Import packages

```
In [1]: import pandas as pd
        import numpy as np
        import matplotlib.pyplot as plt
        import seaborn as sns
```

Read the data

```
In [2]: visa_df=pd.read_csv(r"C:\Users\omkar\OneDrive\Documents\Data science\Naresh IT\N
        visa_df.head(2)
```

Out[2]:

	case_id	continent	education_of_employee	has_job_experience	requires_job_training
0	EZYV01	Asia	High School	N	N
1	EZYV02	Asia	Master's	Y	N

Select the numerical coulmns

```
In [3]: visa_df.select_dtypes(exclude='object').columns
```

```
Out[3]: Index(['no_of_employees', 'yr_of_estab', 'prevailing_wage'], dtype='object')
```

prevailing_wage

- len
- max
- min
- mean
- median
- std
- 75%
- 50%
- 25%

count or len

```
In [4]: len(visa_df['prevailing_wage'])
```

```
Out[4]: 25480
```

max

```
In [5]: max(visa_df['prevailing_wage']) # Keyword
```

```
Out[5]: 319210.27
```

```
In [6]: visa_df['prevailing_wage'].max() # Pandas
```

```
Out[6]: 319210.27
```

```
In [7]: np.max(visa_df['prevailing_wage']) # numpy
```

```
Out[7]: 319210.27
```

min

```
In [8]: min(visa_df['prevailing_wage'])
```

```
Out[8]: 2.1367
```

```
In [9]: visa_df['prevailing_wage'].min()
```

```
Out[9]: 2.1367
```

```
In [10]: np.min(visa_df['prevailing_wage'])
```

```
Out[10]: 2.1367
```

```
In [11]: #instead of len can we use nunique ?
         #how many uniques values different
         #how many total values different
```

mean

```
In [12]: visa_df['prevailing_wage'].mean()
```

```
Out[12]: 74455.81459209183
```

```
In [13]: np.mean(visa_df['prevailing_wage'])
```

```
Out[13]: 74455.81459209183
```

median

```
In [14]: visa_df['prevailing_wage'].median()
```

```
Out[14]: 70308.20999999999
```

```
In [15]: np.median(visa_df['prevailing_wage'])
```

```
Out[15]: 70308.20999999999
```

std

```
In [16]: visa_df['prevailing_wage'].std()
```

Out[16]:
```
52815.94232687357
```

In [17]:
```python
np.std(visa_df['prevailing_wage'])
```

Out[17]:
```
52814.90589711402
```

Mode is not good option because it is numerical variable

In [18]:
```python
##All together
wage_count=round(len(visa_df['prevailing_wage']),2)
wage_min=round(visa_df['prevailing_wage'].min(),2)
wage_max=round(visa_df['prevailing_wage'].max(),2)
wage_mean=round(visa_df['prevailing_wage'].mean(),2)
wage_median=round(visa_df['prevailing_wage'].median(),2)
wage_std=round(visa_df['prevailing_wage'].std(),2)
list_values=[wage_count,wage_min,wage_max,
             wage_mean,wage_median,wage_std]
index_val=['count','min','max','mean','median','std']
pd.DataFrame(list_values,
             columns=['prevailing_wage'],
             index=index_val)
```

Out[18]:

	prevailing_wage
count	25480.00
min	2.14
max	319210.27
mean	74455.81
median	70308.21
std	52815.94

Percentile and Quantile

- Percentile:
    - np.percentile()
    - It will take two arguments
        - data :a
        - percentile: q the values varies from 0 to 100
        - if you want 50P data q=50
- Quantile:
    - np.quantile()
    - It will take two arguments
        - data :a

    - percentile: q the values varies from 0 to 1

    - if you want 50p q=0.5

25p-50p-75p

```
In [19]: wage_25p=round(np.percentile(visa_df['prevailing_wage'],25),2)
         wage_50p=round(np.percentile(visa_df['prevailing_wage'],50),2)
         wage_75p=round(np.percentile(visa_df['prevailing_wage'],75),2)

         print(f"the 25% data is {wage_25p}")
         print(f"the 50% data is {wage_50p}")
         print(f"the 75% data is {wage_75p}")
```

```
the 25% data is 34015.48
the 50% data is 70308.21
the 75% data is 107735.51
```

```
In [20]: 345.89678
```

```
Out[20]: 345.89678
```

```
In [21]: round(345.89678,2)
```

```
Out[21]: 345.9
```

```
In [22]: wage_25p=round(np.quantile(visa_df['prevailing_wage'],0.25),2)
         wage_50p=round(np.quantile(visa_df['prevailing_wage'],0.50),2)
         wage_75p=round(np.quantile(visa_df['prevailing_wage'],0.75),2)

         print(f"the 25% data is {wage_25p}")
         print(f"the 50% data is {wage_50p}")
         print(f"the 75% data is {wage_75p}")
```

```
the 25% data is 34015.48
the 50% data is 70308.21
the 75% data is 107735.51
```

Understand the percentiles

- defination of 25percentile
    - there 25% of employees has salary less than 34015
    - total employees= 25480
    - 25% of employees= 25*25480/100= 6370
    - 6370 employees salary less than 34015

```
In [23]: con=visa_df['prevailing_wage']<34015
         len(visa_df[con])
```

```
Out[23]: 6370
```

```
In [24]: con=visa_df['prevailing_wage']<wage_25p
         len(visa_df[con])
```

Out[24]: 6370

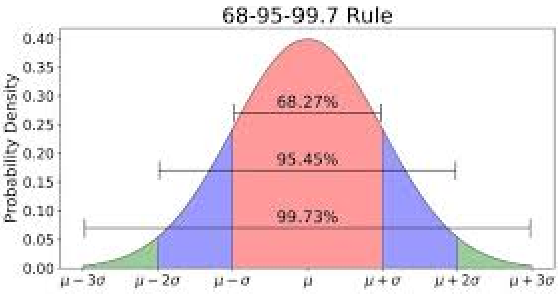
In [25]:
```
con=visa_df['prevailing_wage']<wage_50p
len(visa_df[con])

#50*25480/100
```

Out[25]: 12740

In [26]:
```
con=visa_df['prevailing_wage']<wage_75p
len(visa_df[con])
```

Out[26]: 19110

Emperical rule (68-95-99.7)



- First calculate mean value
- Second calculate std value
- Con1: mean-1*std
- Con2: mean+1*std
- If you apply above conditions on wage data , the output count should be equal to 68percentile data
- 68% of total employees: 17326

In [27]:
```
v1=wage_mean-1*wage_std
v2=wage_mean+1*wage_std
con1=visa_df['prevailing_wage']>v1
con2=visa_df['prevailing_wage']<v2

count1=len(visa_df[con1 & con2])
######################################################################
count1 ,68*25480/100
```

Out[27]: (17171, 17326.4)

In [28]:
```
v1=wage_mean-2*wage_std
v2=wage_mean+2*wage_std
con1=visa_df['prevailing_wage']>v1
con2=visa_df['prevailing_wage']<v2
```

```
count1=len(visa_df[con1 & con2])
###############################################################
count1 ,95*25480/100
```

Out[28]:

```
(24582, 24206.0)
```

In [29]:

```
v1=wage_mean-3*wage_std
v2=wage_mean+3*wage_std
con1=visa_df['prevailing_wage']>v1
con2=visa_df['prevailing_wage']<v2

count1=len(visa_df[con1 & con2])
###############################################################
count1 ,99.7*25480/100
```

Out[29]:

```
(25186, 25403.56)
```

In [30]:

```
##All together
wage_count=round(len(visa_df['prevailing_wage']),2)
wage_min=round(visa_df['prevailing_wage'].min(),2)
wage_max=round(visa_df['prevailing_wage'].max(),2)
wage_mean=round(visa_df['prevailing_wage'].mean(),2)
wage_median=round(visa_df['prevailing_wage'].median(),2)
wage_std=round(visa_df['prevailing_wage'].std(),2)
########################################################
wage_25p=round(np.quantile(visa_df['prevailing_wage'],0.25),2)
wage_50p=round(np.quantile(visa_df['prevailing_wage'],0.50),2)
wage_75p=round(np.quantile(visa_df['prevailing_wage'],0.75),2)
##################################################################
list_values=[wage_count,wage_min,wage_max,
             wage_mean,wage_median,wage_std,
            wage_25p,wage_50p,wage_75p]
index_val=['count','min','max',
           'mean','median','std',
          '25%','50%','75%']
pd.DataFrame(list_values,
             columns=['prevailing_wage'],
             index=index_val)
```

Out[30]:

	prevailing_wage
count	25480.00
min	2.14
max	319210.27
mean	74455.81
median	70308.21
std	52815.94
25%	34015.48
50%	70308.21
75%	107735.51

In [42]:
```
##All together
l1=[]
cols=visa_df.select_dtypes(exclude='object').columns
for i in cols:
    countt=round(len(visa_df[i]),2)
    minn=round(visa_df[i].min(),2)
    maax=round(visa_df[i].max(),2)
    mean=round(visa_df[i].mean(),2)
    median=round(visa_df[i].median(),2)
    std=round(visa_df[i].std(),2)
    ########################################################
    p_25=round(np.quantile(visa_df[i],0.25),2)
    p_50=round(np.quantile(visa_df[i],0.50),2)
    p_75=round(np.quantile(visa_df[i],0.75),2)
    ##################################################################
    l1.append([countt,minn,maax,mean,median,std,p_25,p_50,p_75])

index_val=['count','min','max',
           'mean','median','std',
          '25%','50%','75%']
df=pd.DataFrame(l1,
                columns=index_val,
                index=cols).T
df
```

Out[42]:

	no_of_employees	yr_of_estab	prevailing_wage
count	25480.00	25480.00	25480.00
min	-26.00	1800.00	2.14
max	602069.00	2016.00	319210.27
mean	5667.04	1979.41	74455.81
median	2109.00	1997.00	70308.21
std	22877.93	42.37	52815.94
25%	1022.00	1976.00	34015.48
50%	2109.00	1997.00	70308.21
75%	3504.00	2005.00	107735.51

In [ ]:
```
# Whatever we did till now
# will incresae our python skil
```

Describe

- It is for only numerical data

In [43]:
```
visa_df.describe()
```

Out[43]:

	no_of_employees	yr_of_estab	prevailing_wage
count	25480.000000	25480.000000	25480.000000
mean	5667.043210	1979.409929	74455.814592
std	22877.928848	42.366929	52815.942327
min	-26.000000	1800.000000	2.136700
25%	1022.000000	1976.000000	34015.480000
50%	2109.000000	1997.000000	70308.210000
75%	3504.000000	2005.000000	107735.512500
max	602069.000000	2016.000000	319210.270000

Histogram

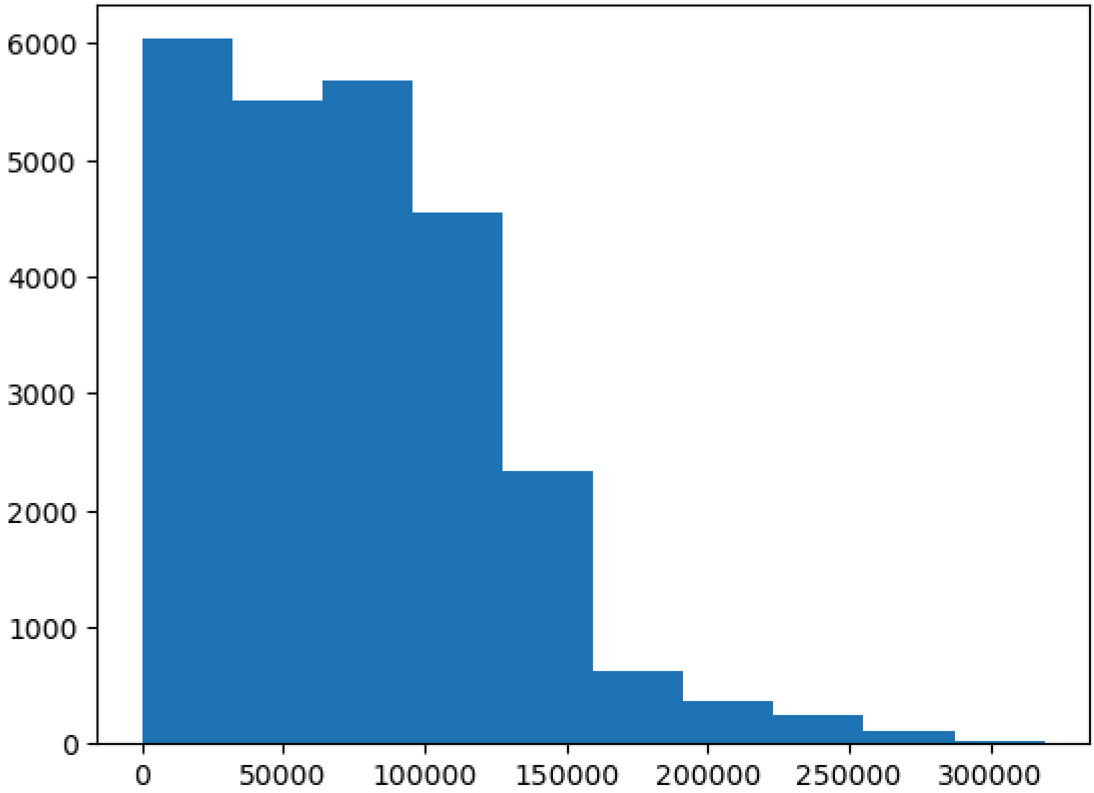
- Histogram can get by matplotlib
- Histogram can get by seaborn also
- plt.hist()

