```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
```

```
temp = pd.read_csv('temperature.csv')
humidity = pd.read_csv('humidity.csv')
covid = pd.read_csv('covid19.csv')
```

```
data = pd.concat([temp[['date', 'da']], humidity['humidity'], covid[['icu', 'deaths',
'tests', 'confirmed']]], axis = 1)
```

```
traffic = pd.read_csv('traffic.csv')
arr = []
for i,j in traffic.iterrows():
    arr.append(j[3])
res = []
for i in range(0,len(arr)-2,2):
    res.append((arr[i] + arr[i+1])/2)
df = pd.concat([data, pd.DataFrame(res)], axis = 1)
df.dropna(axis = 0, inplace = True)
df.columns = ["date", "temp", "humidity", "icu", "deaths", "tests", "confirmed",
"traffic_volume"]
```

```
df.to_csv('final_data.csv')    #save as csv
```

```
df    #check the data
```

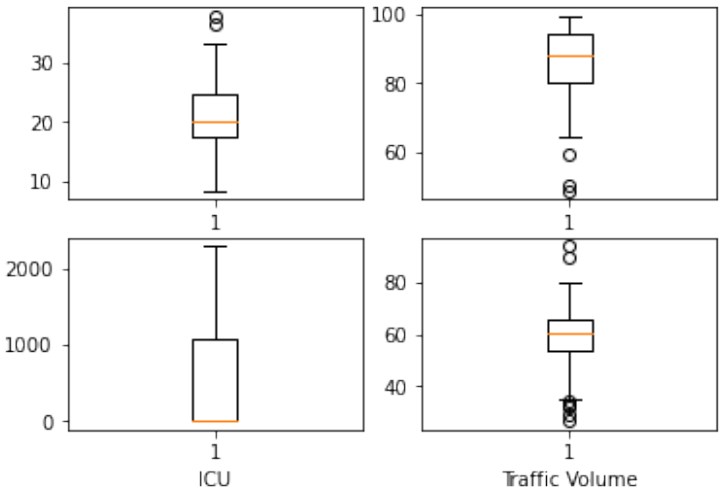
```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

	date	temp	humidity	icu	deaths	tests	confirmed	traffic_volume
