In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import plotly.graph_objects as go
from plotly.subplots import make_subplots
```

In [2]:

```
df = pd.read_csv(r'D:\Datasets\Data Science Jobs Analysis\ds.salaries.csv')
```

In [3]:

```
df.head()
```

Out[3]:

	Unnamed: 0	work_year	experience_level	employment_type	job_title	salary	salary_currency	salary_in_usd	employee_residence	remote_
0	0	2020	MI	FT	Data Scientist	70000	EUR	79833	DE	
1	1	2020	SE	FT	Machine Learning Scientist	260000	USD	260000	JP	
2	2	2020	SE	FT	Big Data Engineer	85000	GBP	109024	GB	
3	3	2020	MI	FT	Product Data Analyst	20000	USD	20000	HN	
4	4	2020	SE	FT	Machine Learning Engineer	150000	USD	150000	US	

In [4]:

```
df.drop('Unnamed: 0', axis = 1, inplace=True)
```

In [5]:

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

Out[5]:

```
work_year             0
experience_level      0
employment_type       0
job_title             0
salary                0
salary_currency       0
salary_in_usd         0
employee_residence    0
remote_ratio          0
company_location      0
company_size          0
dtype: int64
```

In [6]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 607 entries, 0 to 606
Data columns (total 11 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   work_year           607 non-null    int64 
 1   experience_level    607 non-null    object
 2   employment_type     607 non-null    object
 3   job_title           607 non-null    object
 4   salary              607 non-null    int64 
 5   salary_currency     607 non-null    object
 6   salary_in_usd       607 non-null    int64 
 7   employee_residence  607 non-null    object
 8   remote_ratio        607 non-null    int64 
 9   company_location    607 non-null    object
 10  company_size        607 non-null    object
dtypes: int64(4), object(7)
memory usage: 52.3+ KB
```

In [7]:

```
df.duplicated().sum()
```

Out[7]:

```
42
```

In [8]:

```
df.drop_duplicates(inplace=True)
```

In [9]:

```
df.experience_level.value_counts()
```

Out[9]:

```
SE    243
MI    208
EN     88
EX     26
Name: experience_level, dtype: int64
```

In [10]:

```
replace_exp = {'SE':'Senior', 'MI':'Mid-Level', 'EN':'Entry-Level', 'EX':'Experienced'}
```

```
df['experience_level'] = df['experience_level'].replace(replace_exp)
```

In [11]:

```
df.employment_type.value_counts()
```

Out[11]:

```
FT    546
PT     10
CT      5
FL      4
Name: employment_type, dtype: int64
```

In [12]:

```
replace_empt = {'FT':'Full Time', 'PT':'Part Time', 'CT':'Contract', 'FL':'Freelance'}
df['employment_type'] = df['employment_type'].replace(replace_empt)
```

In [13]:

```
df.company_size.value_counts()
```

Out[13]:

```
M    290
L    193
S     82
Name: company_size, dtype: int64
```

In [14]:

```
replace_size = {'M':'Medium', 'L':'Large', 'S':'Small'}
df['company_size'] = df['company_size'].replace(replace_size)
```

In [15]:

```
replace_coun = {'US': 'United States','GB': 'United Kingdom','CA': 'Canada','GR': 'Greece','ES': 'Spain','DE':
                'IN': 'India','AU': 'Australia','PT': 'Portugal','AE': 'United Arab Emirates','FR': 'France','M
                'CH': 'Switzerland','PK': 'Pakistan','IE': 'Ireland','AT': 'Austria','CZ': 'Czech Republic','EE
                'NL': 'Netherlands','PL': 'Poland','DZ': 'Algeria','MX': 'Mexico','LU': 'Luxembourg' }
df['company_location'] = df['company_location'].replace(replace_coun)
```

In [16]:

```
df.head()
```

Out[16]:

	work_year	experience_level	employment_type	job_title	salary	salary_currency	salary_in_usd	employee_residence	remote_ratio	compa
0	2020	Mid-Level	Full Time	Data Scientist	70000	EUR	79833	DE	0	
1	2020	Senior	Full Time	Machine Learning Scientist	260000	USD	260000	JP	0	
2	2020	Senior	Full Time	Big Data Engineer	85000	GBP	109024	GB	50	Un
3	2020	Mid-Level	Full Time	Product Data Analyst	20000	USD	20000	HN	0	
4	2020	Senior	Full Time	Machine Learning Engineer	150000	USD	150000	US	50	

In [17]:

```
df.columns
```

Out[17]:

```
Index(['work_year', 'experience_level', 'employment_type', 'job_title',
       'salary', 'salary_currency', 'salary_in_usd', 'employee_residence',
       'remote_ratio', 'company_location', 'company_size'],
      dtype='object')
```

In [18]:

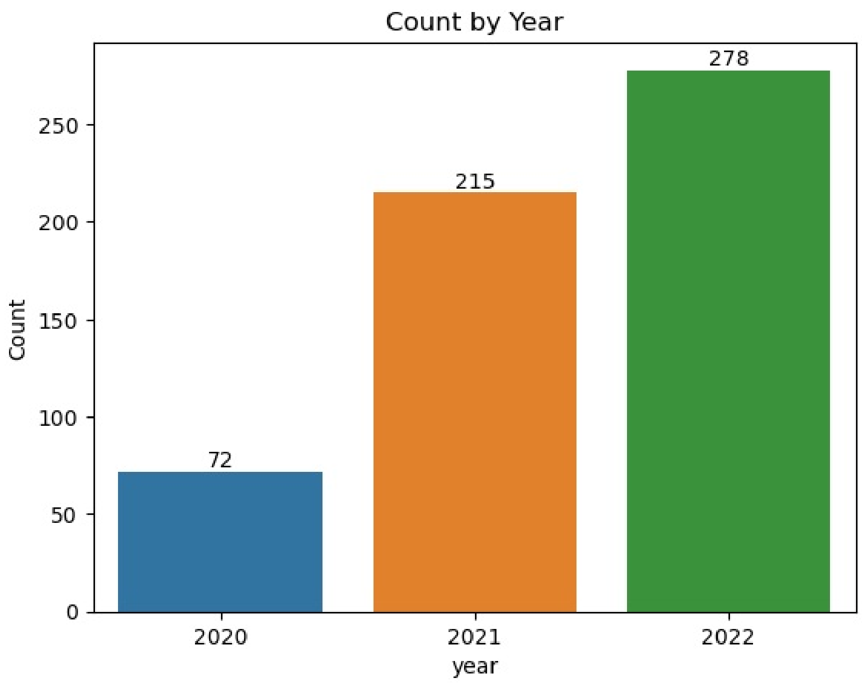
```
df.describe()
```

Out[18]:

	work_year	salary	salary_in_usd	remote_ratio
count	565.000000	5.650000e+02	565.000000	565.000000
mean	2021.364602	3.381160e+05	110610.343363	69.911504
std	0.698138	1.599879e+06	72280.702792	40.900666
min	2020.000000	4.000000e+03	2859.000000	0.000000
25%	2021.000000	6.700000e+04	60757.000000	50.000000
50%	2021.000000	1.109250e+05	100000.000000	100.000000
75%	2022.000000	1.650000e+05	150000.000000	100.000000
max	2022.000000	3.040000e+07	600000.000000	100.000000

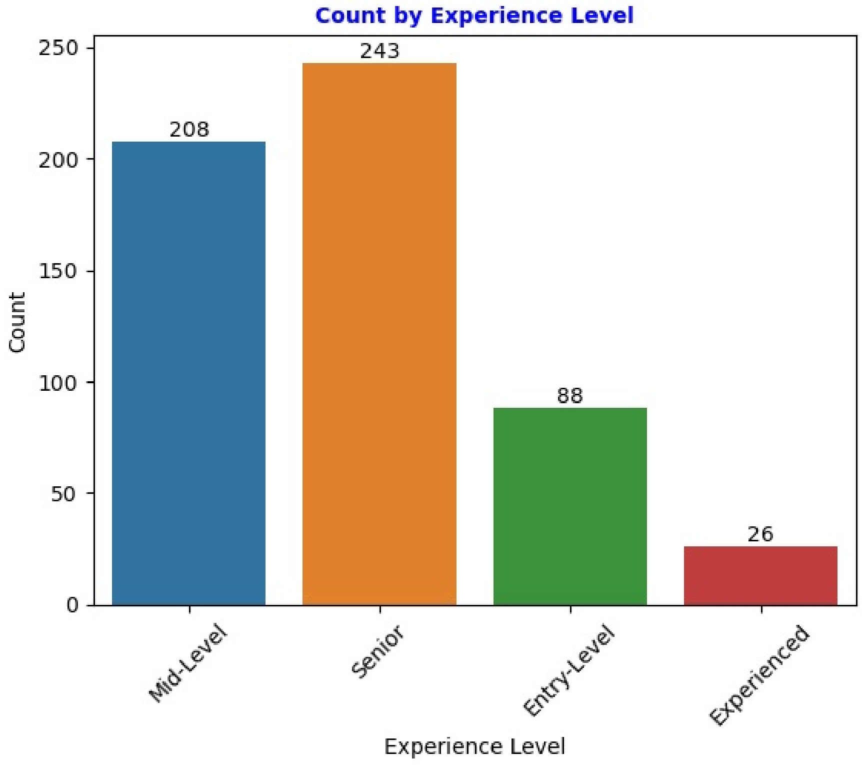
In [19]:

```
fig = sns.countplot(df, x = 'work_year')
for i in fig.containers:
    fig.bar_label(i)

fig.set_title('Count by Year')
fig.set_xlabel('year')
fig.set_ylabel('Count')

plt.show()
```



In [20]:

```
fig = sns.countplot(data=df, x="experience_level")
for i in fig.containers:
    fig.bar_label(i,)

fig.set_xticklabels(fig.get_xticklabels(), rotation=45)
fig.set_title('Count by Experience Level',fontdict={'size' : 10,'weight': 'bold', 'color': 'blue'})
fig.set_xlabel('Experience Level')
fig.set_ylabel('Count')

plt.show()
```



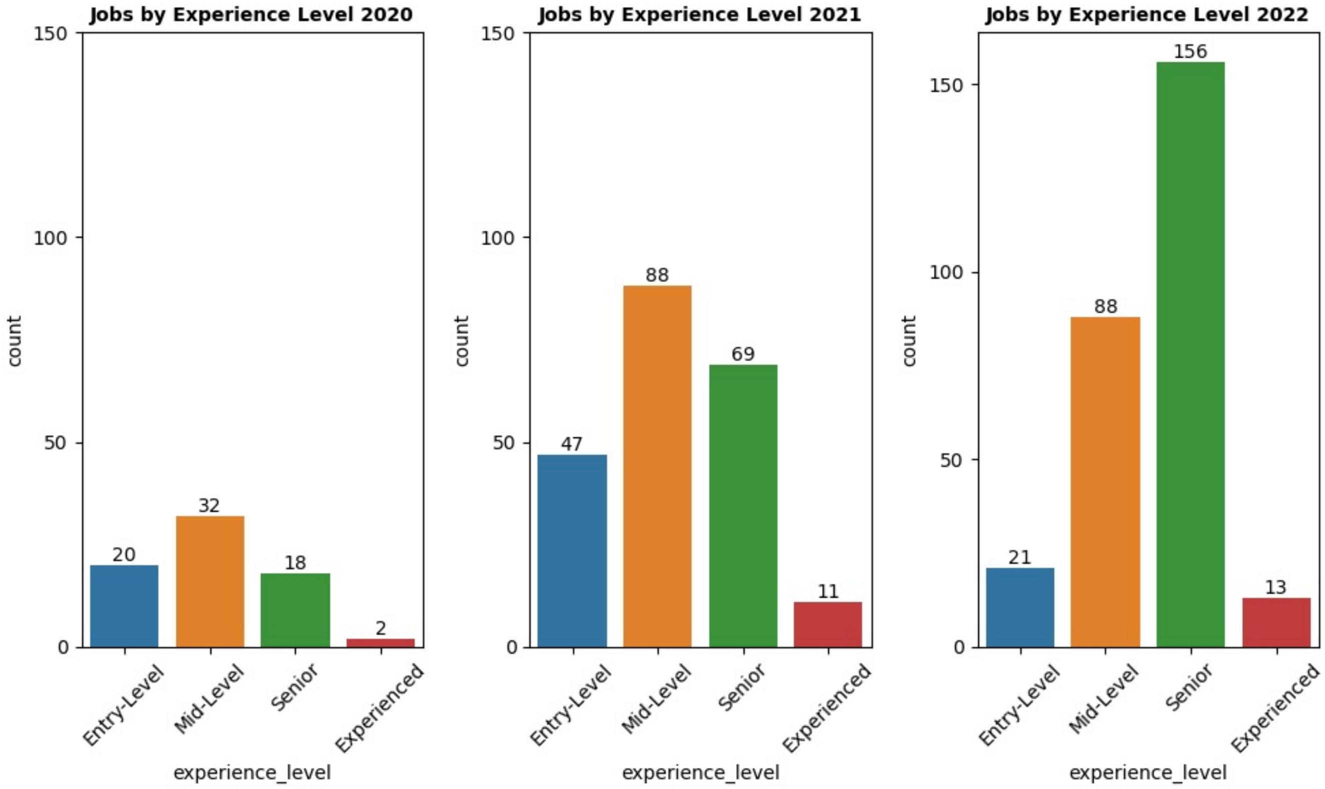
In [21]:

```
df1=df.query("work_year == 2020")
df2=df.query("work_year == 2021")
df3=df.query("work_year == 2022")
```

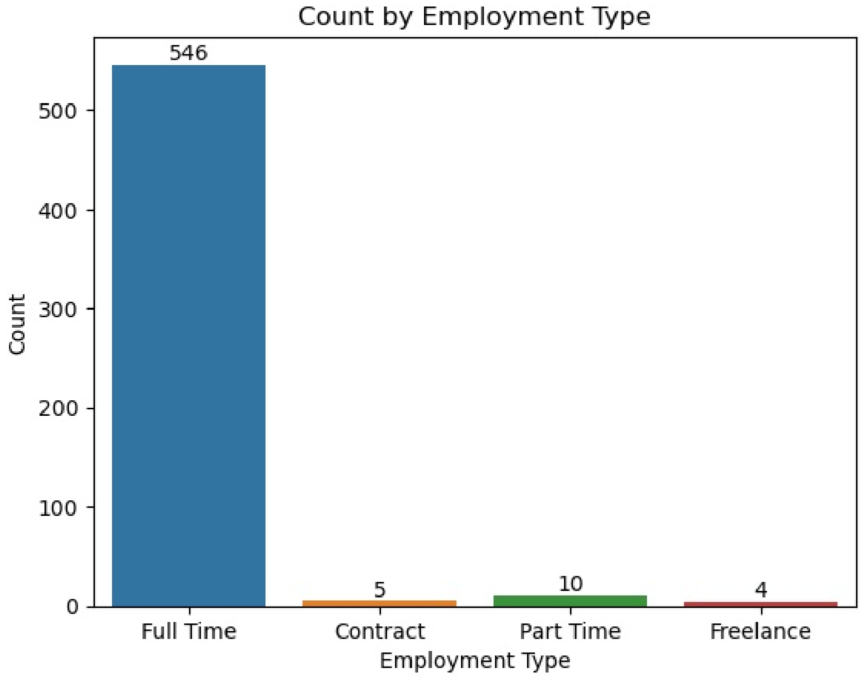
In [22]:

```
fig, axes = plt.subplots(1, 3, figsize=(10,6))

exp_order = ['Entry-Level', 'Mid-Level', 'Senior', 'Experienced']

fig1 = sns.countplot(df1, x = 'experience_level', ax=axes[0], order = exp_order)
fig1.set_title('Jobs by Experience Level 2020', fontdict={'size' : 10, 'weight': 'bold', 'color': 'Black'})
fig1.set_yticks([0,50,100,150])
for i in fig1.containers:
    fig1.bar_label(i)

fig2 = sns.countplot(df2, x = 'experience_level', ax=axes[1], order = exp_order)
```

```
fig2.set_title('Jobs by Experience Level 2021', fontdict={'size' : 10, 'weight': 'bold', 'color': 'Black'})
fig2.set_yticks([0,50,100,150])
for i in fig2.containers:
    fig2.bar_label(i)

fig3 = sns.countplot(df3, x = 'experience_level', ax=axes[2], order = exp_order)
fig3.set_title('Jobs by Experience Level 2022', fontdict={'size' : 10, 'weight': 'bold', 'color': 'Black'})
fig3.set_yticks([0,50,100,150])
for i in fig3.containers:
    fig3.bar_label(i)

for i in axes:
    i.set_xticklabels(i.get_xticklabels(), rotation=45)

fig.tight_layout()
plt.show()
```



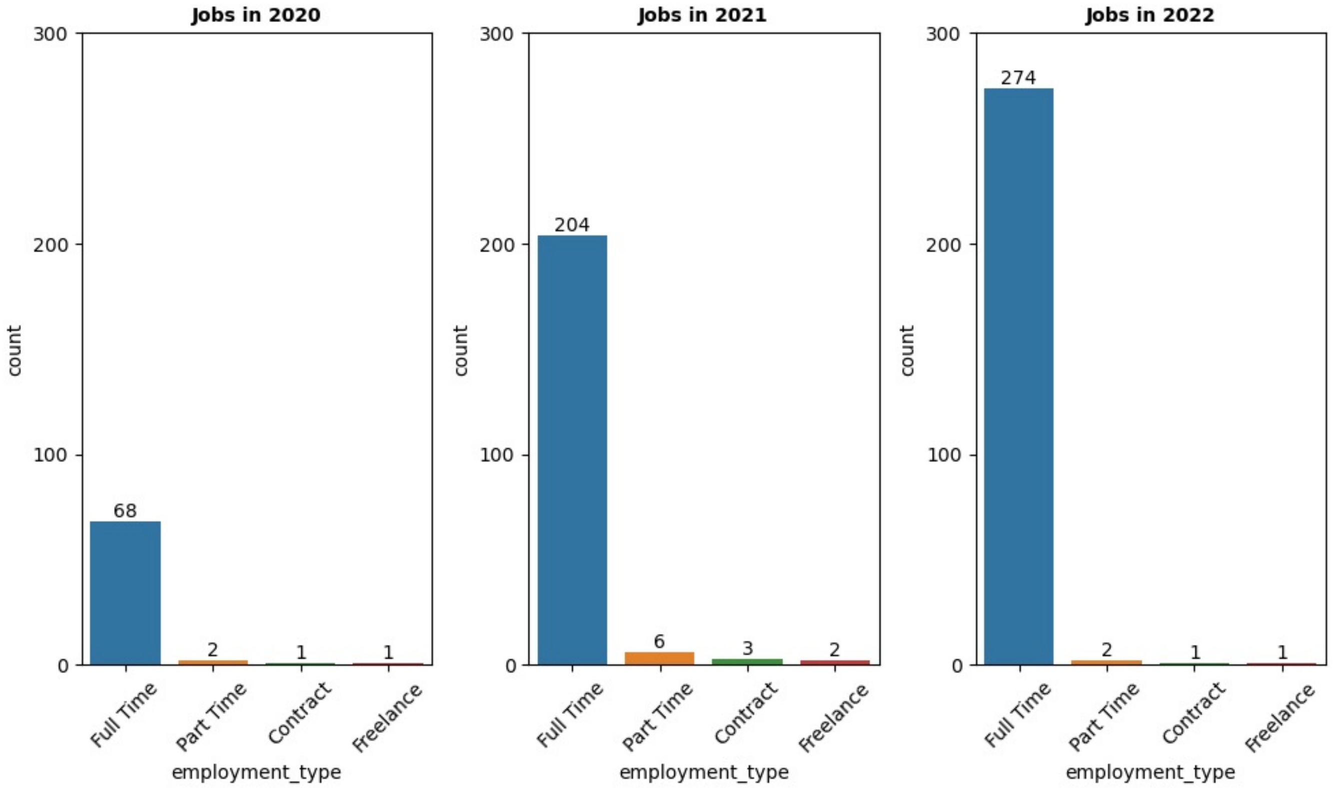
```
In [23]: fig = sns.countplot(data=df, x = 'employment_type')
         for i in fig.containers:
             fig.bar_label(i)

         fig.set_title('Count by Employment Type')
         fig.set_xlabel('Employment Type')
         fig.set_ylabel('Count')

         plt.show()
```



In [24]:

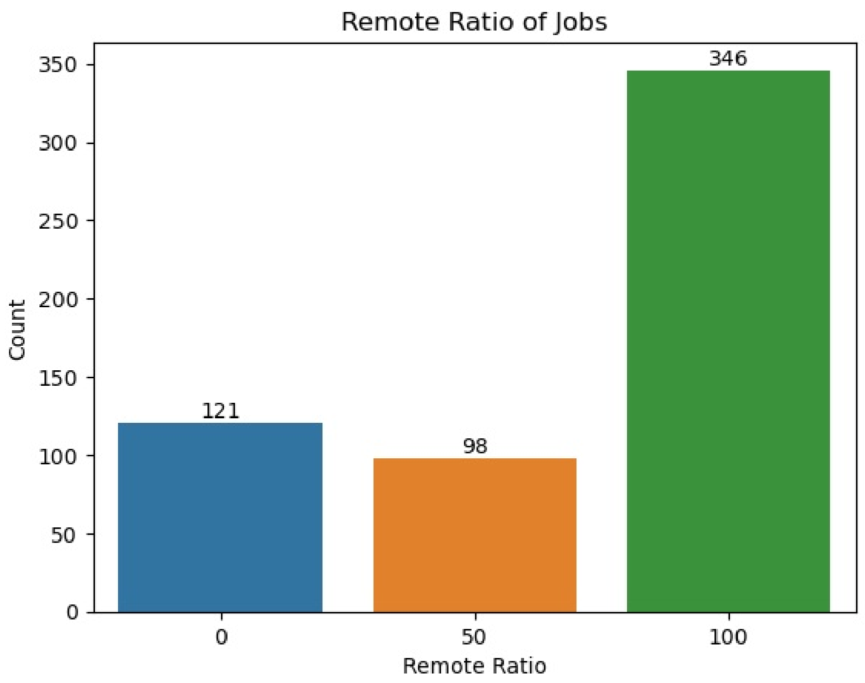
```
fig, axes = plt.subplots(1, 3, figsize=(10,6))

emp_order = ['Full Time', 'Part Time', 'Contract', 'Freelance']

fig1 = sns.countplot(df1, x = 'employment_type', ax=axes[0], order = emp_order)
fig1.set_title('Jobs in 2020', fontdict = {'size':10, 'weight':'bold', 'color':'Black'})
fig1.set_yticks([0,100,200,300])
for i in fig1.containers:
    fig1.bar_label(i)

fig2 = sns.countplot(df2, x = 'employment_type', ax=axes[1], order= emp_order)
fig2.set_title('Jobs in 2021', fontdict={'size':10, 'weight':'bold', 'color':'black'})
fig2.set_yticks([0,100,200,300])
for i in fig2.containers:
    fig2.bar_label(i)

fig3 = sns.countplot(df3, x = 'employment_type', ax=axes[2], order= emp_order)
fig3.set_title('Jobs in 2022', fontdict={'size':10, 'weight':'bold', 'color':'black'})
fig3.set_yticks([0,100,200,300])
for i in fig3.containers:
    fig3.bar_label(i)

for ax in axes:
    ax.set_xticklabels(ax.get_xticklabels(), rotation = 45)

fig.tight_layout()
fig.show()
```

```
C:\Users\Sachintha Umesh\AppData\Local\Temp\ipykernel_18316\881674289.py:27: UserWarning: Matplotlib is current
ly using module://matplotlib_inline.backend_inline, which is a non-GUI backend, so cannot show the figure.
  fig.show()
```

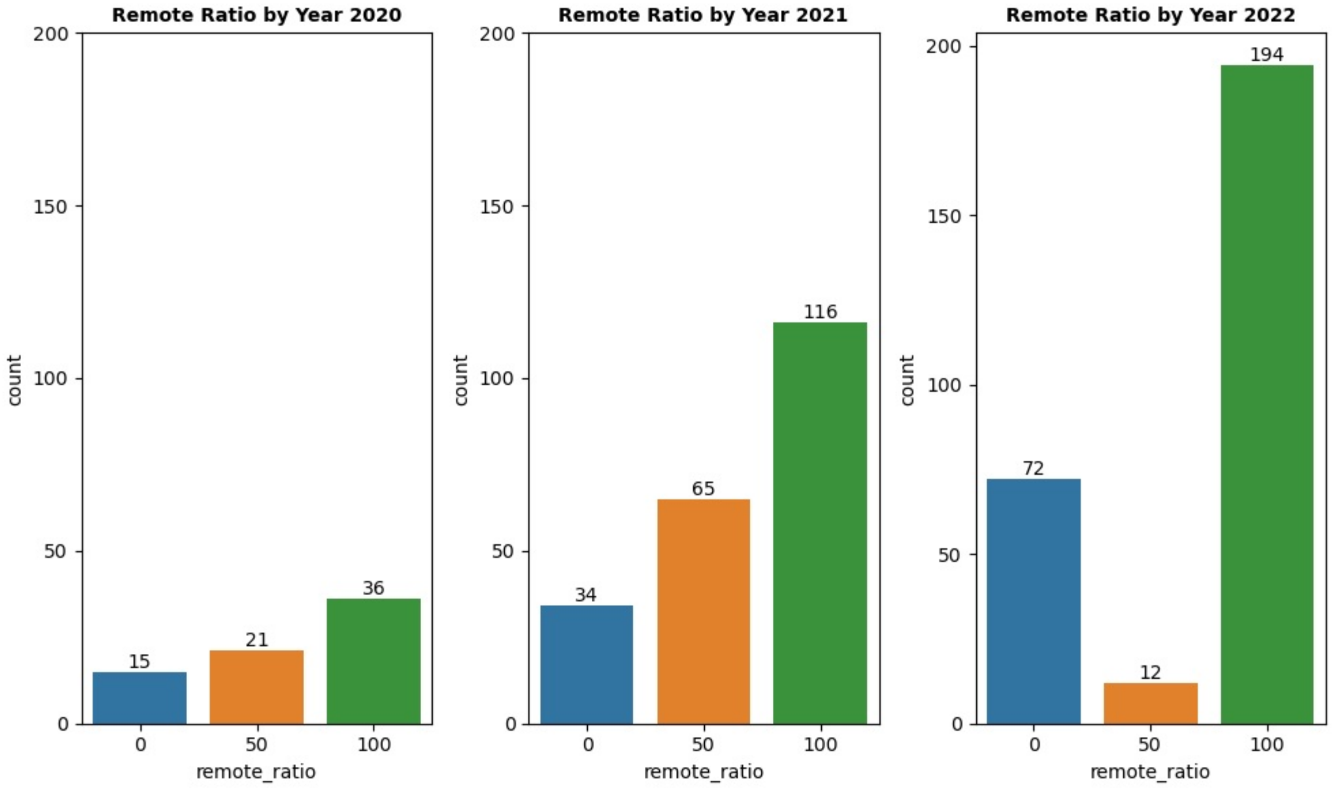


In [25]:

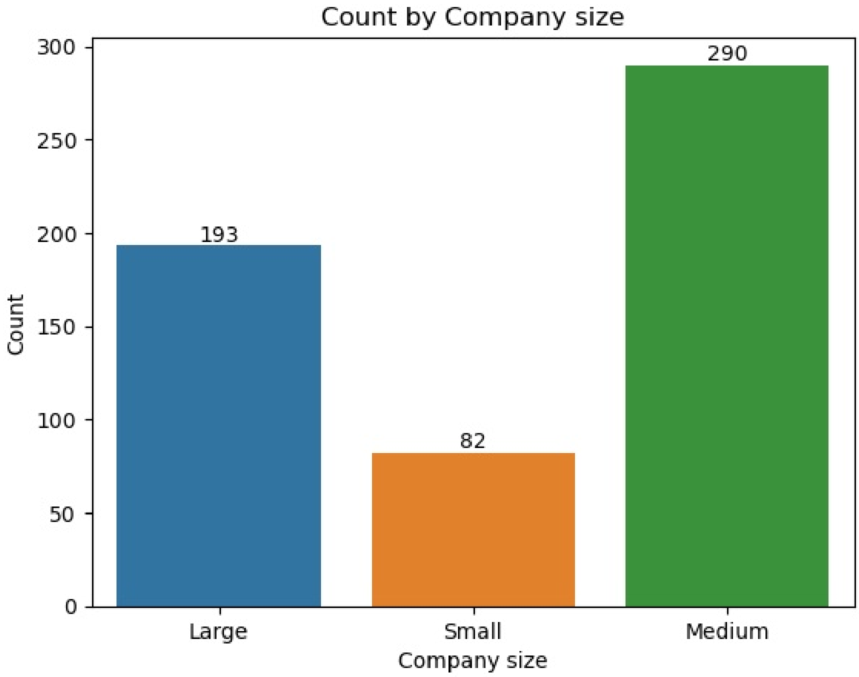
```
fig = sns.countplot(data = df, x='remote_ratio')
for i in fig.containers:
    fig.bar_label(i)

fig.set_title('Remote Ratio of Jobs')
fig.set_xlabel('Remote Ratio')
fig.set_ylabel('Count')

plt.show()
```



In [87]:
```python
fig, axes = plt.subplots(1,3, figsize=(10,6))
rem_order = [0, 50, 100]

fig1 = sns.countplot(df1, x = 'remote_ratio', ax=axes[0], order=rem_order)
fig1.set_title('Remote Ratio by Year 2020', fontdict={'size':10, 'weight':'bold', 'color':'Black'})
fig1.set_yticks([0,50,100,150,200])
for i in fig1.containers:
    fig1.bar_label(i)

fig2 = sns.countplot(df2, x = 'remote_ratio', ax=axes[1], order=rem_order)
fig2.set_title('Remote Ratio by Year 2021', fontdict={'size':10, 'weight':'bold', 'color':'Black'})
fig2.set_yticks([0,50,100,150,200])
for i in fig2.containers:
    fig2.bar_label(i)

fig3 = sns.countplot(df3, x = 'remote_ratio', ax=axes[2], order=rem_order)
fig3.set_title('Remote Ratio by Year 2022', fontdict={'size':10, 'weight':'bold', 'color':'Black'})
fig3.set_yticks([0,50,100,150,200])
for i in fig3.containers:
    fig3.bar_label(i)

fig.tight_layout()
plt.show()
```

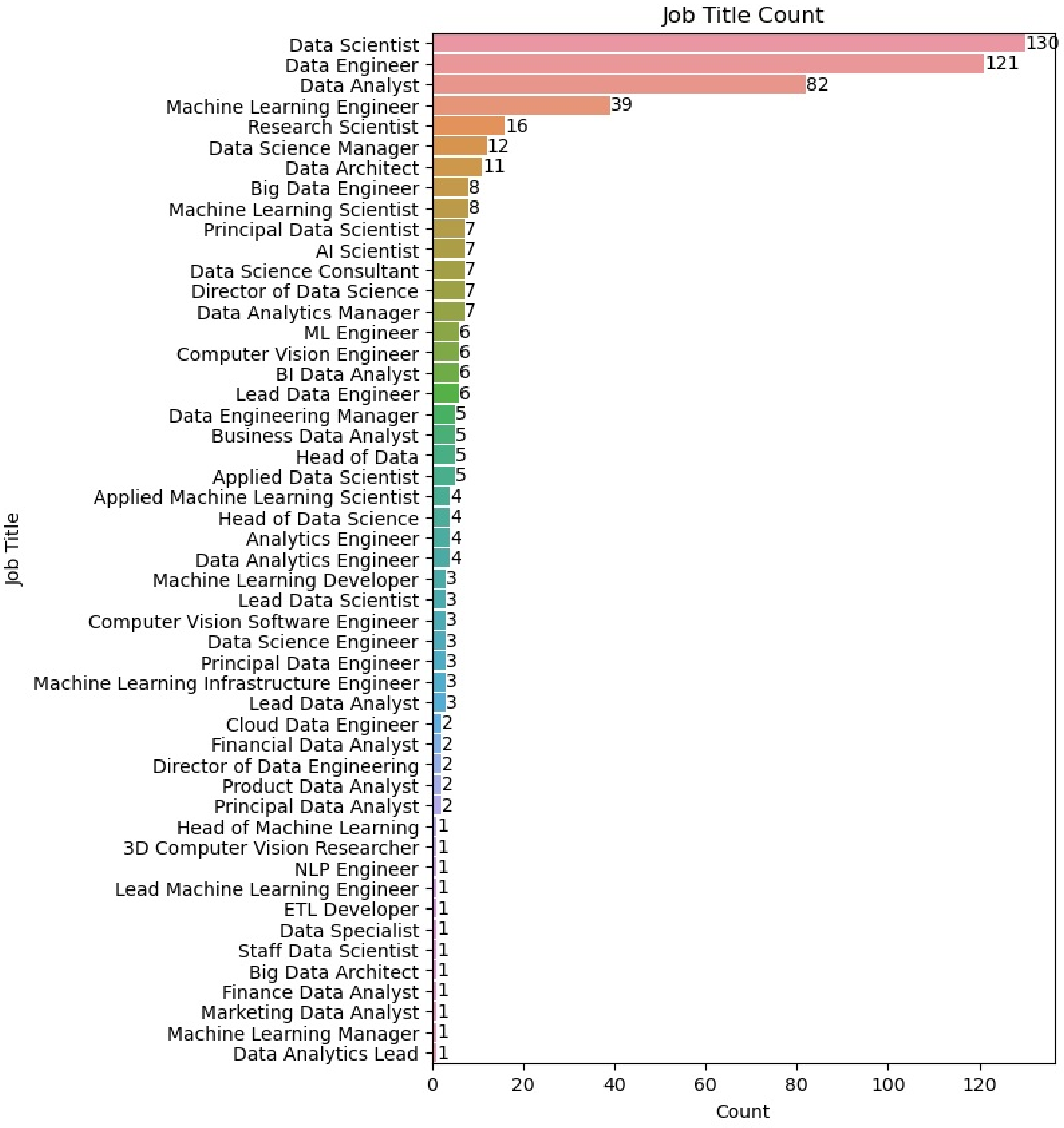


In [26]:
```python
fig = sns.countplot(data = df, x='company_size')
for i in fig.containers:
    fig.bar_label(i)

fig.set_title('Count by Company size')
fig.set_xlabel('Company size')
fig.set_ylabel('Count')

plt.show()
```



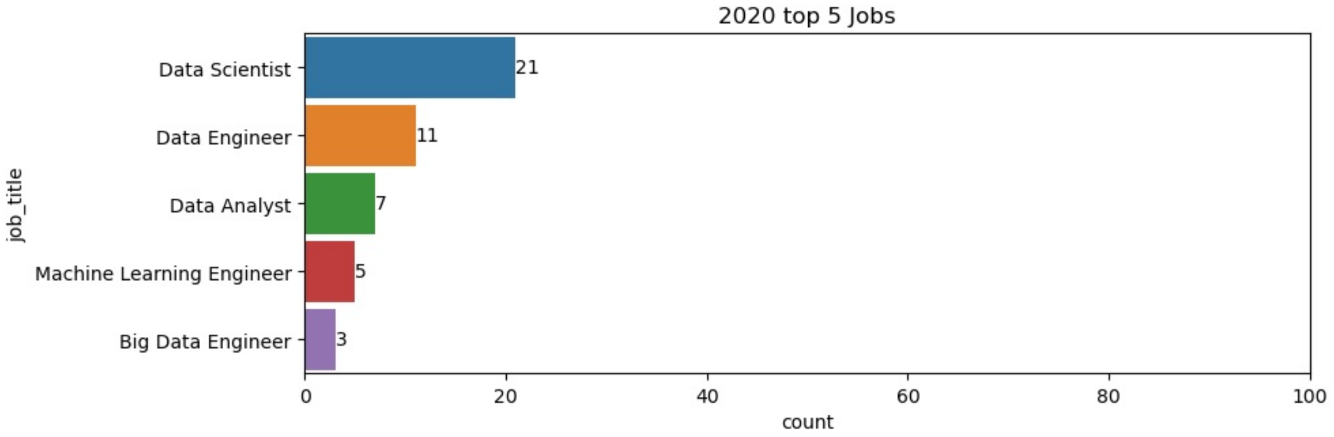
In [49]:

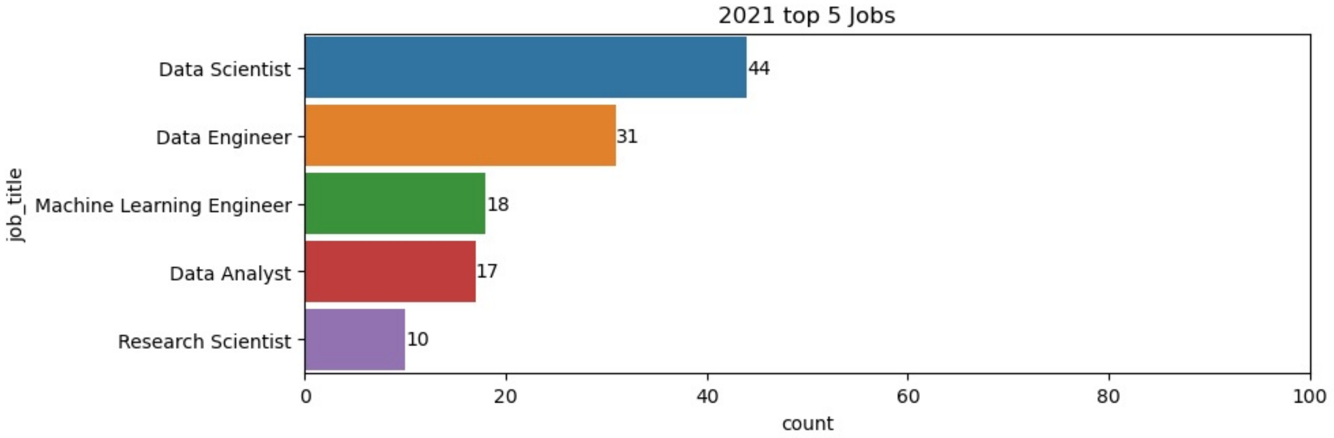
```
fig, axes = plt.subplots(figsize=(6,10))
fig = sns.countplot(df, y = 'job_title', orient='h', order=df['job_title'].value_counts().index, width = 0.9)
for i in fig.containers:
    fig.bar_label(i)

fig.set_title('Job Title Count')
fig.set_xlabel('Count')
fig.set_ylabel('Job Title')
plt.show()
```