In [45]:

```
import matplotlib.pyplot as plt
plt.hist(visa_df['prevailing_wage'])
```

Out[45]:

```
(array([6038., 5504., 5681., 4551., 2334.,  624.,  373.,  240.,  114.,
          21.]),
 array([2.13670000e+00, 3.19229500e+04, 6.38437634e+04, 9.57645767e+04,
        1.27685390e+05, 1.59606203e+05, 1.91527017e+05, 2.23447830e+05,
        2.55368643e+05, 2.87289457e+05, 3.19210270e+05]),
 <BarContainer object of 10 artists>)
```



from interval range

- 2.13670000e+00 to 3.19229500e+04
    - 6038 members have salary between above range
- 3.19229500e+04 to 6.38437634e+04
    - 5504 members have salary
- Histogram will give 3 outputs
    - frequency
        - in each interval range how many observations are there
    - interval
        - interval range
    - number of intervals

Check point-1

```
In [47]: 2.13670000e+00, 3.19229500e+04
```

```
Out[47]: (2.1367, 31922.95)
```

```
In [49]: con1=visa_df['prevailing_wage']>=2.1367
         con2=visa_df['prevailing_wage']<31922.95
         len(visa_df[con1&con2])
```

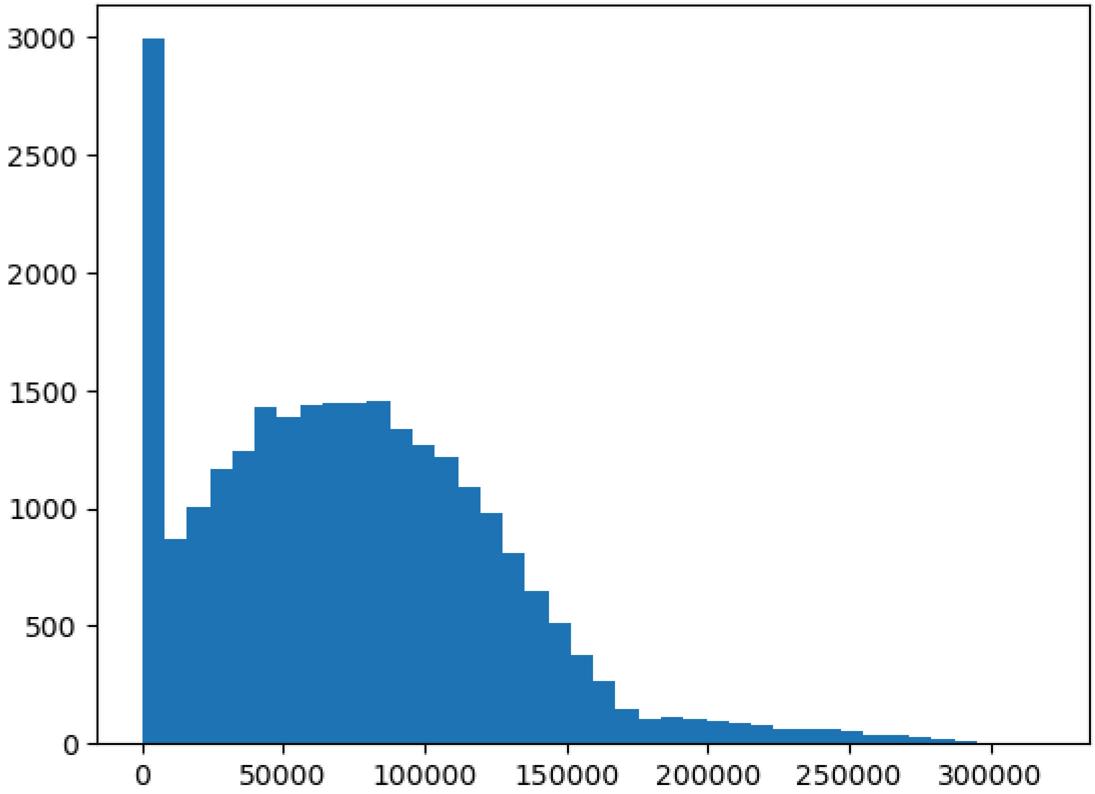
```
Out[49]: 6038
```

Bins

In [53]:

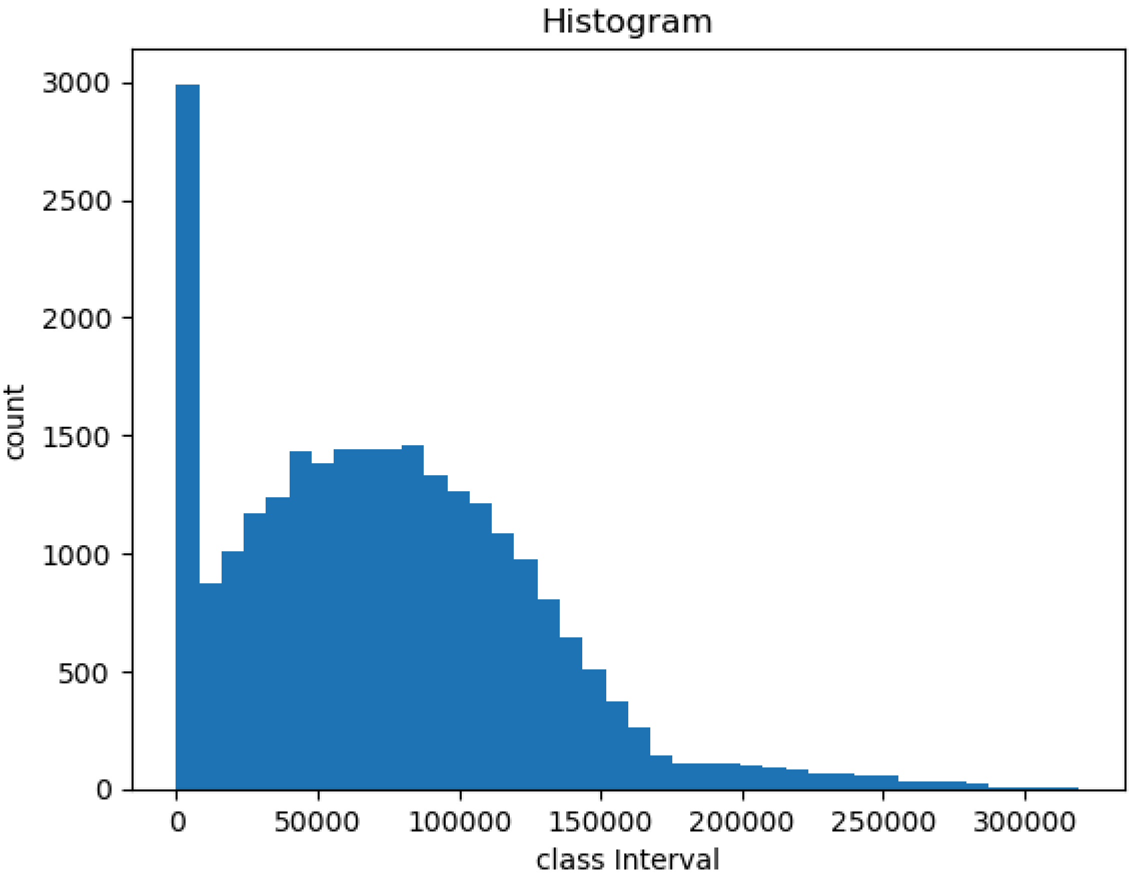
```
import matplotlib.pyplot as plt
f,i,n=plt.hist(visa_df['prevailing_wage'],
        bins=40)

print(n)
```

```
<BarContainer object of 40 artists>
```



In [55]:

```
import matplotlib.pyplot as plt
plt.hist(visa_df['prevailing_wage'],bins=40)
plt.title("Histogram")
plt.xlabel("class Interval")
plt.ylabel("count")
plt.show()
```

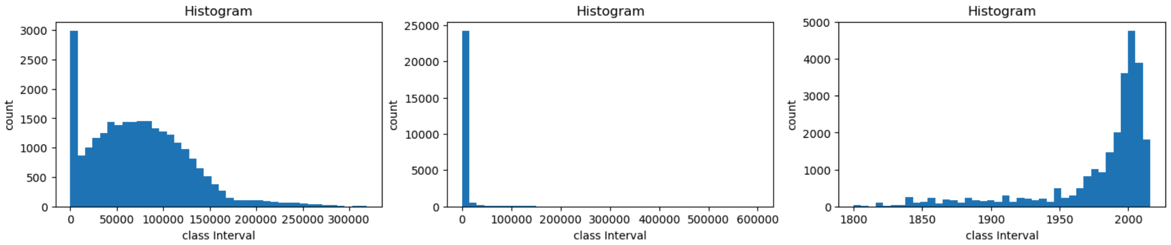


In [57]:
```
cols
```

Out[57]:
```
Index(['no_of_employees', 'yr_of_estab', 'prevailing_wage'], dtype='object')
```

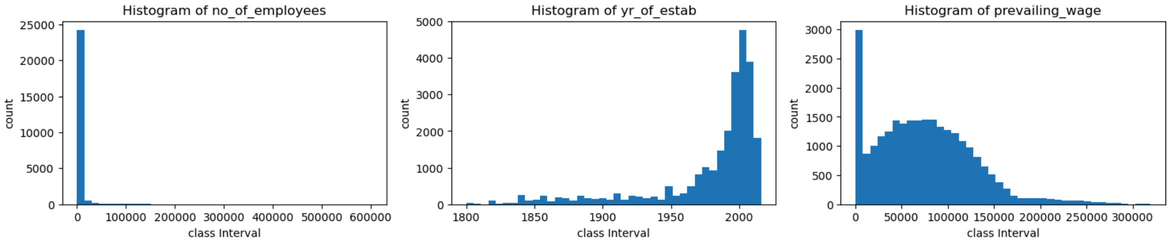
In [62]:
```
import matplotlib.pyplot as plt
plt.figure(figsize=(18,3))
plt.subplot(1,3,1)
plt.hist(visa_df['prevailing_wage'],bins=40)
plt.title("Histogram")
plt.xlabel("class Interval")
plt.ylabel("count")

plt.subplot(1,3,2)
plt.hist(visa_df['no_of_employees'],bins=40)
plt.title("Histogram")
plt.xlabel("class Interval")
plt.ylabel("count")


plt.subplot(1,3,3)
plt.hist(visa_df['yr_of_estab'],bins=40)
plt.title("Histogram")
plt.xlabel("class Interval")
plt.ylabel("count")
```

Out[62]:
```
Text(0, 0.5, 'count')
```



In [64]:

```python
import matplotlib.pyplot as plt
plt.figure(figsize=(18,3))
for i in range(len(cols)):
    plt.subplot(1,len(cols),i+1)
    plt.hist(visa_df[cols[i]],bins=40)
    plt.title(f"Histogram of {cols[i]}")
    plt.xlabel("class Interval")
    plt.ylabel("count")
```