0	2020/3/4	15.4	88.462963	0	1	325	55	89.5
1	2020/3/5	18.0	90.746269	0	1	508	67	94.0
2	2020/3/6	15.4	85.944444	0	1	715	81	79.5
3	2020/3/7	12.6	83.250000	0	1	1206	100	73.5
4	2020/3/8	12.4	76.000000	0	1	1382	112	71.0
...	...	...	...	...	...	...	...	...
256	2020/11/15	22.8	94.229508	1143	18265	18839535	1035981	47.5
257	2020/11/16	23.9	96.583333	1199	18304	18993274	1047360	53.0
258	2020/11/17	21.1	87.000000	1318	18360	19191038	1058096	66.5
259	2020/11/18	14.9	85.205882	1252	18467	19424942	1069517	66.0
260	2020/11/19	16.1	89.481481	1332	18555	19649202	1082674	71.5

261 rows × 8 columns

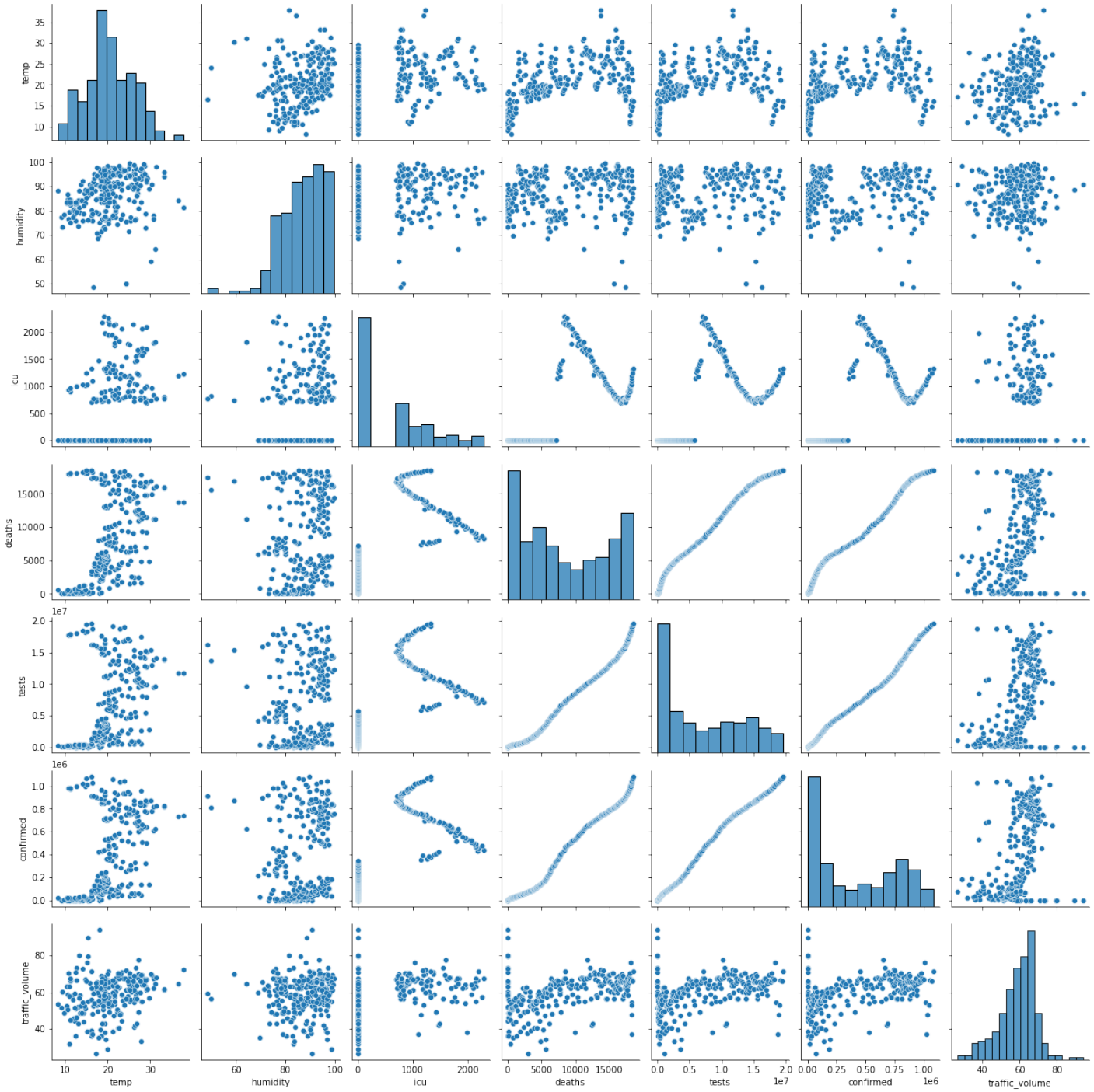
```
plt.subplot(2,2,1)
plt.boxplot(df["temp"])
plt.xlabel("Temperature")
plt.subplot(2,2,2)
plt.boxplot(df["humidity"])
plt.xlabel("Humidity")
plt.subplot(2,2,3)
plt.boxplot(df["icu"])
plt.xlabel("ICU")
plt.subplot(2,2,4)
plt.boxplot(df["traffic_volume"])
plt.xlabel("Traffic Volume")
```

```
Text(0.5, 0, 'Traffic Volume')
```




```
sns.pairplot(df)
```

```
<seaborn.axisgrid.PairGrid at 0x7fa648820a30>
```




```
df.drop("tests", axis = 1, inplace = True)    #similary data
df.drop("deaths",axis = 1, inplace = True)
```

```
df = df[df["temp"] <= 35]    #delete edge value
df = df[df["traffic_volume"] >= 39]
df = df[df["traffic_volume"] <= 80]
df = df[df["humidity"] >63]
```

```
df
```

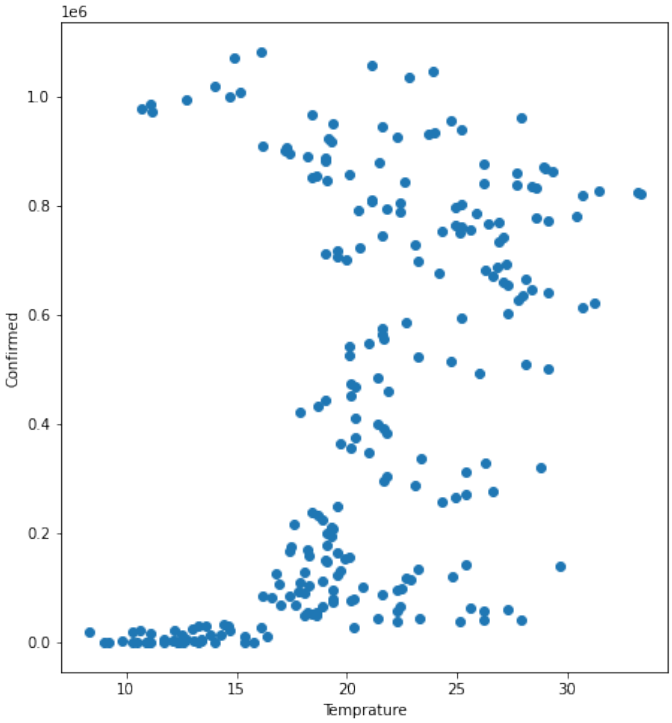
```
.dataframe tbody tr th {
    vertical-align: top;
}

.dataframe thead th {
    text-align: right;
}
```

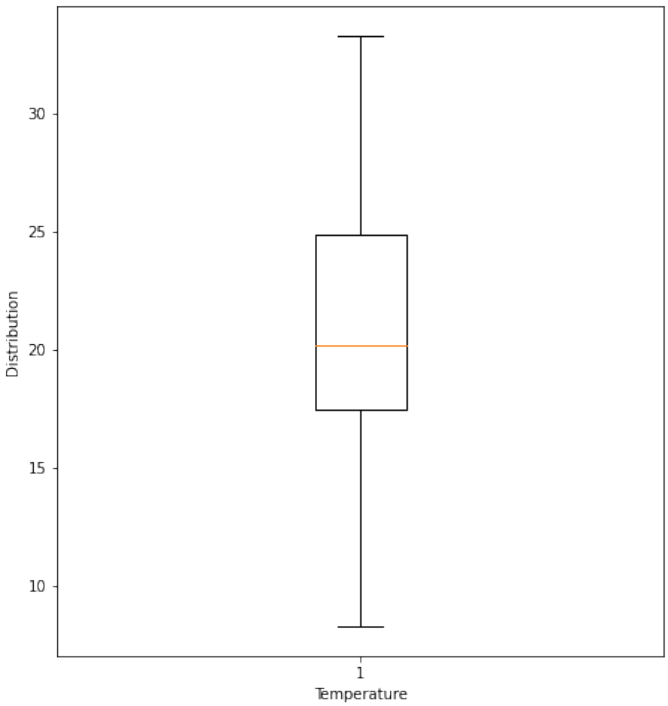
	date	temp	humidity	icu	confirmed	traffic_volume
2	2020/3/6	15.4	85.944444	0	81	79.5
3	2020/3/7	12.6	83.250000	0	100	73.5
4	2020/3/8	12.4	76.000000	0	112	71.0
5	2020/3/9	14.0	75.956522	0	172	73.0
6	2020/3/10	13.3	81.391304	0	179	80.0
...	...	...	...	...	...	...
256	2020/11/15	22.8	94.229508	1143	1035981	47.5
257	2020/11/16	23.9	96.583333	1199	1047360	53.0
258	2020/11/17	21.1	87.000000	1318	1058096	66.5
259	2020/11/18	14.9	85.205882	1252	1069517	66.0
260	2020/11/19	16.1	89.481481	1332	1082674	71.5

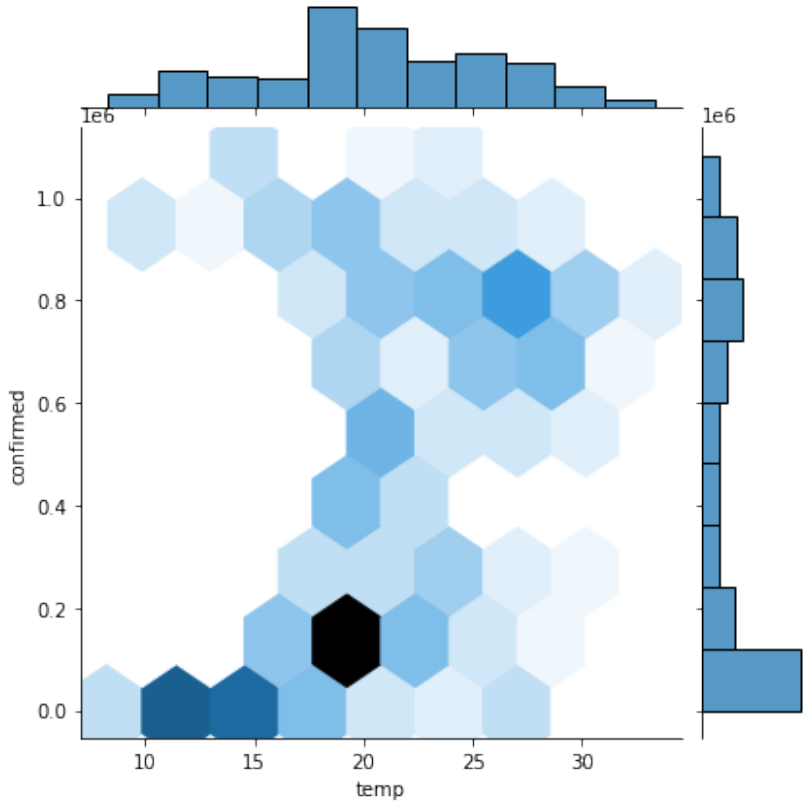
240 rows × 6 columns

```
plt.figure(figsize = (16,8))    #show the relations between temprature and confirmed people
plt.subplot(1,2,1)
plt.scatter(df["temp"], df["confirmed"])
plt.xlabel("Temprature")
plt.ylabel("Confirmed")
plt.subplot(1,2,2)
plt.boxplot(df["temp"])
plt.xlabel("Temperature")
plt.ylabel("Distribution")
sns.jointplot(df["temp"], df["confirmed"], kind = "hex")
```

```
<seaborn.axisgrid.JointGrid at 0x7fa638ce72b0>
```


1e6
1.0
0.8
0.6
0.4
0.2
0.0
Confirmed
10
15
20
25
30
Temprature

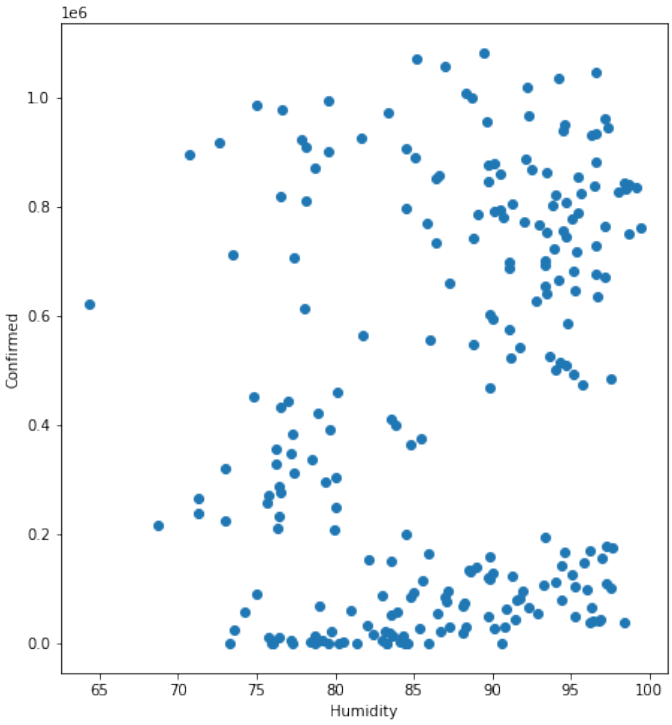

30
25
20
15
10
Distribution
1
Temperature

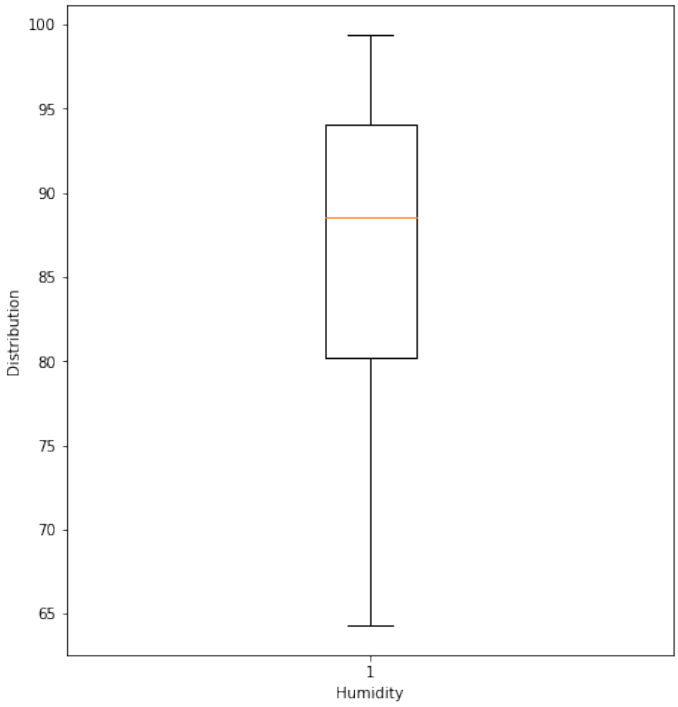

1e6
1e6
1.0
0.8
0.6
0.4
0.2
0.0
confirmed
10
15
20
25
30
temp

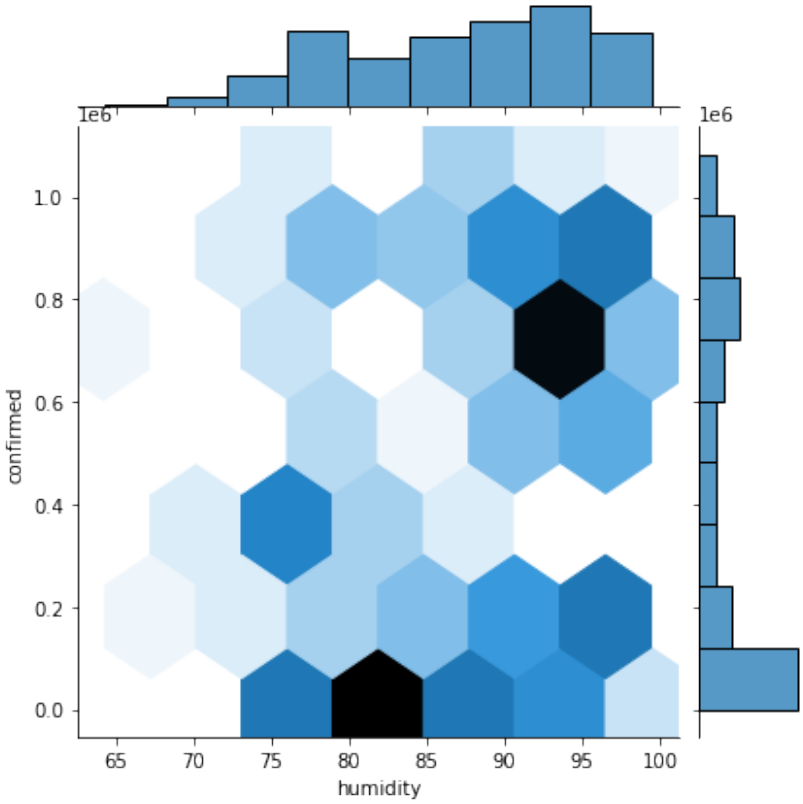
```
plt.figure(figsize = (16,8))    #show the relations between humidity and confirmed people
plt.subplot(1,2,1)
plt.scatter(df["humidity"], df["confirmed"])
plt.xlabel("Humidity")
plt.ylabel("Confirmed")
plt.subplot(1,2,2)
plt.boxplot(df["humidity"])
plt.xlabel("Humidity")
plt.ylabel("Distribution")
sns.jointplot(df["humidity"], df["confirmed"], kind = "hex")
```

