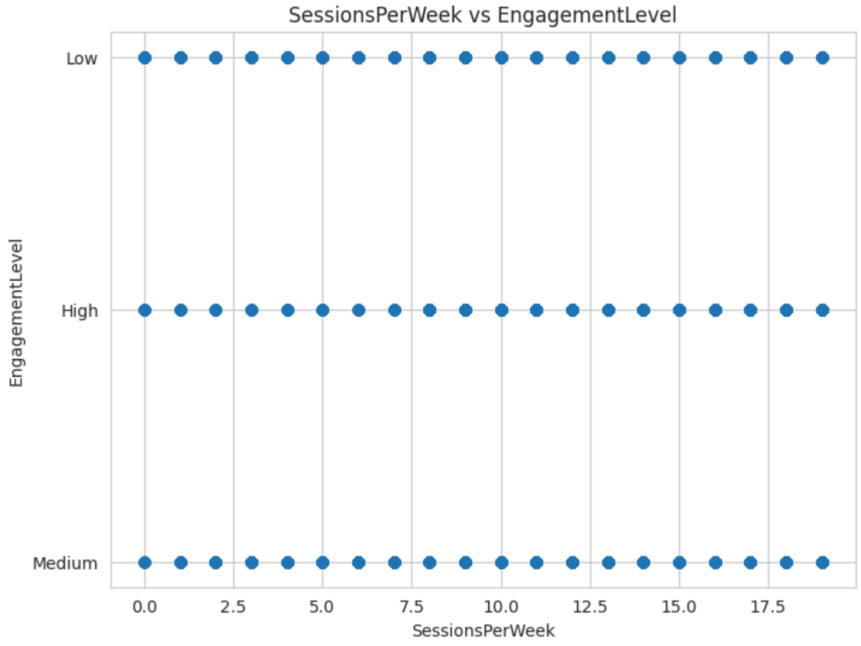
```
df.columns
```

```
Index(['PlayerID', 'Age', 'Gender', 'Location', 'GameGenre', 'PlayTimeHours',
       'InGamePurchases', 'GameDifficulty', 'SessionsPerWeek',
       'AvgSessionDurationMinutes', 'PlayerLevel', 'AchievementsUnlocked',
       'EngagementLevel'],
      dtype='object')
```

```
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
numeric_df = df.select_dtypes (include=['number'])
correlation_matrix = numeric_df.corr()
sns.set_style("whitegrid")
plt.figure(figsize=(10, 8))
sns.heatmap(
    correlation_matrix,
    annot=True,
    cmap='coolwarm',
    fmt=".2f",
    linewidths=.5
)
plt.title('Correlation Heatmap of Numeric Columns')
plt.tight_layout()
plt.show()
```



```
plt.figure(figsize=(8, 6)) # Adjust figure size as needed
plt.scatter(df['SessionsPerWeek'], df ['EngagementLevel'])
# Add labels and title
plt.xlabel('SessionsPerWeek')
plt.ylabel('EngagementLevel')
plt.title('SessionsPerWeek vs EngagementLevel')
# Show the plot
plt.grid(True) # Add a grid for better readability
plt.show()
```



