

In [1]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import preprocessing, svm
```

In [2]:

```
df=pd.read_csv(r"C:\Users\DHEEPAK\Downloads\bottle.csv (1)\bottle.csv",low_memory=False)
df
```

Out[2]:

Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta
0	1	1	054.0 056.0 19-4903CR-HY-060-0930-05400560-0000A-3	0	10.500	33.4400	NaN	25.64900
1	1	2	054.0 056.0 19-4903CR-HY-060-0930-05400560-0008A-3	8	10.460	33.4400	NaN	25.65600
2	1	3	054.0 056.0 19-4903CR-HY-060-0930-05400560-0010A-7	10	10.460	33.4370	NaN	25.65400
3	1	4	054.0 056.0 19-4903CR-HY-060-0930-05400560-0019A-3	19	10.450	33.4200	NaN	25.64300
4	1	5	054.0 056.0 19-4903CR-HY-060-0930-05400560-0020A-7	20	10.450	33.4210	NaN	25.64300
...
864858	34404	864859	093.4 026.4 20-1611SR-MX-310-2239-09340264-0000A-7	0	18.744	33.4083	5.805	23.87055
864859	34404	864860	093.4 026.4 20-1611SR-MX-310-2239-09340264-0002A-3	2	18.744	33.4083	5.805	23.87072
864860	34404	864861	093.4 026.4 20-1611SR-MX-310-2239-09340264-0005A-3	5	18.692	33.4150	5.796	23.88911
864861	34404	864862	093.4 026.4 20-1611SR-MX-310-2239-09340264-0010A-3	10	18.161	33.4062	5.816	24.01426

	Cst_Cnt	Btl_Cnt	Sta_ID	Depth_ID	Depthm	T_degC	Salnty	O2ml_L	STheta
864862	34404	864863	093.4 026.4	20- 1611SR- MX-310- 2239- 09340264- 0015A-3	15	17.533	33.3880	5.774	24.15297

In [3]:

In [3]:

```
df=df[['Salnty','T_degC']]
df.columns = ['Sal','Temp']
```

In [4]:

```
df.head(10)
```

Out[4]:

	Sal	Temp
0	33.440	10.50
1	33.440	10.46
2	33.437	10.46
3	33.420	10.45
4	33.421	10.45
5	33.431	10.45
6	33.440	10.45
7	33.424	10.24
8	33.420	10.06
9	33.494	9.86

In [5]:

```
df.tail()
```

Out[5]:

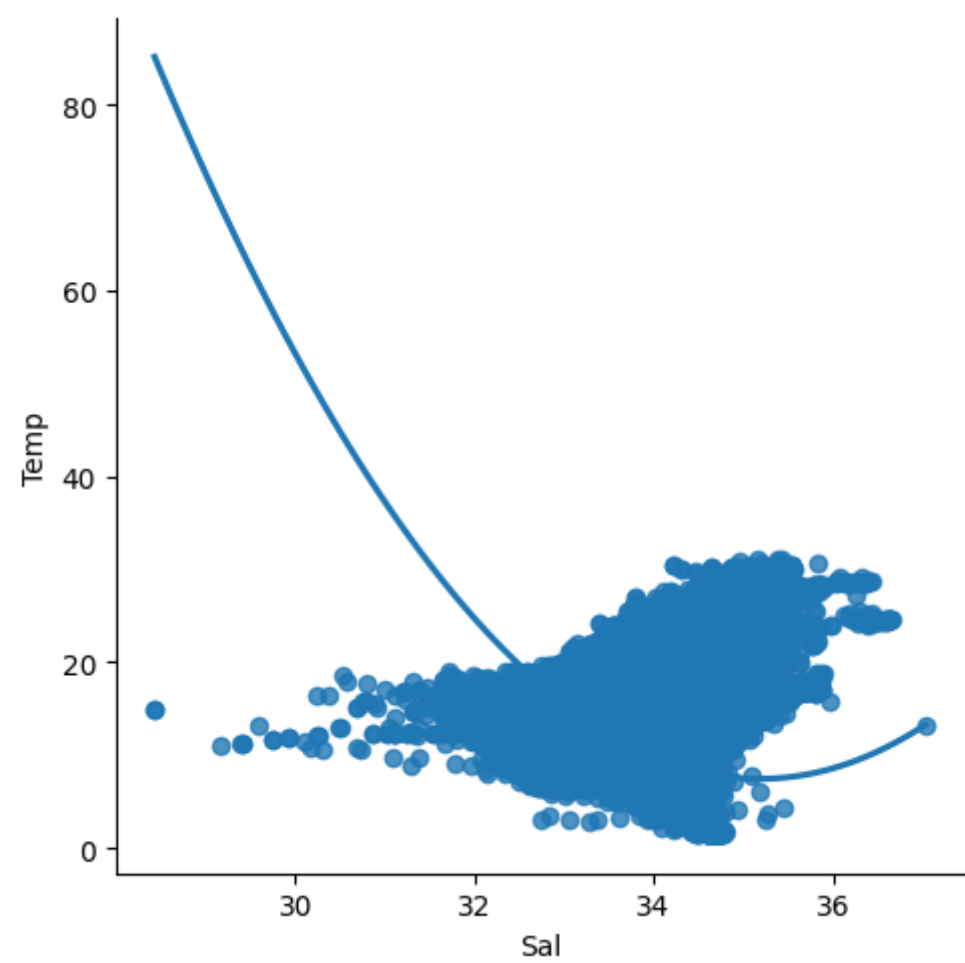
	Sal	Temp
864858	33.4083	18.744
864859	33.4083	18.744
864860	33.4150	18.692
864861	33.4062	18.161
864862	33.3880	17.533

In [6]:

