

# TECHIN 513: Managing Data and Signal Processing ICTE 2

Your task is to load RSSI database from "RSSI.csv" and plot a path map with X and Y.

- TO DO
1. Load CSV file "RSSI.csv"
  2. Check and modify data (check for missing values NaN)
  3. Count the number of times there was no signal from the router in each column except X and Y (-100 represent no signal from that WiFi router)
  4. Find top 10 of most usable WiFi router
  5. Plot a map with X and Y

```
In [ ]: # 1)Load CSV file "RSSI.csv"
# 2)Check and modify data (check for missing values NaN)
# 3)Count the number of times there was no signal from the router in each column exce
# (-100 represent no signal from that WiFi router)
# 4)Find top 10 of most usable WiFi router
# 5)Plot a map with X and Y
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In [ ]: import pandas as pd
import numpy as np

# step 1: load file "RSSI.csv"

RSSI = pd.read_csv("RSSI.csv", header=0)
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In [ ]: # step 2: check missing values

# according to #3, empty values are already represented as -100 instead of NaN, done
# we reverse the change for the sake of this question
RSSI_mod = RSSI.replace(-100, np.nan)

RSSI_mod
```

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Out [ ]:
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	X	Y	00:bb:60:5c:28:30	2c:30:33:49:f1:51	a0:63:91:d9:cf:bb	ac:23:16:eb:20:
0	-4.729264	-8.266995	NaN	NaN	NaN	-
1	-5.504700	-8.094806	-83.0	NaN	NaN	-
2	-5.807762	-7.380555	-83.0	NaN	NaN	-
3	-6.008443	-6.611304	-82.0	NaN	NaN	-
4	-6.217061	-5.797879	-82.0	NaN	NaN	-
...	...	...	...	...	...	...
1007	-24.432861	-7.485832	-68.0	NaN	NaN	-
1008	-24.797718	-8.147212	-68.0	NaN	NaN	-
1009	-24.850538	-7.899585	-80.0	NaN	NaN	-
1010	-24.725263	-8.245343	-80.0	NaN	NaN	-
1011	-24.723473	-8.248850	-73.0	NaN	NaN	-

1012 rows × 229 columns

```

In [ ]: # step 3: count empty values

# drops X and Y for easier comparison
# router_data = RSSI_mod.drop(['X', 'Y'], axis=1)

signals = RSSI_mod.iloc[:, 2:229]

# adds a column with the count of valid signals for each router
valid = signals.notnull().sum(axis=1)
RSSI_mod = pd.concat([RSSI_mod, valid.rename('valid')], axis=1)

# # adds a column with the count of empty signals for each router
empty = signals.isnull().sum(axis=1)
RSSI_mod = pd.concat([RSSI_mod, empty.rename('empty')], axis=1)

empty

```

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Out [ ]: 0      163
         1      163
         2      163
         3      163
         4      163
         ...
        1007    164
        1008    164
        1009    164
        1010    164
        1011    162
Length: 1012, dtype: int64

```

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In [ ]: # step 4: rank valid counts

# adds a column with the ranking of routers' usability
ranking = valid.rank(ascending=0)
RSSI_mod = pd.concat([RSSI_mod, ranking.rename('ranking')], axis=1)

# sorts the routers by their usability
RSSI_rank = RSSI_mod.set_index('ranking').sort_index()

# finds the top 10 routers
RSSI_top = RSSI_rank.head(10)

RSSI_top.loc[:, ['X', 'Y', 'valid']]

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Out [ ]:

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	X	Y	valid
ranking			
3.5	-28.587851	57.727020	66
3.5	-27.681598	57.748005	66
3.5	-26.745995	57.638415	66
3.5	-25.844334	57.535345	66
3.5	-24.888309	-21.477894	66
3.5	-24.294086	-20.869478	66
91.0	-8.498357	34.605604	65
91.0	-7.716759	35.101800	65
91.0	-7.615818	36.054524	65
91.0	-7.576172	36.973923	65

```
In [ ]: from matplotlib import pyplot as plt
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# step 5: plot two-axis map
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# plot x and y axes
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plt.plot(RSSI['X'], RSSI['Y'])
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plt.show()
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