```
/opt/anaconda3/lib/python3.8/site-packages/seaborn/_decorators.py:36: FutureWarning: Pass the
following variables as keyword args: x, y. From version 0.12, the only valid positional argument
will be `data`, and passing other arguments without an explicit keyword will result in an error
or misinterpretation.
  warnings.warn(
```

```
<seaborn.axisgrid.JointGrid at 0x7fa609ab4730>
```

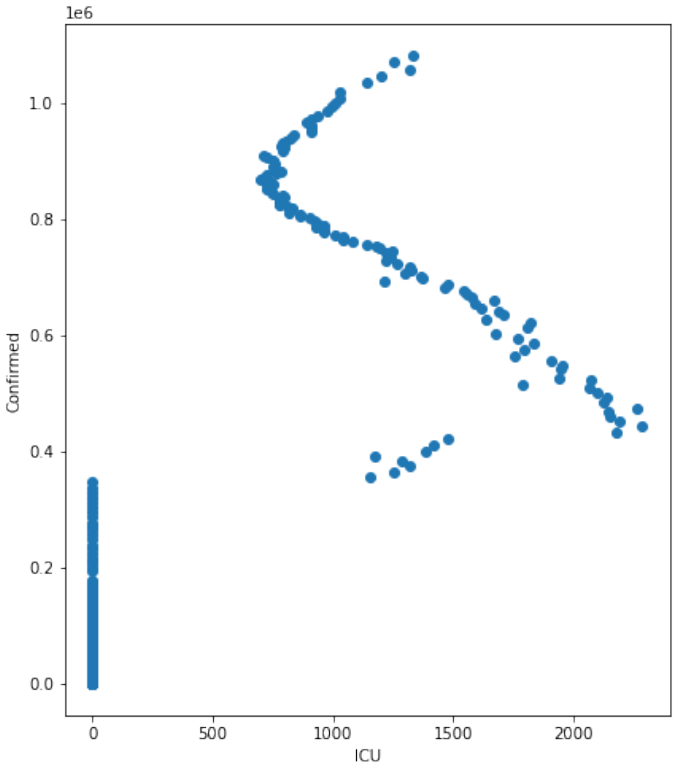


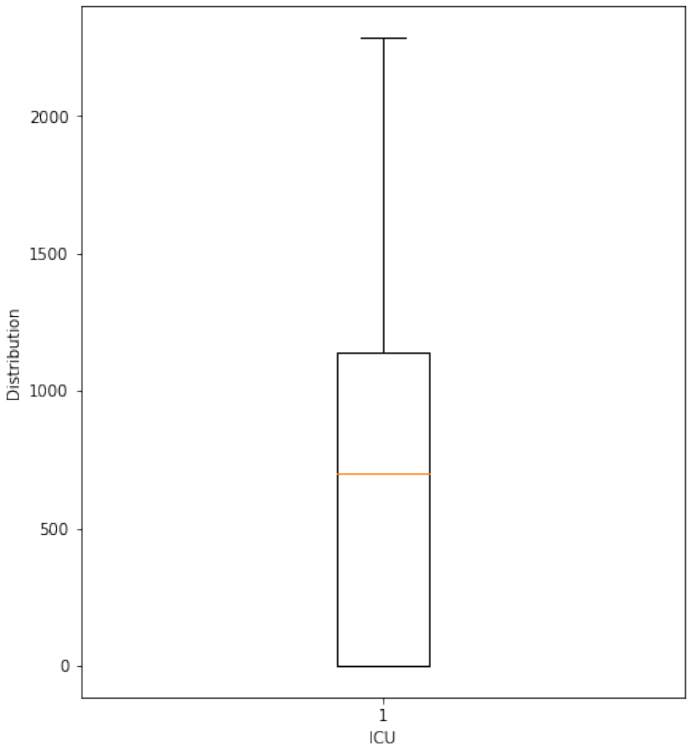


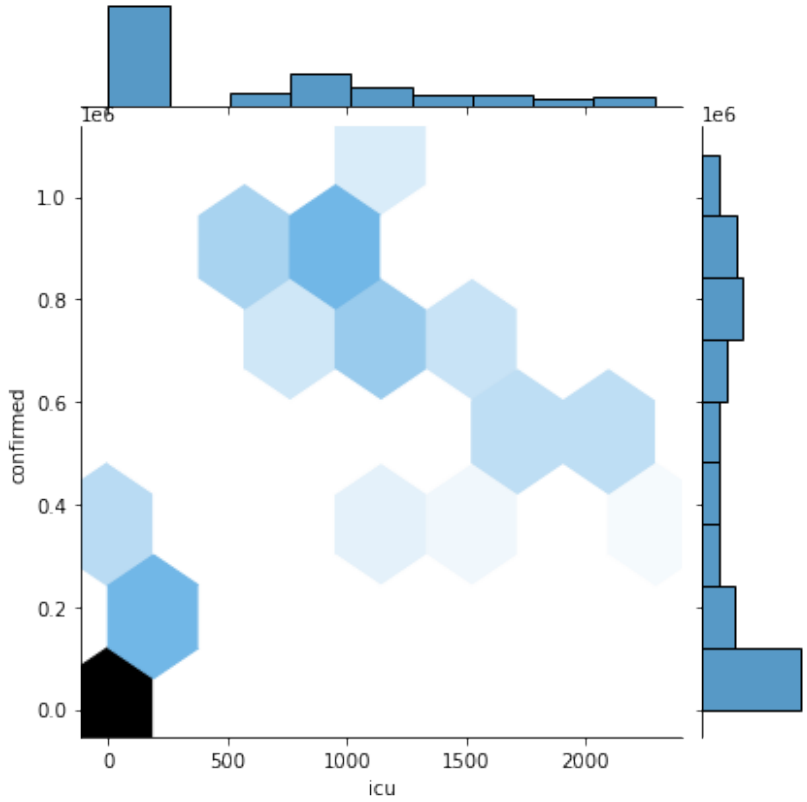



```
plt.figure(figsize = (15,8))    #show the relations between icu and confirmed people
plt.subplot(1,2,1)
plt.scatter(df["icu"], df["confirmed"])
plt.xlabel("ICU")
plt.ylabel("Confirmed")
plt.subplot(1,2,2)
plt.boxplot(df["icu"])
plt.xlabel("ICU")
plt.ylabel("Distribution")
sns.jointplot(df["icu"], df["confirmed"], kind = "hex")
```

```
<seaborn.axisgrid.JointGrid at 0x7fa638e15e80>
```

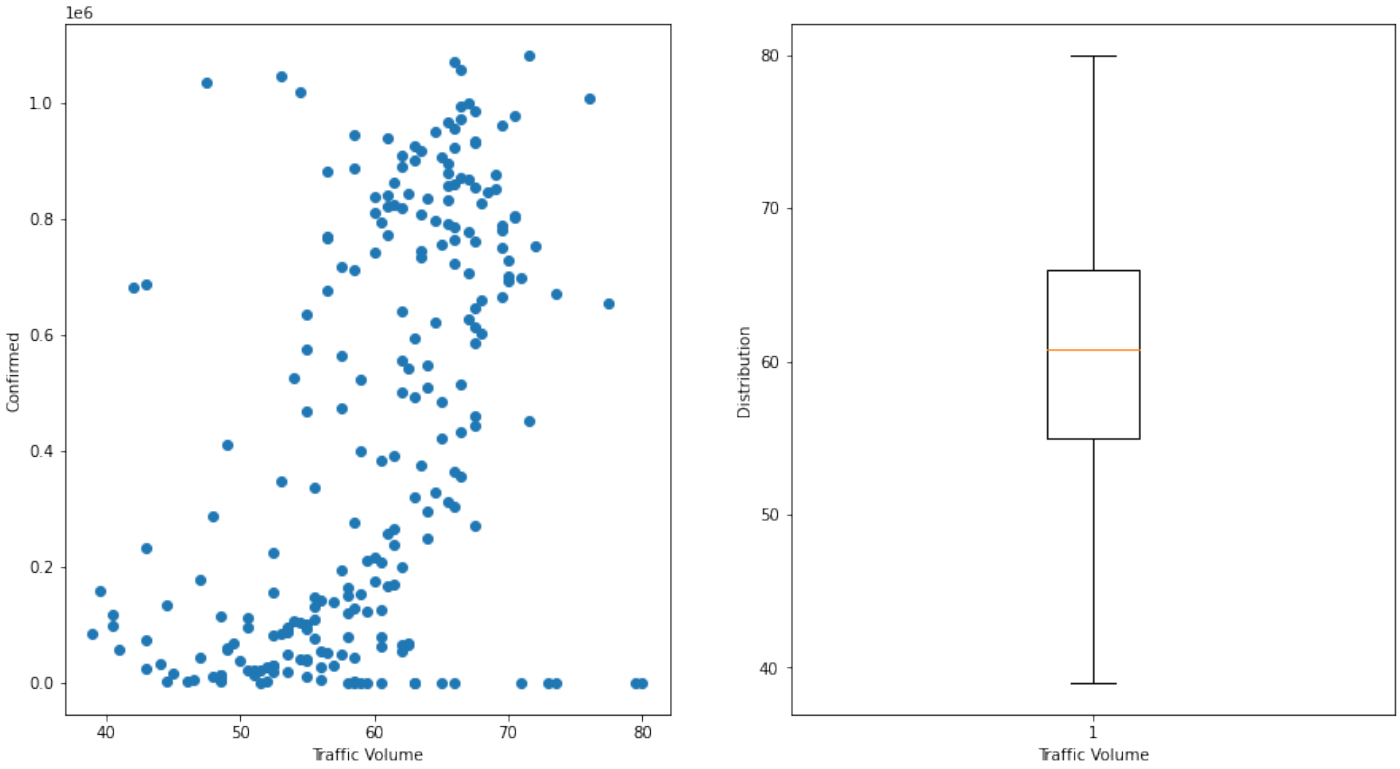

1e6
1.0
0.8
0.6
0.4
0.2
0.0
Confirmed
0
500
1000
1500
2000
ICU

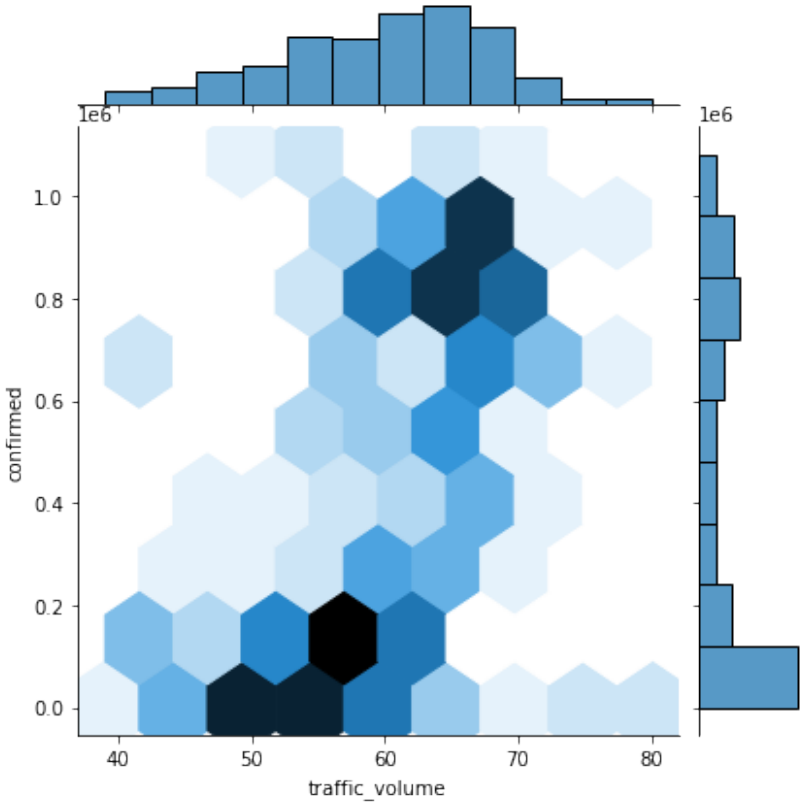

2000
1500
1000
500
0
Distribution
1
ICU


1e6
1e6
1.0
0.8
0.6
0.4
0.2
0.0
confirmed
0
500
1000
1500
2000
icu

```
plt.figure(figsize = (15,8))    #show the relations between traffic volume and confirmed people
plt.subplot(1,2,1)
plt.scatter(df["traffic_volume"], df["confirmed"])
plt.xlabel("Traffic Volume")
plt.ylabel("Confirmed")
plt.subplot(1,2,2)
plt.boxplot(df["traffic_volume"])
plt.xlabel("Traffic Volume")
plt.ylabel("Distribution")
sns.jointplot(df["traffic_volume"], df["confirmed"], kind = "hex")
```

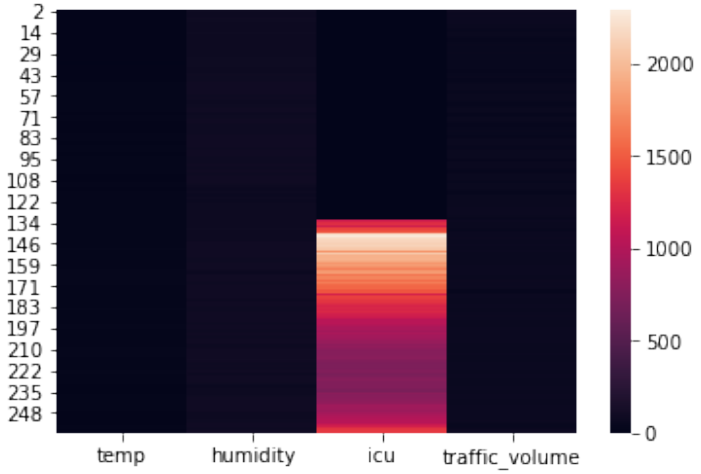
```
<seaborn.axisgrid.JointGrid at 0x7fa638e83d90>
```






```
sns.heatmap(df.drop("date", axis = 1).drop("confirmed", axis = 1))
```

```
<AxesSubplot:>
```



```
from sklearn.linear_model import LinearRegression    #import machine learning packages
from sklearn.model_selection import train_test_split
from xgboost.sklearn import XGBRegressor
from sklearn.svm import SVR
from sklearn.neural_network import MLPRegressor
from sklearn.linear_model import LogisticRegression
```

```
X, y = df[["temp", 'humidity', "icu", "traffic_volume" ]], df["confirmed"]
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.33, random_state =
17)#split dataset
```

```
lm = LinearRegression()    #Linear Regression
lm.fit(X_train, y_train)
res_LR = lm.predict(X_test)
```

```
regressor = XGBRegressor()  #XGB Regressor
regressor.fit(X_train, y_train)
res_XGB = regressor.predict(X_test)
```

```
svr =SVR(C = 0.5)    #Support Vector Machine
svr.fit(X_train, y_train)
res_SVR = svr.predict(X_test)
```

```
mlp = MLPRegressor(hidden_layer_sizes=(100,50),
activation='relu',solver='adam',alpha=0.01,max_iter=50000)    #MLP Regressor
mlp.fit(X_train,y_train)
res_MLP = mlp.predict(X_test)
```

```
logistic = LogisticRegression(C = 1, max_iter = 1e7)
logistic.fit(X_train, y_train)
res_LOG = logistic.predict(X_test)
```

```
from sklearn import metrics    #calculate the mean squre error of the models
def calMSE(predictList, testList, name):
    print("The MSE of the regression model " + name + " is : %.4f" %
(metrics.mean_squared_error(testList, predictList)))
    print("The R^2 of the regression model " + name + " is : %.4f" %
(metrics.r2_score(testList,predictList)))
```

```
calMSE(res_LR, y_test, "Linear Regressor")    #show the result
calMSE(res_SVR, y_test, "SVR Regressor")
calMSE(res_LOG, y_test, "Logistic Regressor")
calMSE(res_XGB, y_test, "XGB Regressor")
calMSE(res_MLP, y_test, "MLP Regressor")
```

```
The MSE of the regression model Linear Regressor is : 59115793490.1905
The R^2 of the regression model Linear Regressor is : 0.5361
The MSE of the regression model SVR Regressor is : 143231449030.1893
The R^2 of the regression model SVR Regressor is : -0.1239
The MSE of the regression model Logistic Regressor is : 17432926185.7125
The R^2 of the regression model Logistic Regressor is : 0.8632
The MSE of the regression model XGB Regressor is : 13252068369.4420
The R^2 of the regression model XGB Regressor is : 0.8960
The MSE of the regression model MLP Regressor is : 12611696256.2392
The R^2 of the regression model MLP Regressor is : 0.9010
```