Analyse_Dispersion

November 13, 2021

[1]:
```
from pandas import *

positions_stations = {"esp20":{"name":"esp20","x":7835,"y":8690.
↪84716796875},"esp21":{"name":"esp21","x":955,"y":12270.84716796875},"esp22":
↪{"name":"esp22","x":8935,"y":12120.84716796875}}

df = read_csv("device_all.csv")
df
```

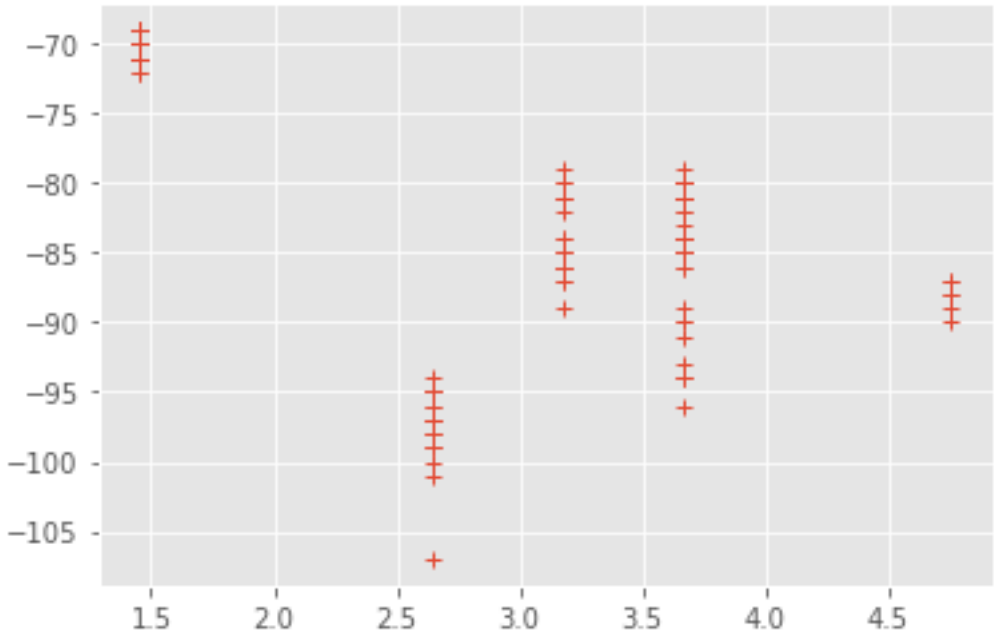
[1]:

	device	measure_no	rssi	measured_distance	labelx	labely
0	esp20	1	-87	4.757198	3403.97583	6959.674805
1	esp20	1	-89	4.757198	3403.97583	6959.674805
2	esp20	1	-87	4.757198	3403.97583	6959.674805
3	esp20	1	-88	4.757198	3403.97583	6959.674805
4	esp20	1	-90	4.757198	3403.97583	6959.674805
..	…	…	…	…	…	…
525	esp22	7	-96	5.312698	5208.35498	8334.440430
526	esp22	7	-96	5.312698	5208.35498	8334.440430
527	esp22	7	-94	5.312698	5208.35498	8334.440430
528	esp22	7	-95	5.312698	5208.35498	8334.440430
529	esp22	7	-97	5.312698	5208.35498	8334.440430

[530 rows x 6 columns]

[2]:
```
from sklearn.preprocessing import *
import matplotlib.pyplot as plt
from pandas.plotting import register_matplotlib_converters
register_matplotlib_converters()
plt.style.use("ggplot")
```

[3]:
```
esp22df = df.loc[df["device"] == "esp20"]

plt.plot(esp22df["measured_distance"].to_numpy(),esp22df["rssi"].to_numpy(),␣
↪"+")
plt.show()
```

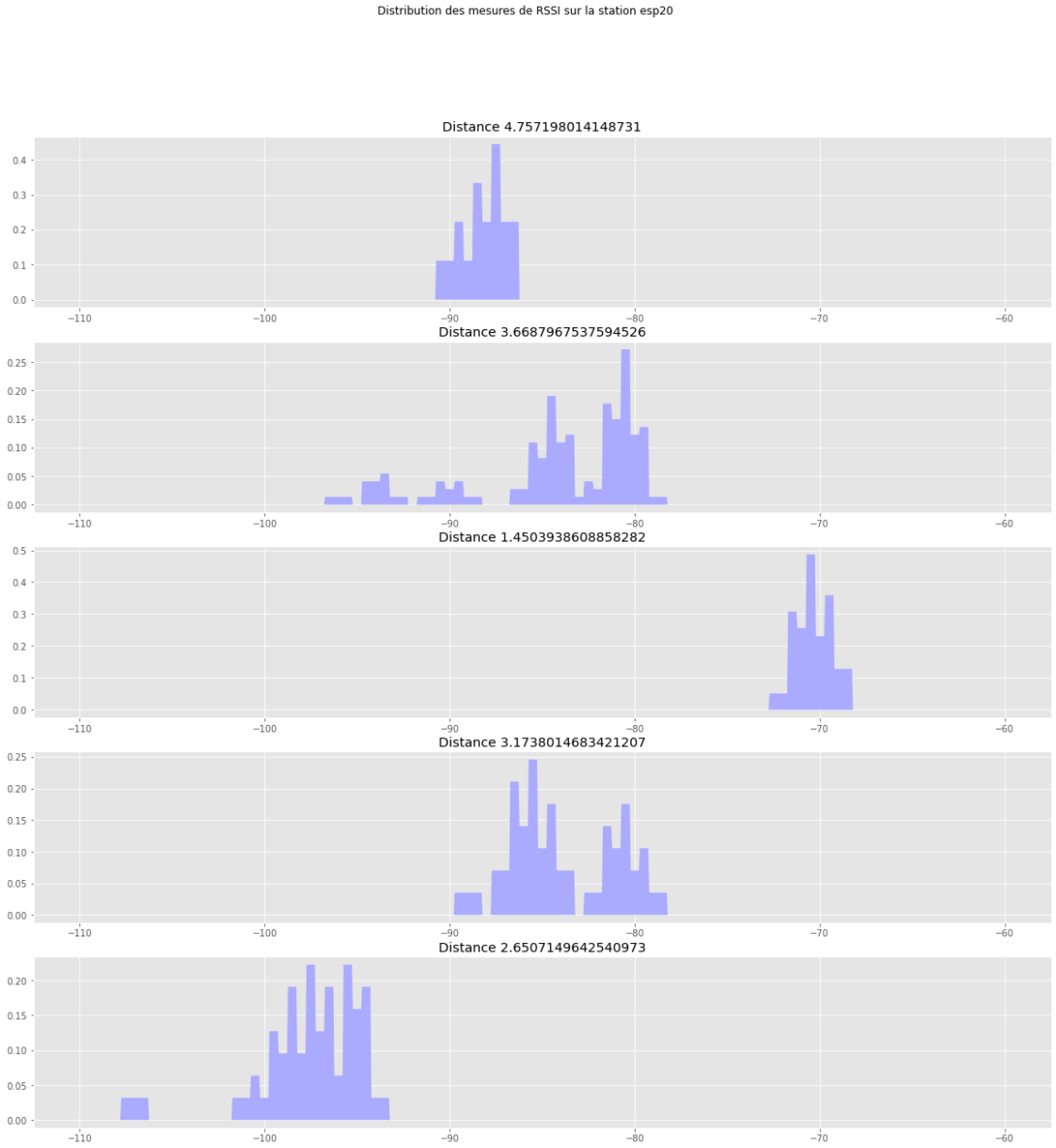


[4]:
```
distances = esp22df['measured_distance'].unique()
```

[5]:
```
from sklearn.neighbors import KernelDensity
from matplotlib.pyplot import figure
import numpy as np


def plot_density(station):

    dfstation = df.loc[df["device"] == station]
    distances = dfstation['measured_distance'].unique()

    fig, axs = plt.subplots(len(distances), figsize=(20,20))
    fig.suptitle('Distribution des mesures de RSSI sur la station ' +␣
 ↪str(station))

    #axs[0].plot(x, y)
    #axs[1].plot(x, -y)

    X_plot = np.linspace(-110, -60, 1000)[:, np.newaxis]
    bins = np.linspace(-110, -60, 10)

    for idx,i in enumerate(distances):
        # print(idx)
        XDF = dfstation[dfstation['measured_distance'] == i]['rssi']
```

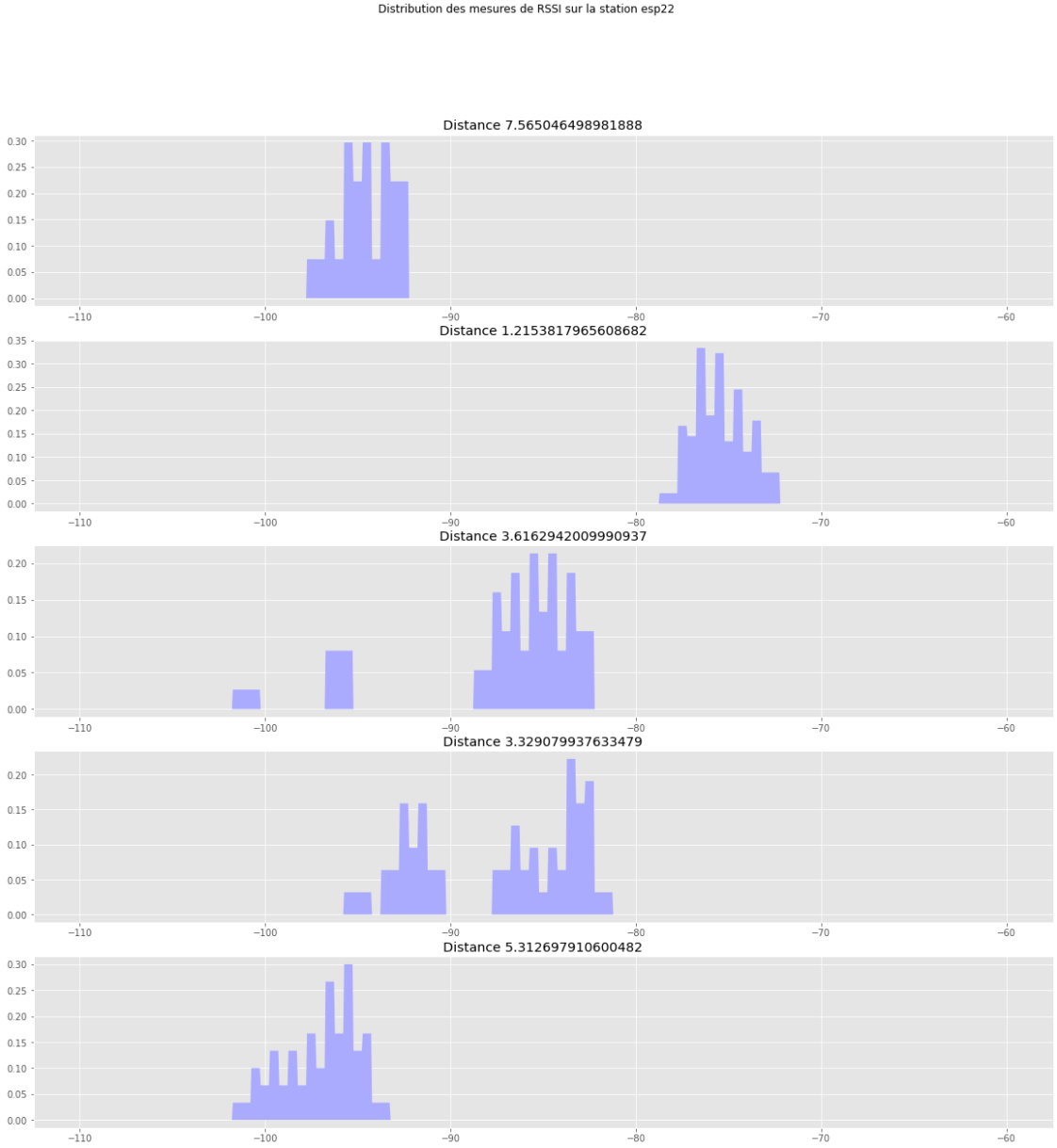
```
        # print(XDF)
        X = XDF.to_numpy()

        # print(X)
        s = np.shape(X)
        X = X.reshape(s[0],1)

        kde = KernelDensity(kernel="tophat", bandwidth=0.75).fit(X)
        log_dens = kde.score_samples(X_plot)
        axs[idx].fill(X_plot[:, 0], np.exp(log_dens), fc="#AAAAFF")
        axs[idx].set_title('Distance ' + str(i))

        axs[idx].plot()
```

[6]:
```
plot_density("esp20")
```



[7]:
```
plot_density("esp21")
```

[8]:
```
plot_density("esp22")
```


Distribution des mesures de RSSI sur la station esp22
Distance 7.565046498981888
Distance 1.2153817965608682
Distance 3.6162942009990937
Distance 3.329079937633479
Distance 5.312697910600482

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