```
sns.lmplot(x="Sal",y="Temp",data=df,order=2,ci=None)
```

Out[6]:

<seaborn.axisgrid.FacetGrid at 0x1ef8ec1e3d0>



In [7]:

```
df.describe()
```

Out[7]:

	Sal	Temp
count	817509.000000	853900.000000
mean	33.840350	10.799677
std	0.461843	4.243825
min	28.431000	1.440000
25%	33.488000	7.680000
50%	33.863000	10.060000
75%	34.196900	13.880000
max	37.034000	31.140000

In [8]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 864863 entries, 0 to 864862
Data columns (total 2 columns):
#   Column  Non-Null Count  Dtype  
---  -
0    Sal      817509 non-null    float64
1    Temp      853900 non-null    float64
dtypes: float64(2)
memory usage: 13.2 MB
```

In [9]:

```
df.fillna(method='ffill',inplace=True)
```

C:\Users\DHEEPAK\AppData\Local\Temp\ipykernel_27196\4116506308.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
df.fillna(method='ffill',inplace=True)
```

In [10]:

```

df.fillna(method='ffill',inplace=True)
x=np.array(df['Sal']).reshape(-1,1)
y=np.array(df['Temp']).reshape(-1,1)
df.dropna(inplace=True)
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25)
regr=LinearRegression()
regr.fit(x_train,y_train)
print("Regression: ",regr.score(x_test,y_test))
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()

```

C:\Users\DHEEPAK\AppData\Local\Temp\ipykernel_27196\228254547.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

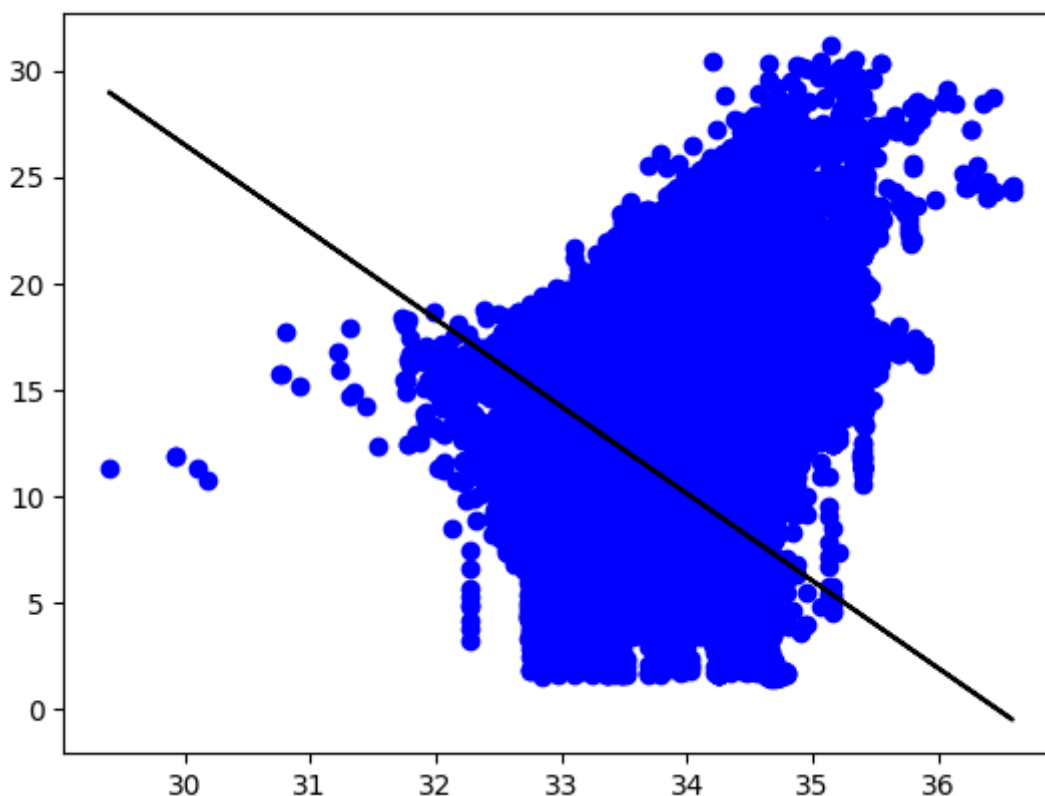
```
df.fillna(method='ffill',inplace=True)
```

C:\Users\DHEEPAK\AppData\Local\Temp\ipykernel_27196\228254547.py:4: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

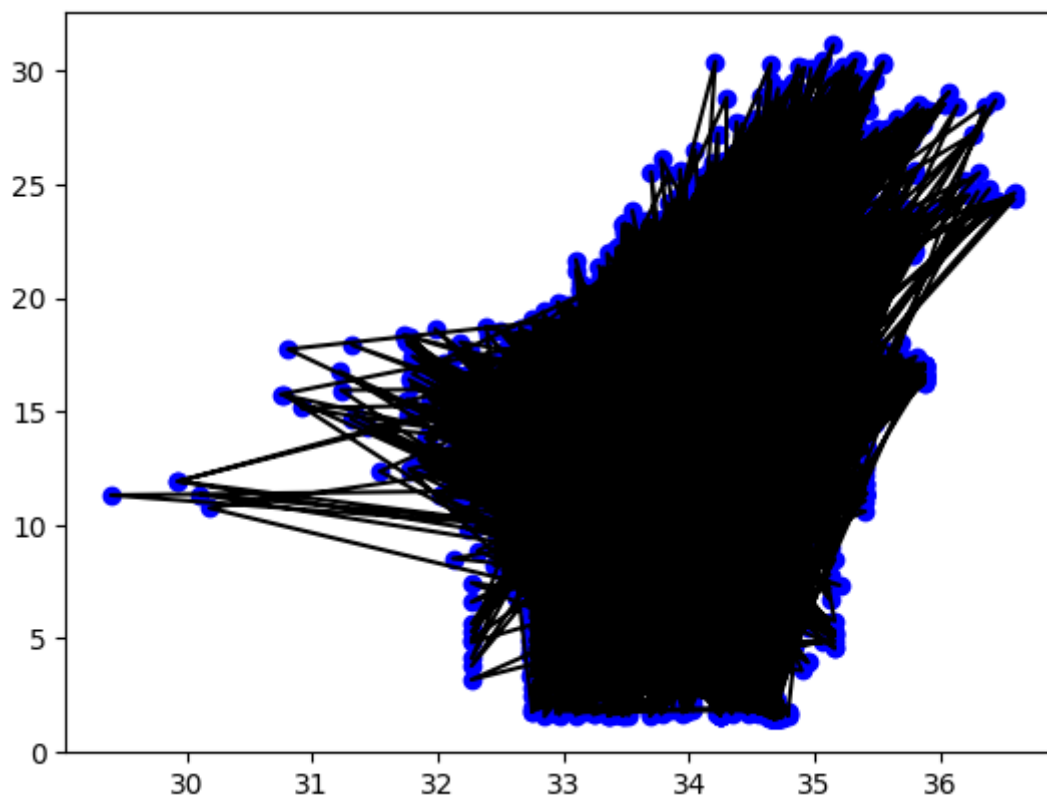
```
df.dropna(inplace=True)
```

Regression: 0.20490214449132882



In [11]:

```
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_test,color='k')
plt.show()
```



In [12]:

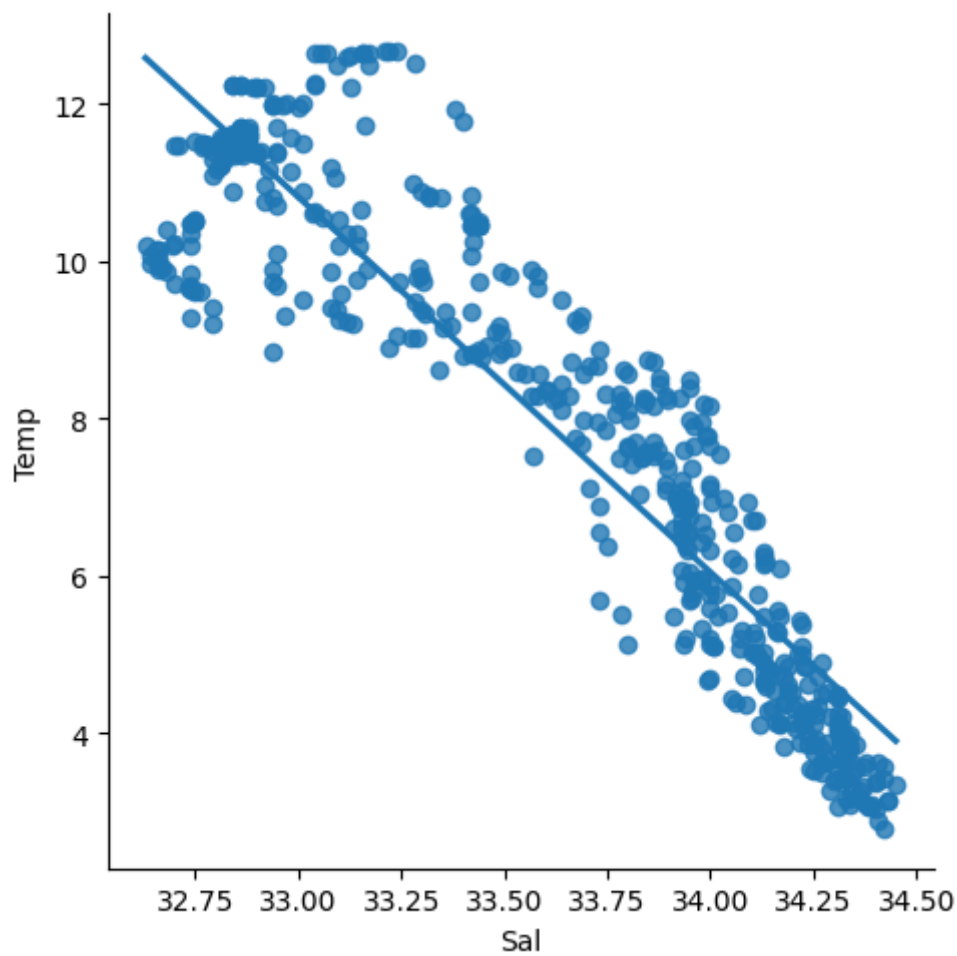
```
df=df[:, :500]
```


In [13]:

```
sns.lmplot(x="Sal",y="Temp",data=df,order=1,ci=None)
```

Out[13]:

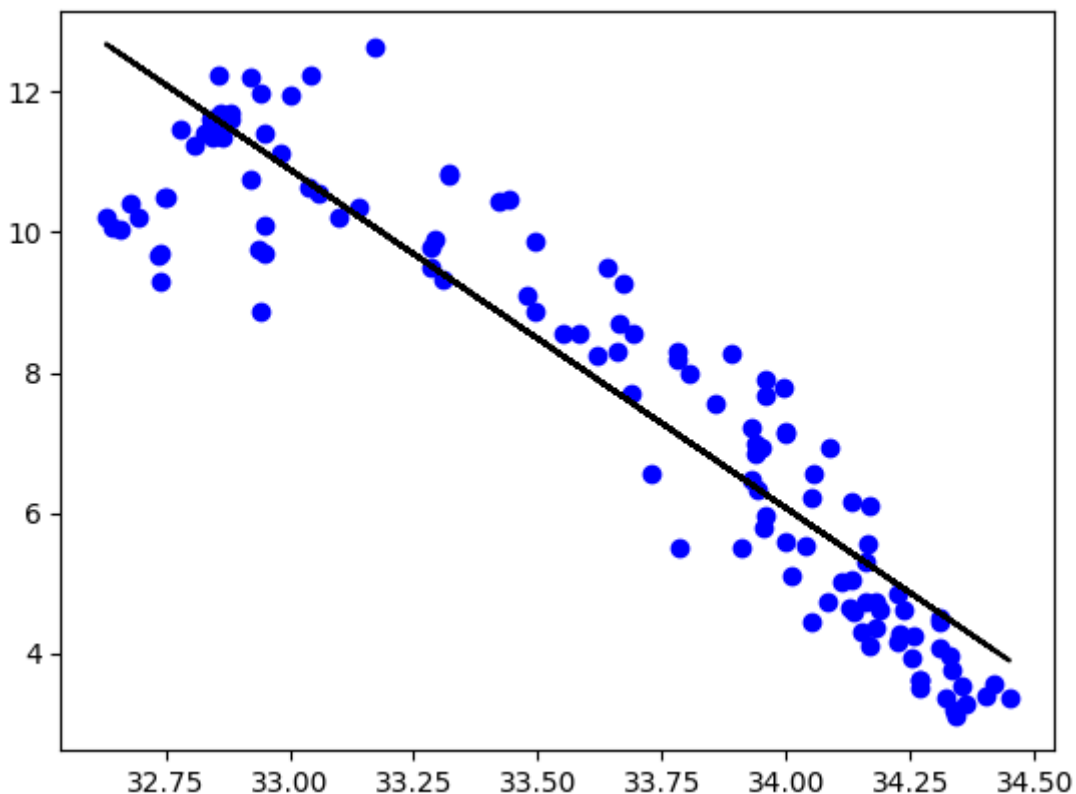
<seaborn.axisgrid.FacetGrid at 0x1ef8fde8b90>



In [14]:

```
df.fillna(method='ffill',inplace=True)
x=np.array(df['Sal']).reshape(-1,1)
y=np.array(df['Temp']).reshape(-1,1)
df.dropna(inplace=True)
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25)
regr=LinearRegression()
regr.fit(x_train,y_train)
print("Regression: ",regr.score(x_test,y_test))
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```

Regression: 0.8538709763872632



In [15]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
model=LinearRegression()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
r2=r2_score(y_test,y_pred)
print("r2 score:",r2)
```

r2 score: 0.8538709763872632

In [17]:

```
#elasticnet
from sklearn.linear_model import ElasticNet
regr=ElasticNet()
regr.fit(x,y)
print(regr.coef_)
print(regr.intercept_)
y_pred_elastic=regr.predict(x_train)
mean_squared_error=np.mean((y_pred_elastic-y_train)**2)
print("Mean Squared Error on test set",mean_squared_error)
```

```
[-1.23013343]
[49.21076752]
Mean Squared Error on test set 8.994056932707466
```

In []: