```
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
from sklearn.ensemble import IsolationForest
from scipy.stats import multivariate_normal
from sklearn.metrics import f1_score
import io
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.metrics import f1_score,roc_auc_score,roc_curve,precision_recall_curve,auc,make_scorer,recall_score,accuracy_score,precisi
```

```
data = pd.read_csv('/content/agent_2.csv')
data.head(10)
```

	Agent Name	Agent Email	Queue	Direction	Date Interval	Time Interval	Distribution	Handled	Offers Total	Offers Answered	...	Total Ring Duration
0	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Aug 27,2024"	1 Day	ACD	2	2	2	...	0:00:11
1	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Aug 28,2024"	1 Day	ACD	1	1	1	...	0:00:04
2	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Aug 29,2024"	1 Day	ACD	0	1	0	...	0:00:16
3	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 04,2024"	1 Day	ACD	2	2	2	...	0:00:07
4	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 08,2024"	1 Day	ACD	1	1	1	...	0:00:06
5	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 09,2024"	1 Day	ACD	1	1	1	...	0:00:03
6	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 10,2024"	1 Day	ACD	0	1	0	...	0:00:30
7	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 11,2024"	1 Day	ACD	3	3	3	...	0:00:10
8	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 12,2024"	1 Day	ACD	2	2	2	...	0:00:12
9	Kliu Elon	piggy.china04@piggyexp.com	Partnership	IN	"Sep 13,2024"	1 Day	ACD	3	3	3	...	0:00:08

```
data.shape
```

```
(1210, 37)
```

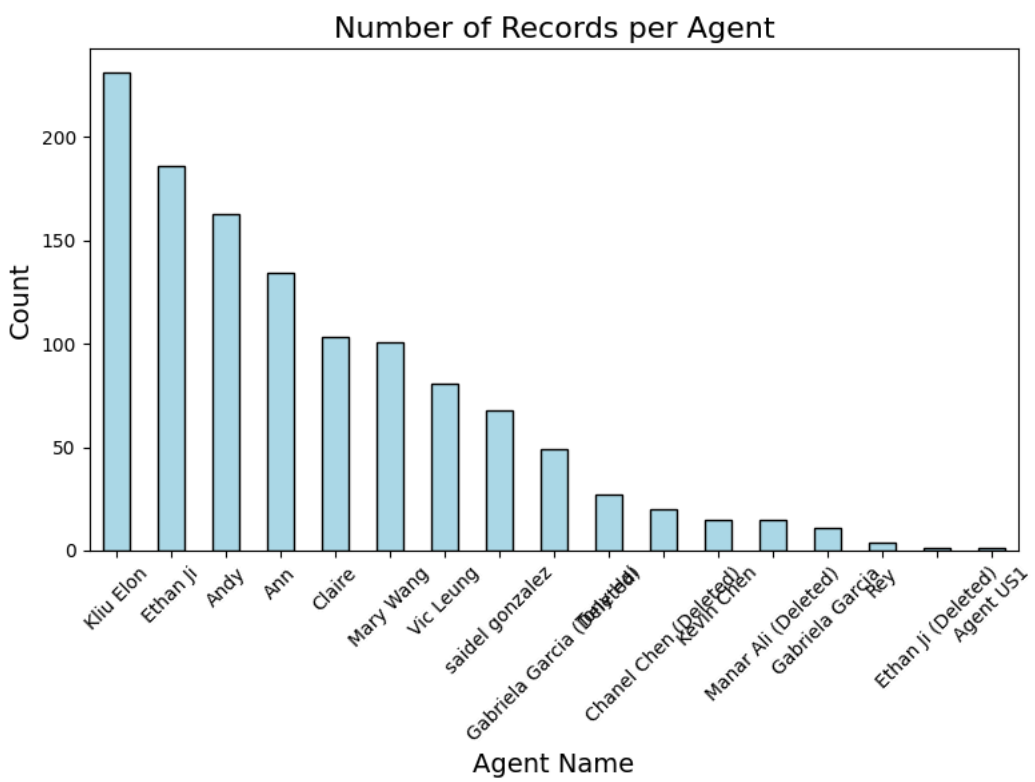
```
# data.info()
```

```
columns_to_keep = ['Agent Name', 'Agent Email', 'Queue', 'Offers Total', 'Offers Answered',
                   'Total Ring Duration', 'Avg. Ring Duration', 'Total Handling Duration',
                   'Avg. Handling Duration', 'Total Talking Duration', 'Avg. Talking Duration',
                   'Total Hold Duration']
data = data[columns_to_keep]
print(data.info())
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1210 entries, 0 to 1209
Data columns (total 12 columns):
 #   Column                   Non-Null Count  Dtype
---  ------                   --------------  -----
 0   Agent Name               1210 non-null   object
 1   Agent Email              1210 non-null   object
 2   Queue                    1210 non-null   object
 3   Offers Total             1210 non-null   int64
 4   Offers Answered          1210 non-null   int64
 5   Total Ring Duration      1210 non-null   object
 6   Avg. Ring Duration       1210 non-null   object
 7   Total Handling Duration  1210 non-null   object
 8   Avg. Handling Duration   1210 non-null   object
 9   Total Talking Duration   1210 non-null   object
 10  Avg. Talking Duration    1210 non-null   object
 11  Total Hold Duration      1210 non-null   object
dtypes: int64(2), object(10)
memory usage: 113.6+ KB
None
```

```
data['Agent Name'].value_counts()
```

```
#每个Agent在今年工作的天数
agent_counts = data['Agent Name'].value_counts()
plt.figure(figsize=(8, 6))
agent_counts.plot(kind='bar', color='lightblue', edgecolor='black')
plt.title('Number of Records per Agent', fontsize=16)
plt.xlabel('Agent Name', fontsize=14)
plt.ylabel('Count', fontsize=14)
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```




```
queue_summary = data.groupby('Queue').size().sort_values(ascending=False)
print(queue_summary)
#不同的渠道进来的电话汇总
```

```
Queue
Delivery_Eng    811
Delivery_Cn     158
Delivery_Esp    117
Partnership      85
3PL_Eng          31
Demo              6
3PL_Esp           2
dtype: int64
```

```
handled_offers_summary = data.groupby('Agent Name')[['Offers Total','Offers Answered']].sum()
print(handled_offers_summary)
#每个Agent接的电话汇总,收到的电话和接听的电话
```

Agent Name	Offers Total	Offers Answered
Agent US1	3	1
Andy	6774	6294
Ann	5650	5547
Chanel Chen (Deleted)	1004	526
Claire	2687	2597
Ethan Ji	3793	2311
Ethan Ji (Deleted)	1	1
Gabriela Garcia	222	209
Gabriela Garcia (Deleted)	407	372
Kevin Chen	37	19
Kliu Elon	6452	6040
Manar Ali (Deleted)	600	600
Mary Wang	2957	1913
Rey	11	6
Tony Hai	628	495
Vic Leung	4076	2343
saidel gonzalez	1109	1054

```
def duration_to_seconds(duration_str):
    h, m, s = map(int, duration_str.split(':'))
```

```
    return h * 3600 + m * 60 + s
data['Total Ring Duration'] = data['Total Ring Duration'].apply(duration_to_seconds)
ring_duration_summary = data.groupby('Agent Name')['Total Ring Duration'].sum().sort_values(ascending=False)
print(ring_duration_summary)
#每个Agent响铃的总时长
```

```
Agent Name
Andy                        91729
Ethan Ji                    74641
Ann                         74254
Vic Leung                   72130
Mary Wang                   52735
Kliu Elon                   50612
Claire                      35255
Chanel Chen (Deleted)       20059
Tony Hai                    10327
saidel gonzalez              9570
Manar Ali (Deleted)          4910
Gabriela Garcia (Deleted)    2781
Gabriela Garcia              2135
Kevin Chen                    298
Rey                           222
Agent US1                      60
Ethan Ji (Deleted)              2
Name: Total Ring Duration, dtype: int64
```

```
def duration_to_seconds(duration_str):
    h, m, s = map(int, duration_str.split(':'))
    return h * 3600 + m * 60 + s
data['Total Handling Duration'] = data['Total Handling Duration'].apply(duration_to_seconds)
ring_handled_summary = data.groupby('Agent Name')['Total Handling Duration'].sum().sort_values(ascending=False)
print(ring_handled_summary)
#每个Agent接电话的总时长,按照秒数计算
```

```
Agent Name
Kliu Elon                   1940810
Andy                        1861602
Ann                         1642456
Ethan Ji                    1540941
Mary Wang                   1402407
Claire                      1402004
Vic Leung                   1398207
Tony Hai                     699322
saidel gonzalez              316387
Manar Ali (Deleted)          188306
Chanel Chen (Deleted)        177633
Gabriela Garcia (Deleted)    145504
Gabriela Garcia               67849
Kevin Chen                    27060
Ethan Ji (Deleted)            16658
Rey                             340
Agent US1                         0
Name: Total Handling Duration, dtype: int64
```

```
def duration_to_seconds(duration_str):
    h, m, s = map(int, duration_str.split(':'))
    return h * 3600 + m * 60 + s
data['Total Talking Duration'] = data['Total Talking Duration'].apply(duration_to_seconds)
ring_talking_summary = data.groupby('Agent Name')['Total Talking Duration'].sum().sort_values(ascending=False)
print(ring_talking_summary)
#每个Agent通话的总时长
```

```
Agent Name
Andy                        829734
Kliu Elon                   822153
Ann                         708671
Claire                      601577
Vic Leung                   588860
Mary Wang                   514685
Ethan Ji                    419033
saidel gonzalez             215990
Tony Hai                    143732
Gabriela Garcia (Deleted)   135705
Manar Ali (Deleted)         105391
Chanel Chen (Deleted)        77604
Gabriela Garcia              47329
Kevin Chen                    2104
Rey                            180
Ethan Ji (Deleted)             153
Agent US1                        0
Name: Total Talking Duration, dtype: int64
```

```
summary = data.groupby('Agent Name')[['Total Ring Duration', 'Total Handling Duration', 'Total Talking Duration']].sum()
# print(summary)
summary.to_excel('agent_summary.xlsx', sheet_name='Summary')
```

```
print(summary.to_excel)
#汇总每个Agent今年工作的总时长
```

```
<bound method NDFrame.to_excel of                          Total Ring Duration  Total Handling Duration  \
Agent Name
Agent US1                                    60                       0
Andy                                      91729                 1861602
Ann                                       74254                 1642456
Chanel Chen (Deleted)                     20059                  177633
Claire                                    35255                 1402004
Ethan Ji                                  74641                 1540941
Ethan Ji (Deleted)                            2                   16658
Gabriela Garcia                            2135                   67849
Gabriela Garcia (Deleted)                  2781                  145504
Kevin Chen                                  298                   27060
Kliu Elon                                 50612                 1940810
Manar Ali (Deleted)                        4910                  188306
Mary Wang                                 52735                 1402407
Rey                                         222                     340
Tony Hai                                  10327                  699322
Vic Leung                                 72130                 1398207
saidel gonzalez                            9570                  316387

                           Total Talking Duration
Agent Name
Agent US1                                       0
Andy                                       829734
Ann                                        708671
Chanel Chen (Deleted)                       77604
Claire                                     601577
Ethan Ji                                   419033
Ethan Ji (Deleted)                            153
Gabriela Garcia                             47329
Gabriela Garcia (Deleted)                  135705
Kevin Chen                                   2104
Kliu Elon                                  822153
Manar Ali (Deleted)                        105391
Mary Wang                                  514685
Rey                                           180
Tony Hai                                   143732
Vic Leung                                  588860
saidel gonzalez                            215990  >
```