Рубежный контроль №1

Выполнил: Иванников Александр Владимирович, группа ИУ5-23М

Описание задания:

Вариант №3

Для заданного набора данных произведите масштабирование данных (для одного признака) и преобразование категориальных признаков в количественные двумя способами (label encoding, one hot encoding) для одного признака.

In [1]:

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

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

In [0]:

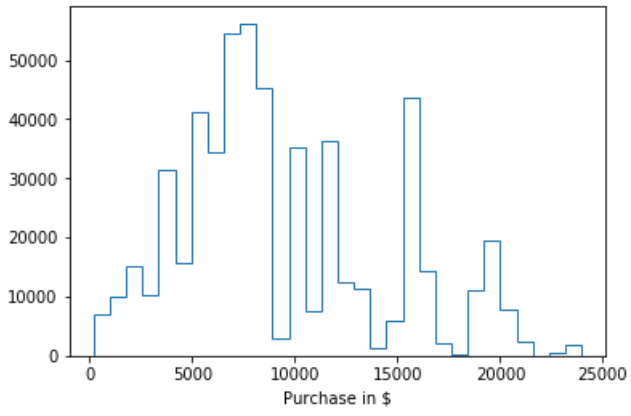
```
from google.colab import files
import os
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
os.listdir()
data = pd.read_csv('drive/My Drive/Files/dataset/BlackFriday.csv', sep=",")
```

Масштабирование данных

Возьмем параметр покупок:

In [3]:

```
plt.hist(data['Purchase'], 30, histtype='step')
plt.xlabel('Purchase in $')
plt.show()
```



Масштабируем данные по методу минимакса и Z-оценок:

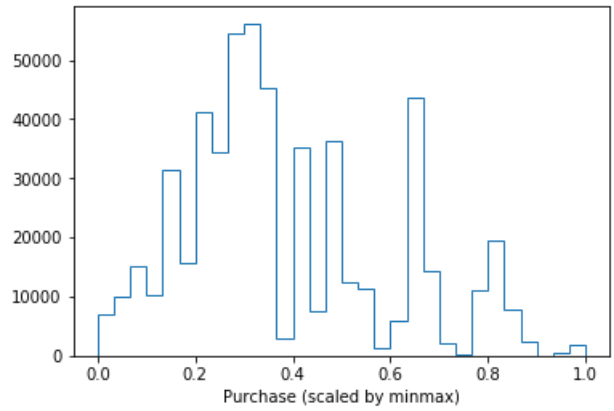
In [4]:

```
from sklearn.preprocessing import MinMaxScaler, StandardScaler
```

```
sc1 = MinMaxScaler()
sc1_data = sc1.fit_transform(data[['Purchase']])

plt.hist(sc1_data, 30, histtype='step')
plt.xlabel('Purchase (scaled by minmax)')
plt.show()
```

```
/usr/local/lib/python3.6/dist-packages/sklearn/preprocessing/data.py:334: DataConversionWarning: D
ata with input dtype int64 were all converted to float64 by MinMaxScaler.
  return self.partial_fit(X, y)
```

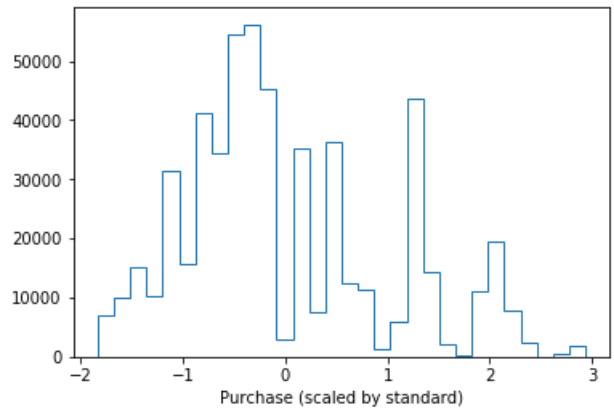


In [5]:

```
sc2 = StandardScaler()
sc2_data = sc2.fit_transform(data[['Purchase']])

plt.hist(sc2_data, 30, histtype='step')
plt.xlabel('Purchase (scaled by standard)')
plt.show()
```

```
/usr/local/lib/python3.6/dist-packages/sklearn/preprocessing/data.py:645: DataConversionWarning: D
ata with input dtype int64 were all converted to float64 by StandardScaler.
  return self.partial_fit(X, y)
/usr/local/lib/python3.6/dist-packages/sklearn/base.py:464: DataConversionWarning: Data with input
dtype int64 were all converted to float64 by StandardScaler.
  return self.fit(X, **fit_params).transform(X)
```



Логичнее использовать масштабирование minmax, так как параметр имеет значения почти от 0 до большого значения (и поэтому логичнее маштабировать от 0 до 1).

Преобразование категориальных признаков

In [0]:

```
from sklearn.preprocessing import LabelEncoder, OneHotEncoder
```

Использование LabelEncoder

In [7]:

```
cat_temp_data = data[['Gender']]
cat_temp_data[0:10]
```

Out[7]:

	Gender
0	F
1	F
2	F
3	F
4	M
5	M
6	M
7	M
8	M
9	M

Сравним исходные данные и их целочисленные значения:

In [8]:

```
le = LabelEncoder()
cat_enc_le = le.fit_transform(cat_temp_data['Gender'])
cat_enc2 = pd.DataFrame({'Gender':cat_temp_data['Gender'], 'Gender bin':cat_enc_le})
cat_enc2[0:10]
```

Out[8]:

	Gender	Gender bin
0	F	0
1	F	0
2	F	0
3	F	0
4	M	1
5	M	1
6	M	1
7	M	1
8	M	1
9	M	1

Внедрим данные в исходные данные:

In [9]:

```
data.head(5)
```

Out[9]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category_1	Pro
0	1000001	P00069042	F	0-17	10	A	2	0	3	
1	1000001	P00248942	F	0-	10	A	2	0	1	

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category_1	Pro
2	1000001	P00087842	F	0-17	10	A	2	0	12	
3	1000001	P00085442	F	0-17	10	A	2	0	12	
4	1000002	P00285442	M	55+	16	C	4+	0	8	

In [10]:

```
data2 = data
data2['Gender'] = cat_enc_le
data2.head(5)
```

Out[10]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category_1	Pro
0	1000001	P00069042	0	0-17	10	A	2	0	3	
1	1000001	P00248942	0	0-17	10	A	2	0	1	
2	1000001	P00087842	0	0-17	10	A	2	0	12	
3	1000001	P00085442	0	0-17	10	A	2	0	12	
4	1000002	P00285442	1	55+	16	C	4+	0	8	

Использование OneHotEncoder

In [11]:

```
ohe = OneHotEncoder()
cat_enc_ohe = ohe.fit_transform(data[['City_Category']])
cat_enc_ohe.todense()[0:10]
```

Out[11]:

```
matrix([[1., 0., 0.],
        [1., 0., 0.],
        [1., 0., 0.],
        [1., 0., 0.],
        [0., 0., 1.],
        [1., 0., 0.],
        [0., 1., 0.],
        [0., 1., 0.],
        [0., 1., 0.],
        [1., 0., 0.]])
```

In [12]:

```
data4 = pd.get_dummies(data[['City_Category']])
data4.head(5)
```

Out[12]:

	City_Category_A	City_Category_B	City_Category_C
0	1	0	0
1	1	0	0
2	1	0	0
3	1	0	0
4	0	0	1

Добавим в исходные данные новые столбцы:

In [13]:

```
data3=data2.join(data4)
data3.head(5)
```

Out[13]:

	User_ID	Product_ID	Gender	Age	Occupation	City_Category	Stay_In_Current_City_Years	Marital_Status	Product_Category_1	Pro
0	1000001	P00069042	0	0-17	10	A	2	0	3	
1	1000001	P00248942	0	0-17	10	A	2	0	1	
2	1000001	P00087842	0	0-17	10	A	2	0	12	
3	1000001	P00085442	0	0-17	10	A	2	0	12	
4	1000002	P00285442	1	55+	16	C	4+	0	8	