3. Data Preparation / Preprocessing

Menghapus Kolom

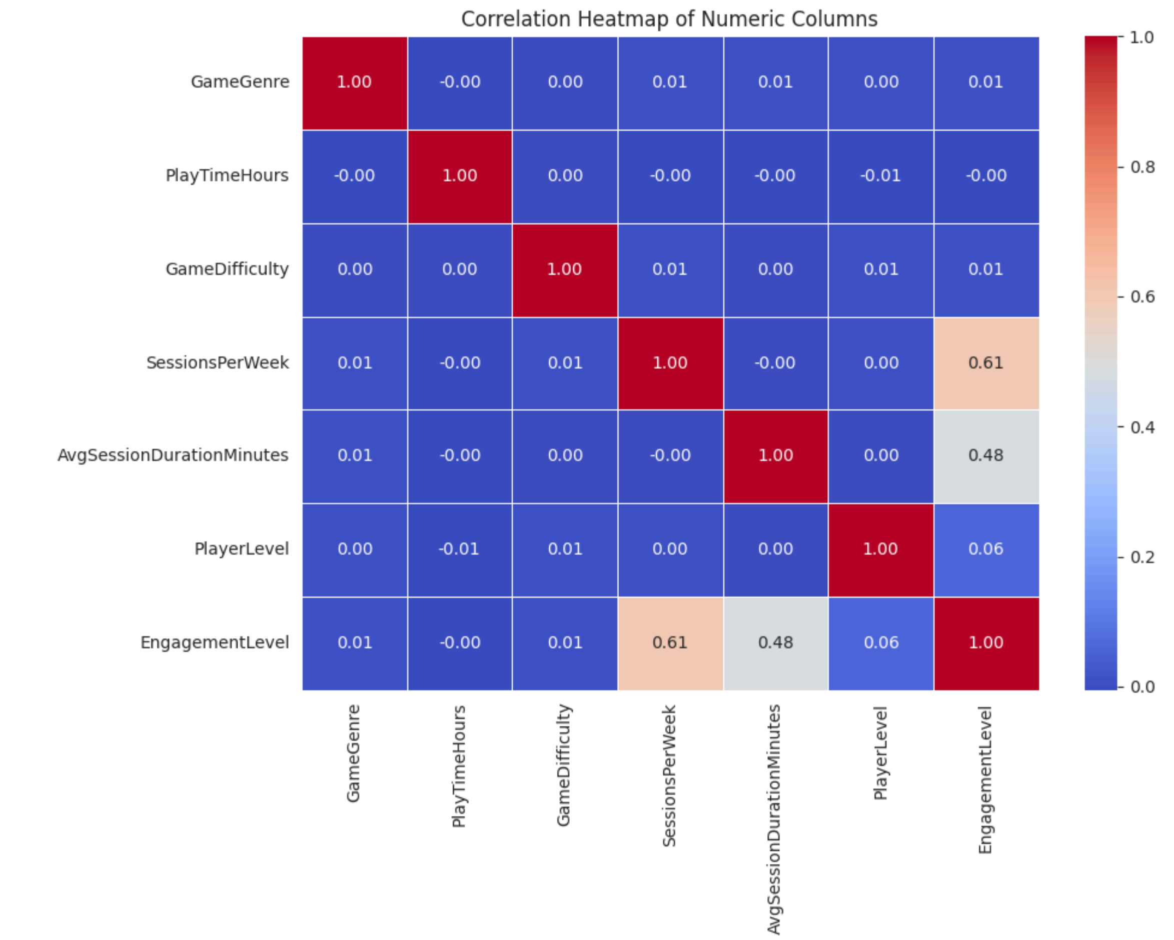
```
df.drop(['PlayerID', 'Age', 'Gender', 'Location', 'InGamePurchases', 'AchievementsUnlocked'], axis=1, inplace=True)
df.reset_index(drop=True, inplace=True)
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 40034 entries, 0 to 40033
Data columns (total 7 columns):
 #   Column                    Non-Null Count  Dtype  
---  ------                    --------------  -----  
 0   GameGenre                 40034 non-null  object 
 1   PlayTimeHours             40034 non-null  float64
 2   GameDifficulty            40034 non-null  object 
 3   SessionsPerWeek           40034 non-null  int64  
 4   AvgSessionDurationMinutes  40034 non-null  int64  
 5   PlayerLevel               40034 non-null  int64  
 6   EngagementLevel           40034 non-null  object 
dtypes: float64(1), int64(3), object(3)
memory usage: 2.1+ MB
```

- Encoding

```
from sklearn.preprocessing import OrdinalEncoder

categorical_cols = ['GameGenre']
encoder = OrdinalEncoder()
df[categorical_cols] = encoder.fit_transform(df[categorical_cols])
df.head()

# # membersihkan kolom teks terlebih dahulu
df['GameDifficulty'] = df['GameDifficulty'].str.lower().str.strip()
df['EngagementLevel'] = df['EngagementLevel'].str.lower().str.strip()

# # mengubah data pada kolom dengan mapping
difficulty_mapping = {'easy': 0, 'medium': 1, 'hard': 2}
engagement_mapping = {'low': 0, 'medium': 1, 'high': 2}

# # menerapkan pemetaan pada data
df['GameDifficulty'] = df['GameDifficulty'].map(difficulty_mapping)
df['EngagementLevel'] = df['EngagementLevel'].map(engagement_mapping)
```

```
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
numeric_df = df.select_dtypes (include=['number'])
correlation_matrix = numeric_df.corr()
sns.set_style("whitegrid")
plt.figure(figsize=(10, 8))
sns.heatmap(
    correlation_matrix,
    annot=True,
    cmap='coolwarm',
    fmt=".2f",
    linewidths=.5
)
plt.title('Correlation Heatmap of Numeric Columns')
plt.tight_layout()
plt.show()
```



Normalisasi

```
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split

df_features = df.drop(columns={"EngagementLevel"}) #features
df_target = df["EngagementLevel"] #target
```

```
# Tampilkan beberapa baris pertama dari fitur dan target untuk memastikan pemisahan
print("\nBeberapa baris pertama dari fitur (X):")
print(x.head())
print("\nBeberapa baris pertama dari target (y):")
print(y.head())
```

```
Beberapa baris pertama dari fitur (X):
   GameGenre  InGamePurchases  GameDifficulty  SessionsPerWeek  \
0        4.0                0               1                6
1        4.0                0               1                5
2        3.0                0               0               16
3        0.0                1               0                9
4        0.0                0               1                2

   AvgSessionDurationMinutes  PlayerLevel  AchievementsUnlocked
0                        108           79                    25
1                        144           11                    10
2                        142           35                    41
3                         85           57                    47
4                        131           95                    37

Beberapa baris pertama dari target (y):
0    1
1    1
2    2
3    1
4    1
Name: EngagementLevel, dtype: int64
```

```
from sklearn.preprocessing import StandardScaler
cols = list(x.columns)
df_features_scaled = pd.DataFrame(data = x)
df_features_scaled[cols] = StandardScaler().fit_transform(x[cols])
df_features_scaled.head()
```

	GameGenre	InGamePurchases	GameDifficulty	SessionsPerWeek	AvgSessionDurationMinutes	PlayerLevel	AchievementsUnlocked
0	1.412273	-0.501334	0.383999	-0.602363	0.269487	1.026459	0.032814
1	1.412273	-0.501334	0.383999	-0.775865	1.004019	-1.352160	-1.006648
2	0.705766	-0.501334	-0.896340	1.132666	0.963212	-0.512647	1.141573
3	-1.413756	1.994676	-0.896340	-0.081854	-0.199798	0.256906	1.557358
4	-1.413756	-0.501334	0.383999	-1.296374	0.738771	1.586134	0.864383

- Train test split

```
from sklearn.model_selection import train_test_split
# Membagi data dengan train test split
X_train, X_test, y_train, y_test = train_test_split(df_features_scaled, df_target, test_size=0.2, random_state=45)

# Menampilkan data X_train dan X_test
print('Train set:', X_train.shape, y_train.shape)
print(X_train.head())
print('\n')
print('Test set:', X_test.shape, y_test.shape)
print(X_test.head())
```

```
Train set: (32027, 7) (32027,)
       GameGenre  InGamePurchases  GameDifficulty  SessionsPerWeek  \
11408   1.412273        -0.501334        1.664339        -0.949368
6944   -0.000741         1.994676       -0.896340         0.785660
15158   0.705766        -0.501334        0.383999         0.265152
2334   -1.413756        -0.501334        0.383999         0.438654
26043   0.705766        -0.501334       -0.896340         1.479671

       AvgSessionDurationMinutes  PlayerLevel  AchievementsUnlocked
11408                  -1.322000    -0.127871              1.141573
6944                    1.432497     0.991479             -0.452268
15158                  -1.383212    -0.197830              0.171409
2334                    1.208056     0.921520              1.557358
26043                  -0.526257    -1.107302             -0.729458


Test set: (8007, 7) (8007,)
       GameGenre  InGamePurchases  GameDifficulty  SessionsPerWeek  \
33152  -1.413756        -0.501334        0.383999        -1.643379
20373  -1.413756         1.994676       -0.896340         0.265152
11565   0.705766        -0.501334        0.383999         0.785660
17858  -0.000741         1.994676        0.383999         0.785660
11085  -1.413756         1.994676       -0.896340        -1.296374

       AvgSessionDurationMinutes  PlayerLevel  AchievementsUnlocked
33152                  -0.689486    -1.422119             -0.660161
20373                   1.187652     1.271317             -1.561027
11565                  -0.240605    -1.666977              0.656491
17858                  -0.444642     1.481195              1.141573
11085                  -0.689486     0.431804             -0.175078
```

4. Modeling

- Linear regression

```
from sklearn.linear_model import LinearRegression
lr_model = LinearRegression()
lr_model.fit(X_train, y_train)
```

```
▾ LinearRegression ⓘ ?
LinearRegression()
```

```
lr_model.coef_
```

```
array([ 6.24008082e-04,  5.55584745e-03, -2.03529680e-04,  4.34633390e-01,
        3.42716265e-01,  3.93567264e-02,  4.32613904e-02])
```

```
lr_model.intercept_
```

```
np.float64(0.9997915464230268)
```

- Prediksi

```
# Menguji model
# Menguji model dengan X_test
import numpy as np
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score, confusion_matrix, classification_report
y_pred = lr_model.predict(X_test)
# Round the continuous predictions to the nearest integer to get discrete classes
```

```
y_pred_classes = np.round(y_pred).astype(int)
print('Data asli: \n', y_test[0:10])
print('\n')
print('Hasil prediksi (setelah pembulatan): \n', y_pred_classes[0:10])
# Evaluasi
acc = accuracy_score(y_test, y_pred_classes)
prec = precision_score(y_test, y_pred_classes, average='macro')
rec = recall_score(y_test, y_pred_classes, average='macro')
f1 = f1_score(y_test, y_pred_classes, average='macro')
cm = confusion_matrix(y_test, y_pred_classes)
# Tampilkan hasil
print("Akurasi :", acc)
print("Presisi :", prec)
print("Recall :", rec)
print("F1 Score :", f1)
print("Confusion Matrix:\n", cm)
print("\nLaporan Klasifikasi:\n", classification_report(y_test, y_pred_classes))
```

```
Data asli:
 33152    1
20373    2
11565    1
17858    1
11085    0
20671    1
34000    1
17368    1
35195    1
22371    1
Name: EngagementLevel, dtype: int64
```