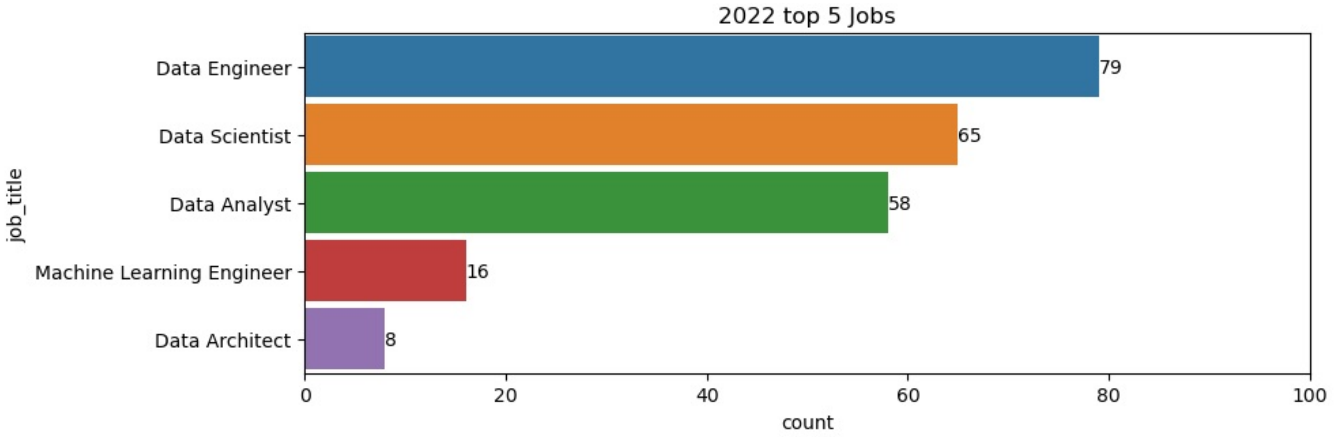


In [57]:

```
fig, axes = plt.subplots(3, 1, figsize=(10,10))

fig1 = sns.countplot(df1, y = 'job_title', orient='h',ax=axes[0], order=df1['job_title'].value_counts()[:5].ind
fig1.set_title('2020 top 5 Jobs')
fig1.set_xticks([0,20,40,60,80,100])
for i in fig1.containers:
    fig1.bar_label(i)

fig2 = sns.countplot(df2, y = 'job_title', orient='h',ax=axes[1], order=df2['job_title'].value_counts()[:5].ind
fig2.set_title('2021 top 5 Jobs')
fig2.set_xticks([0,20,40,60,80,100])
for i in fig2.containers:
    fig2.bar_label(i)

fig3 = sns.countplot(df3, y = 'job_title', orient='h',ax=axes[2], order=df3['job_title'].value_counts()[:5].ind
fig3.set_title('2022 top 5 Jobs')
fig3.set_xticks([0,20,40,60,80,100])
for i in fig3.containers:
    fig3.bar_label(i)

fig.tight_layout()
plt.show()
```

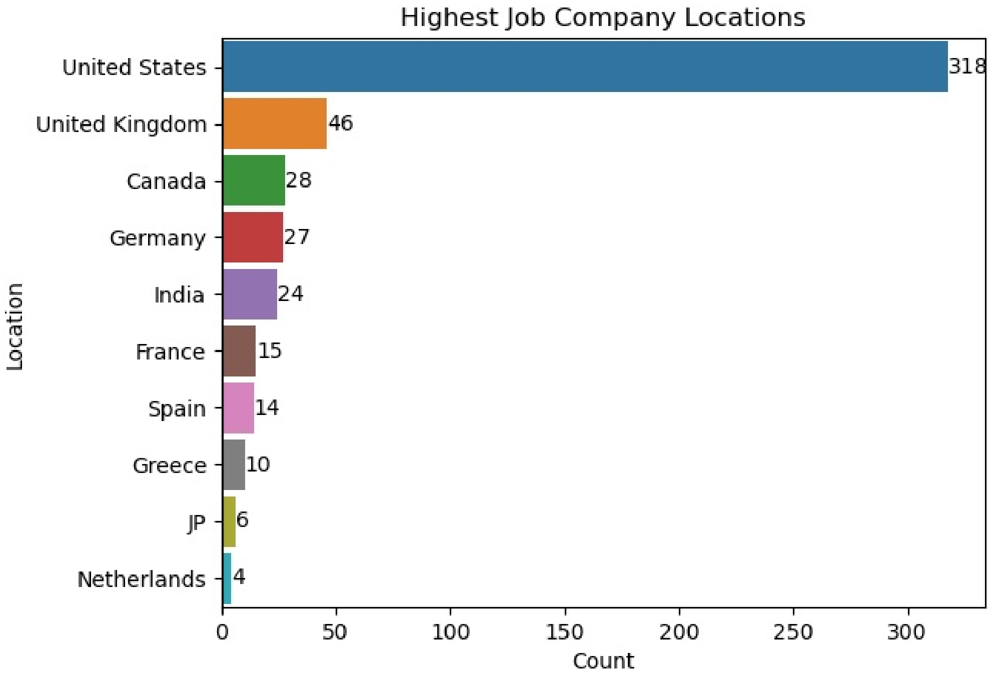




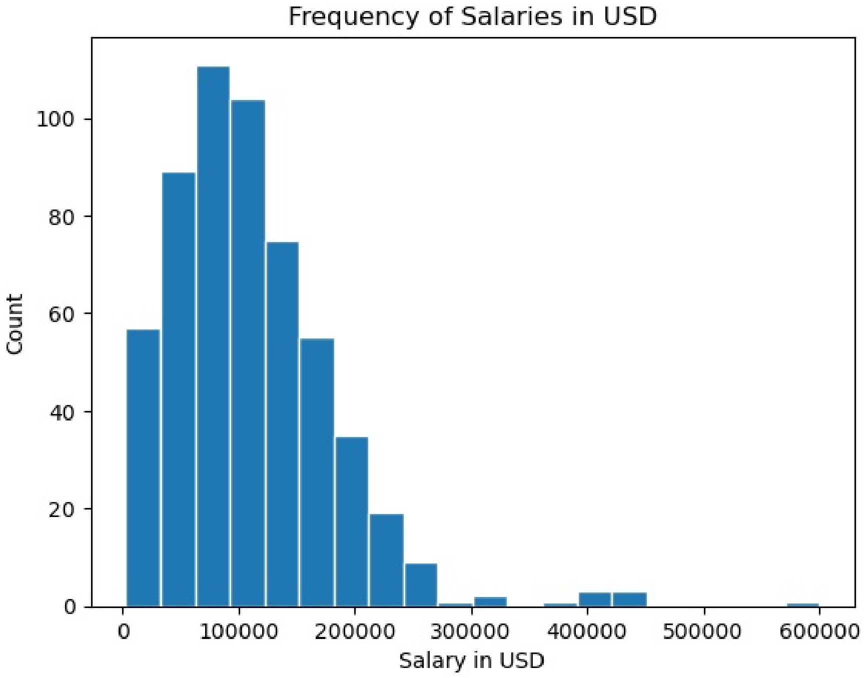


In [28]:

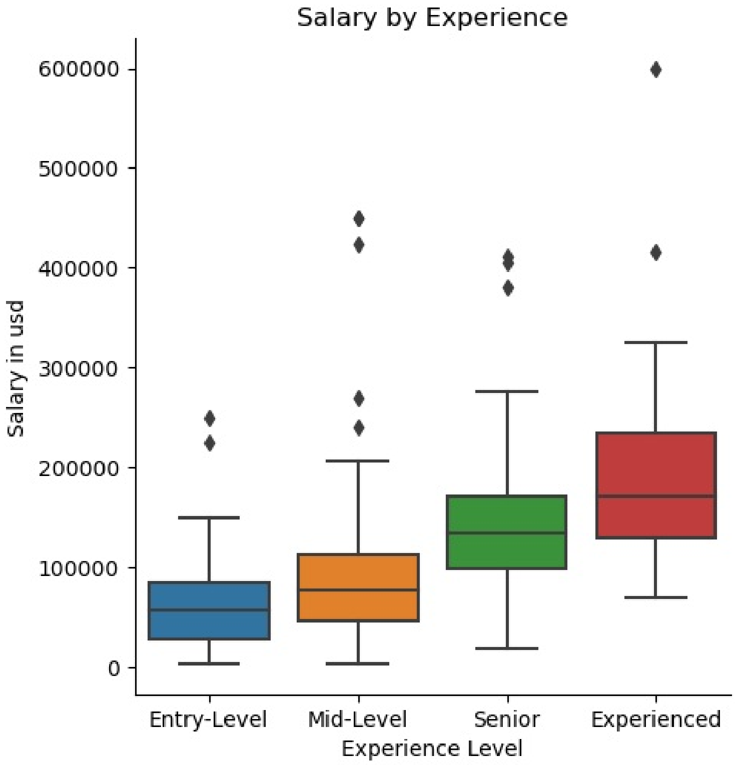
```
fig = sns.countplot(df, y = 'company_location', orient='h', order=df['company_location'].value_counts()[:10].in
for i in fig.containers:
    fig.bar_label(i)

fig.set_title('Highest Job Company Locations')
fig.set_xlabel('Count')
fig.set_ylabel('Location')

plt.show()
```



```
In [29]: fig = plt.hist(data=df, x='salary_in_usd', bins = 20, ec='white')
         plt.title('Frequency of Salaries in USD')
         plt.xlabel('Salary in USD')
         plt.ylabel('Count')

         plt.show()
```

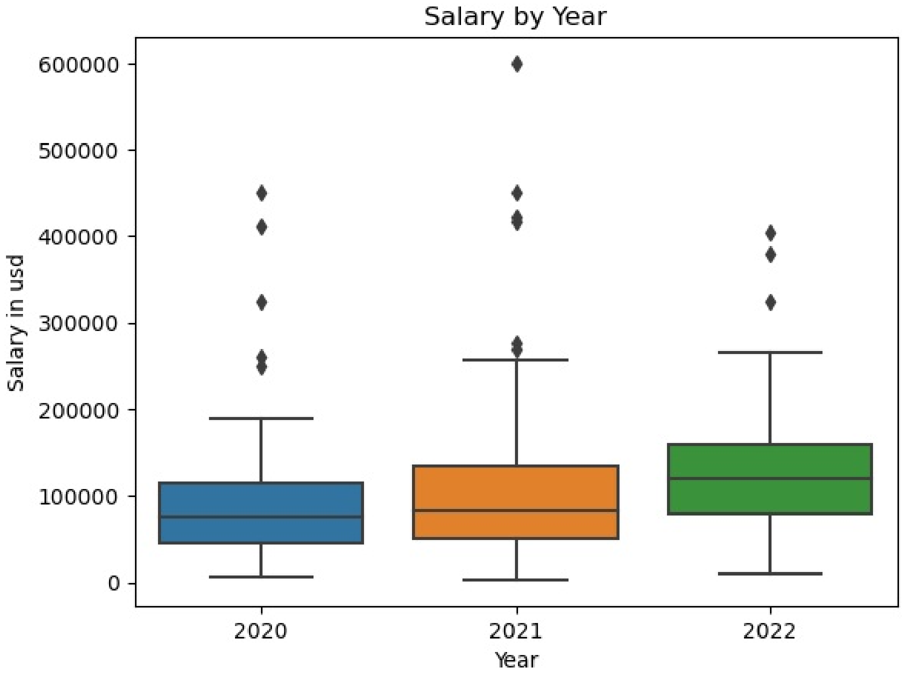


```
In [67]: exp_order = ['Entry-Level', 'Mid-Level', 'Senior', 'Experienced']
         sns.catplot(data=df,
                     x='experience_level',
                     y='salary_in_usd',
                     kind='box',
                     order=exp_order)
         plt.title('Salary by Experience')
         plt.xlabel('Experience Level')
         plt.ylabel('Salary in usd')
         plt.show()
```



In [68]:

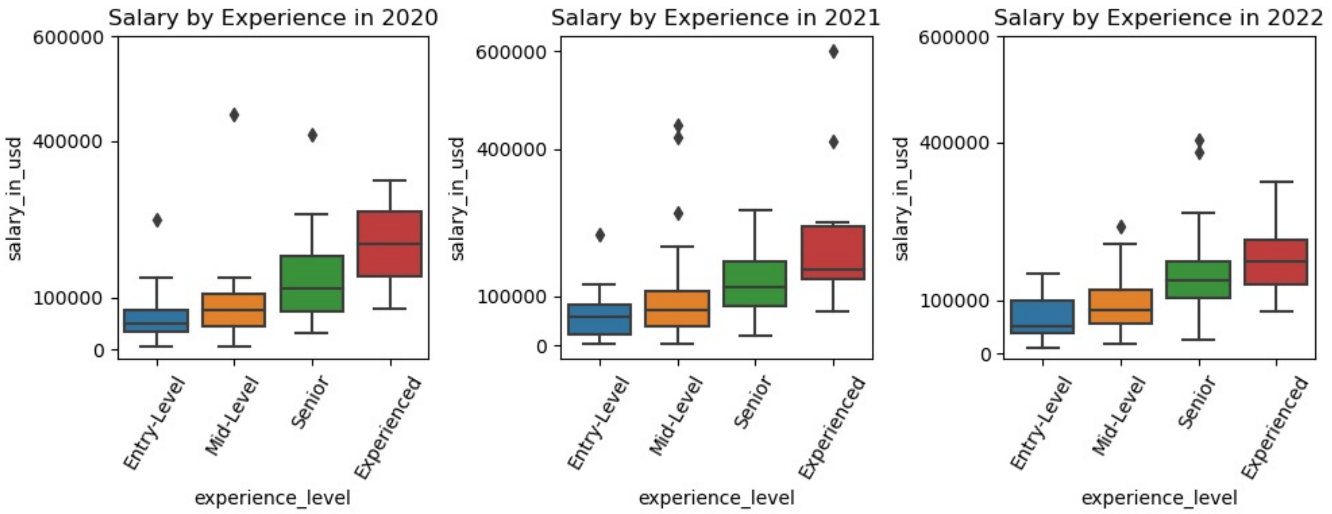
```
sns.boxplot(data=df,
            x='work_year',
            y='salary_in_usd')
plt.title('Salary by Year')
plt.xlabel('Year')
plt.ylabel('Salary in usd')
plt.show()
```



In [85]:

```
fig, axes = plt.subplots(1, 3, figsize=(10,4))

fig1 = sns.boxplot(df1, x='experience_level', y = 'salary_in_usd', ax=axes[0], order=exp_order)
fig1.set_title('Salary by Experience in 2020')
fig1.set_yticks([0,100000,400000,600000])

fig2 = sns.boxplot(df2, x='experience_level', y = 'salary_in_usd', ax=axes[1], order=exp_order)
fig2.set_title('Salary by Experience in 2021')
fig2.set_yticks([0,100000,400000,600000])

fig3 = sns.boxplot(df3, x='experience_level', y = 'salary_in_usd', ax=axes[2], order=exp_order)
fig3.set_title('Salary by Experience in 2022')
fig3.set_yticks([0,100000,400000,600000])

for i in axes:
    i.set_xticklabels(i.get_xticklabels(), rotation = 60)

fig.tight_layout()
```

```
plt.show()
```


Salary by Experience in 2020
Salary by Experience in 2021
Salary by Experience in 2022
salary_in_usd
600000
400000
100000
0
Entry-Level
Mid-Level
Senior
Experienced
experience_level

```
In [ ]:
```