# BayesOptProphetHyperparameters

December 30, 2020

```
[2]: %matplotlib inline
```

```
[3]: import pandas as pd
     import matplotlib.pyplot as plt
     from time import sleep
     from fbprophet import Prophet
     from bayes_opt import BayesianOptimization
```

```
Importing plotly failed. Interactive plots will not work.
```

## 1 Import Data

Data has been cleaned but may still have issues. See ...

```
[4]: df = pd.read_csv("../data/CamUKWeather.csv", parse_dates=True)
     df_test = df[df['year'] >= 2019]
     df = df[df['year'] < 2019]
     #pd.to_datetime(cam.ds)
```

```
[5]: df.shape
```

```
[5]: (174882, 11)
```

```
[6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 174882 entries, 0 to 174881
Data columns (total 11 columns):
 #   Column         Non-Null Count   Dtype
---  ------         --------------   -----
 0   ds             174882 non-null  object
 1   year           174882 non-null  int64
 2   doy            174882 non-null  int64
 3   time           174882 non-null  object
 4   y              174882 non-null  int64
 5   humidity       174882 non-null  int64
 6   dew.point      174882 non-null  int64
```

```
7    pressure           174882 non-null  int64
8    wind.speed.mean    174882 non-null  int64
9    wind.bearing.mean  174882 non-null  int64
10   wind.speed.max     174882 non-null  int64
dtypes: int64(9), object(2)
memory usage: 16.0+ MB
```

[7]: `df.describe()`

[7]:
|       | year          | doy           | y             | humidity      \ |
|-------|---------------|---------------|---------------|---------------|
| count | 174882.000000 | 174882.000000 | 174882.000000 | 174882.000000 |
| mean  | 2013.366213   | 188.028831    | 101.931760    | 79.453060     |
| std   | 2.980922      | 106.144290    | 64.615275     | 16.815623     |
| min   | 2008.000000   | 1.000000      | -138.000000   | 25.000000     |
| 25%   | 2011.000000   | 96.000000     | 56.000000     | 69.000000     |
| 50%   | 2013.000000   | 192.000000    | 100.000000    | 83.000000     |
| 75%   | 2016.000000   | 280.000000    | 145.000000    | 92.000000     |
| max   | 2018.000000   | 366.000000    | 339.000000    | 100.000000    |

|       | dew.point     | pressure      | wind.speed.mean | wind.bearing.mean \ |
|-------|---------------|---------------|-----------------|-------------------|
| count | 174882.000000 | 174882.000000 | 174882.000000   | 174882.000000     |
| mean  | 63.408801     | 1014.474783   | 44.704344       | 196.035956        |
| std   | 51.146203     | 11.625438     | 39.890768       | 82.706731         |
| min   | -143.000000   | 963.000000    | 0.000000        | 0.000000          |
| 25%   | 26.000000     | 1008.000000   | 12.000000       | 135.000000        |
| 50%   | 66.000000     | 1016.000000   | 35.000000       | 225.000000        |
| 75%   | 101.000000    | 1023.000000   | 66.000000       | 270.000000        |
| max   | 207.000000    | 1048.000000   | 291.000000      | 315.000000        |

|       | wind.speed.max |
|-------|---------------|
| count | 174882.000000 |
| mean  | 116.971901    |
| std   | 79.975367     |
| min   | 0.000000      |
| 25%   | 60.000000     |
| 50%   | 100.000000    |
| 75%   | 160.000000    |
| max   | 580.000000    |

[8]: `df`

[8]:
|   | ds                  | year | doy | time     | y   | humidity | dew.point \ |
|---|---------------------|------|-----|----------|-----|----------|-----------|
| 0 | 2008-08-01 08:30:00 | 2008 | 214 | 09:30:00 | 186 | 69       | 128       |
| 1 | 2008-08-01 09:00:00 | 2008 | 214 | 10:00:00 | 191 | 70       | 135       |
| 2 | 2008-08-01 09:30:00 | 2008 | 214 | 10:30:00 | 195 | 68       | 134       |
| 3 | 2008-08-01 10:00:00 | 2008 | 214 | 11:00:00 | 200 | 68       | 139       |
| 4 | 2008-08-01 10:30:00 | 2008 | 214 | 11:30:00 | 213 | 61       | 135       |

```
...                    ...   ...  ...    ...      ...    ...      ...
174877  2018-12-31 21:30:00  2018  365  21:30:00   72       78        36
174878  2018-12-31 22:00:00  2018  365  22:00:00   72       79        38
174879  2018-12-31 22:30:00  2018  365  22:30:00   68       78        32
174880  2018-12-31 23:00:00  2018  365  23:00:00   68       80        36
174881  2018-12-31 23:30:00  2018  365  23:30:00   72       74        29


        pressure  wind.speed.mean  wind.bearing.mean  wind.speed.max
0           1010              123                180             280
1           1010              137                180             260
2           1010              133                180             260
3           1010              129                180             240
4           1010              145                180             260
...          ...              ...                ...             ...
174877      1035               36                225             140
174878      1035               22                225              80
174879      1035               27                225              80
174880      1035               43                225             120
174881      1035               41                270             120

[174882 rows x 11 columns]
```

[ ]:

# 2 Archival

Archive code, markdown and formatted results.

Assumes all pdf, html, latex dependencies are installed.

[ ]:
```python
!jupyter nbconvert --to python BayesOptProphetHyperparameters.ipynb
sleep(5)
!jupyter nbconvert --to script BayesOptProphetHyperparameters.ipynb
sleep(5)
!jupyter nbconvert --to markdown BayesOptProphetHyperparameters.ipynb
sleep(5)

#!jupyter nbconvert --execute --to html BayesOptProphetHyperparameters.ipynb
!jupyter nbconvert --to html BayesOptProphetHyperparameters.ipynb
sleep(10)
#!jupyter nbconvert --execute --to pdf BayesOptProphetHyperparameters.ipynb
!jupyter nbconvert --to pdf BayesOptProphetHyperparameters.ipynb
sleep(10)
```

```
[NbConvertApp] Converting notebook BayesOptProphetHyperparameters.ipynb to
python
```

[ ]: