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Files

- ..
- sample\_data
- customer churn.xlsx
- telco\_churn.csv

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```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from scipy.stats import chi2_contingency
data=pd.read_csv('telco_churn.csv')
print(data.head())
data =data.dropna()
data['Churn']=data['Churn'].map({'Yes':1,'No':0})
print(data.describe())
plt.figure(figsize=(12,6))
plt.subplot(1,2,1)
sns.countplot(data=data,x='Contract',hue='Churn')
plt.title('Churn vs ContractType')
plt.subplot(1,2,1)
sns.countplot(data=data,x='PaymentMethod',hue='Churn')
plt.title('Churn vs PaymentMethod')
plt.tight_layout()
plt.show()
churn_rate_contract=data.groupby('Contract')['Churn'].mean()
churn_rate_payment=data.groupby('PaymentMethod')['Churn'].mean()
print("Churn Rate by ContractType:\n",churn_rate_contract)
print("Churn Rate by PaymentMethod:\n",churn_rate_payment)
contingency_contract=pd.crosstab(data['Contract'],data['Churn'])
chi2_contract,p_contract,_,_=chi2_contingency(contingency_contract)
s chi_square test:p_value={p_contract}')
d crosstab(data['PaymentMethod'],data['Churn'])
```

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contingency\_contract=pd.crosstab(data['Contract'],data['Churn'])  
chi2\_contract,p\_contract,\_,\_=chi2\_contingency(contingency\_contract)  
print(f'Contract types chi\_square test:p\_value={p\_contract}')  
contingency\_payment=pd.crosstab(data['PaymentMethod'],data['Churn'])  
chi2\_payment,p\_payment,\_,\_=chi2\_contingency(contingency\_payment)  
print(f'Payment methods chi-square test: p-value={p\_payment}')

count	4121.000000	4121.000000	4121.000000	2043.000000
mean	1253.162097	32.829896	73.504513	0.272149
std	773.818942	24.541226	26.214826	0.445175
min	0.000000	0.000000	18.550000	0.000000
25%	602.000000	9.000000	55.750000	0.000000
50%	1207.000000	30.000000	78.949997	0.000000
75%	1817.000000	56.000000	94.199997	1.000000
max	2998.000000	72.000000	118.650002	1.000000

### Churn vs PaymentMethod

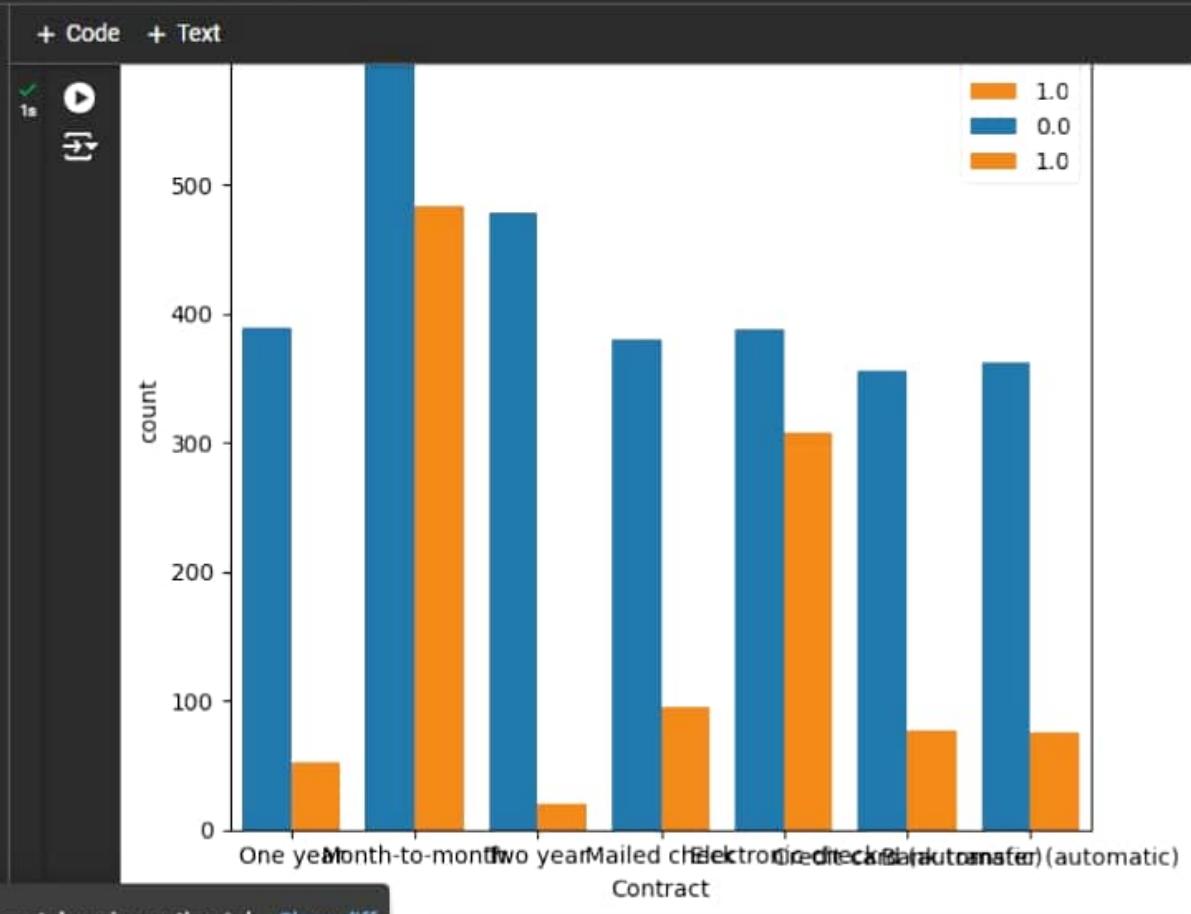
PaymentMethod	Churn
1	0.0
2	1.0
3	0.0
4	1.0

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Churn Rate by ContractType:

Contract

Month-to-month 0.437897

One year 0.119910

Two year 0.040161

Name: Churn, dtype: float64

Churn Rate by PaymentMethod:

PaymentMethod

Bank transfer (automatic) 0.173516

Credit card (automatic) 0.177829

Electronic check 0.442529

Mailed check 0.199580

Name: Churn, dtype: float64

Contract types chi-square test:p\_value=1.4816607448329118e-74

Payment methods chi-square test: p-value=1.62170149674659e-33

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```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from datetime import datetime
df = pd.read_csv('telco_churn.csv')
columns = ['gender', 'SeniorCitizen', 'Partner', 'Dependents']
numerical = columns
plt.figure(figsize=(20,4))
for i,column in enumerate(numerical):
    axis = plt.subplot(1,len(numerical),i+1)
    sns.countplot(x=str(column), data=df)
    axis.set_title(f"{column}")
    sns.boxplot(x='Churn',y='MonthlyCharges',data=df)
    data = {'customer_id':[1,2,3,4,5], 'start_date':['2020-01-01', '2019-06-15', '2018-09-30', '2021-03-22', '2020-12-01'], 'churn': [0, 1, 0, 1, 0]}
df = pd.DataFrame(data)
df['start_date']=pd.to_datetime(df['start_date'])
print(df)
plt.figure(figsize=(7,4))
plt.title('customer churn distribution')
plt.ylabel('number of customer')
plt.xlabel('customer status')
plt.show()
```

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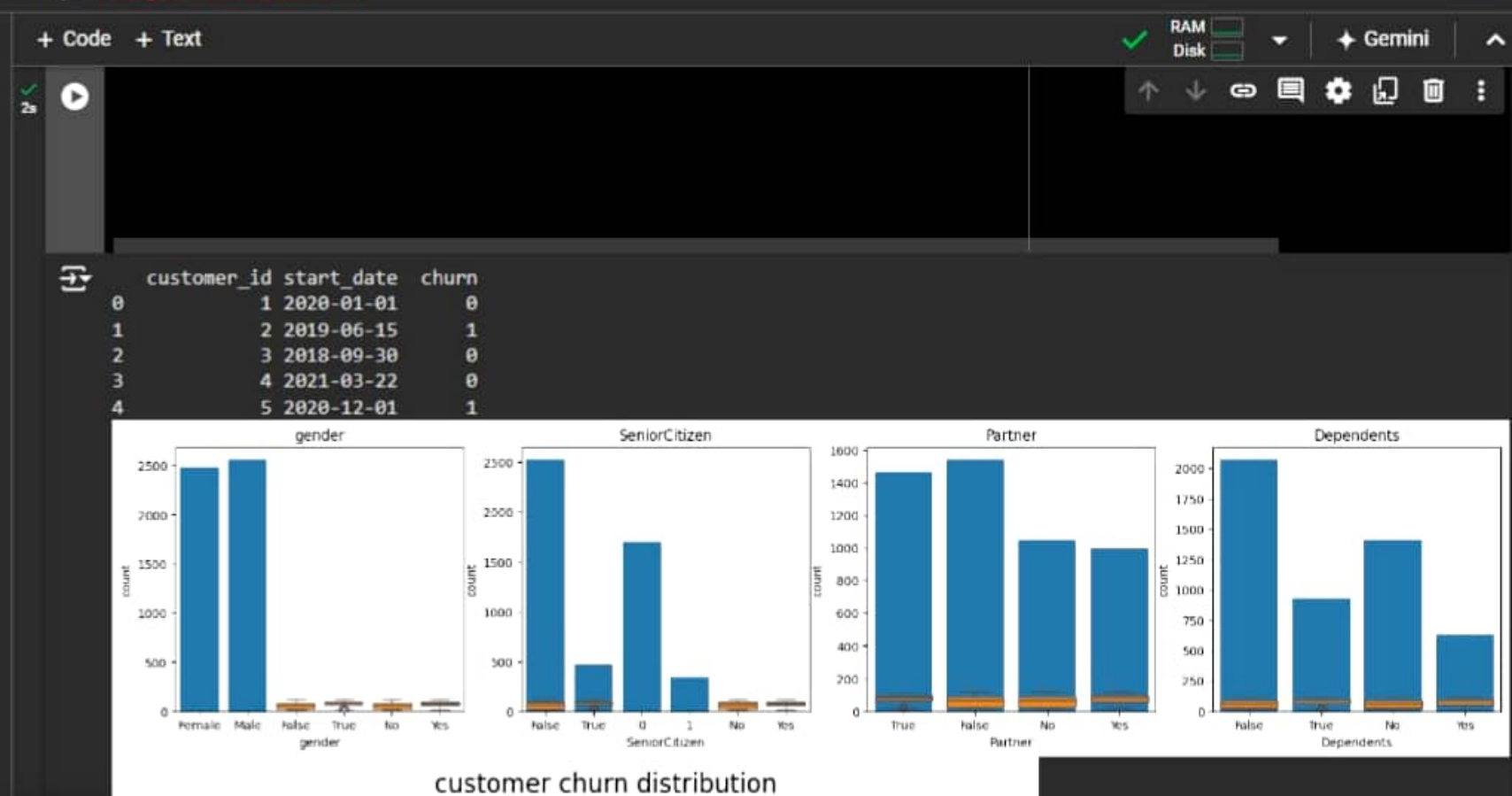
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