Histogram using seaborn

- histplot
- distplot

In [65]:

```python
import seaborn as sns
```

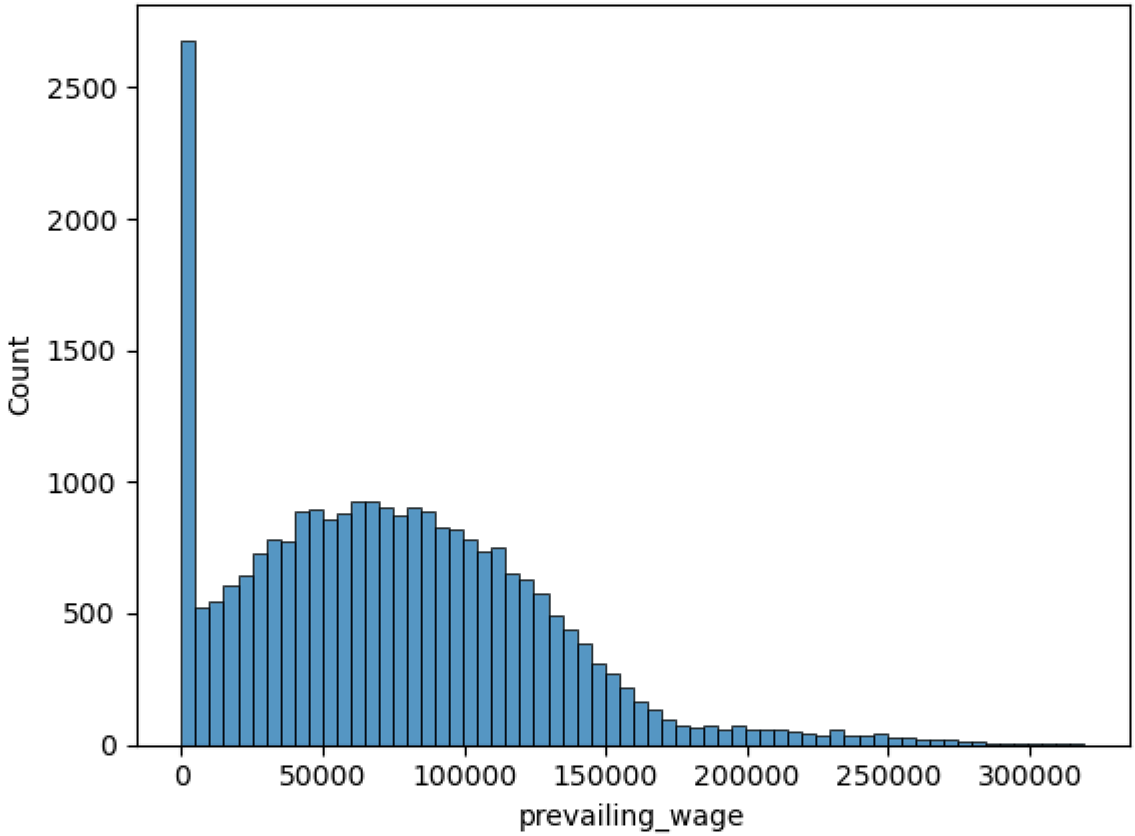
In [66]:

```python
sns.histplot(visa_df['prevailing_wage'])
```

```
C:\Users\omkar\anaconda3\Lib\site-packages\seaborn\_oldcore.py:1119: FutureWarnin
g: use_inf_as_na option is deprecated and will be removed in a future version. Co
nvert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

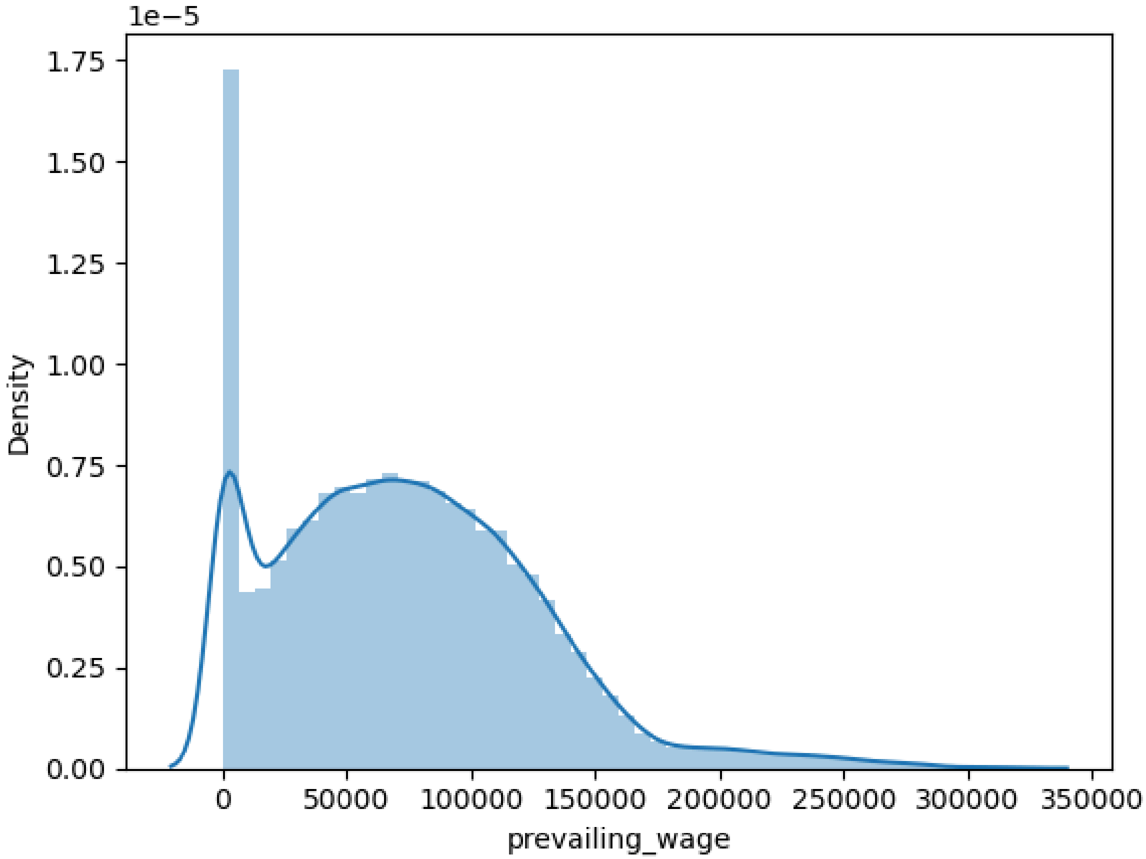
Out[66]:

```
<Axes: xlabel='prevailing_wage', ylabel='Count'>
```



```
In [69]: import warnings
         warnings.filterwarnings("ignore")

         sns.distplot(visa_df['prevailing_wage'])
```

```
Out[69]: <Axes: xlabel='prevailing_wage', ylabel='Density'>
```



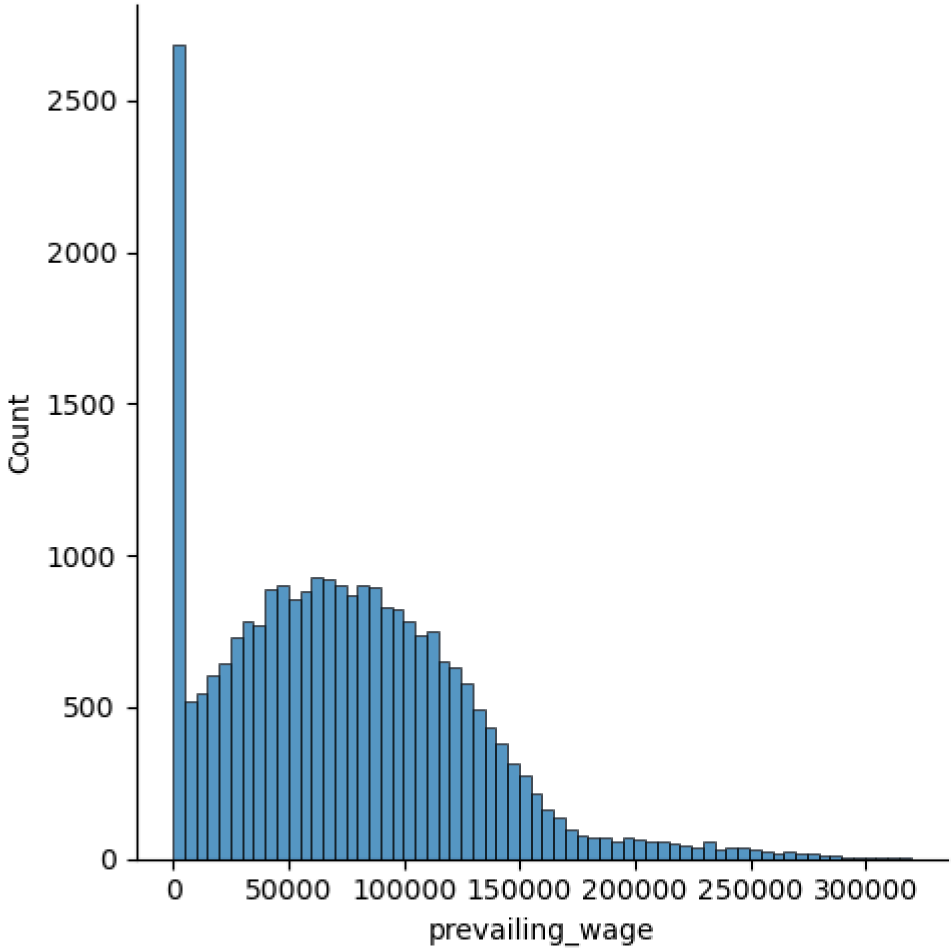
In [68]:

```
sns.displot(visa_df['prevailing_wage'])
```

```
C:\Users\omkar\anaconda3\Lib\site-packages\seaborn\_oldcore.py:1119: FutureWarnin
g: use_inf_as_na option is deprecated and will be removed in a future version. Co
nvert inf values to NaN before operating instead.
  with pd.option_context('mode.use_inf_as_na', True):
```

Out[68]:

```
<seaborn.axisgrid.FacetGrid at 0x20e42f91550>
```



In [ ]: