nbf_paid

July 19, 2020

1 Predicting Customer Website Clicks

[1]:
```
# importing libraries
from utilities import *

%matplotlib inline
%load_ext autoreload
%autoreload 2
```

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

[2]:
```
# file paths
catalogs_file_path = r'data\NBF_Catalogs.xlsx'
paid_file_path = r"data\NBF_Web-Web_Channel_Paid_Search_2010101-20200531.xlsx"
```

[3]:
```
# parameters
n_forecast_weeks = 13
freq = "W"
```

[4]:
```
# import catalogs data set
nbf_catalogs_ts = read_catalogs_data(catalogs_file_path, freq)
```

[5]:
```
# import direct data set
nbf_paid_ts = read_clicks_data(paid_file_path, freq)
```

```
------------------------------------------------------------------------
['google' 'bing' 'bingafid' 'bingHON coordinate sit to stand specs'
 'bSAUDERing']
```

[6]:
```
# merge catalogs and direct data sets
nbf_catalogs_paid_ts = merge_catalogs_clicks(nbf_catalogs_ts, nbf_paid_ts)
```

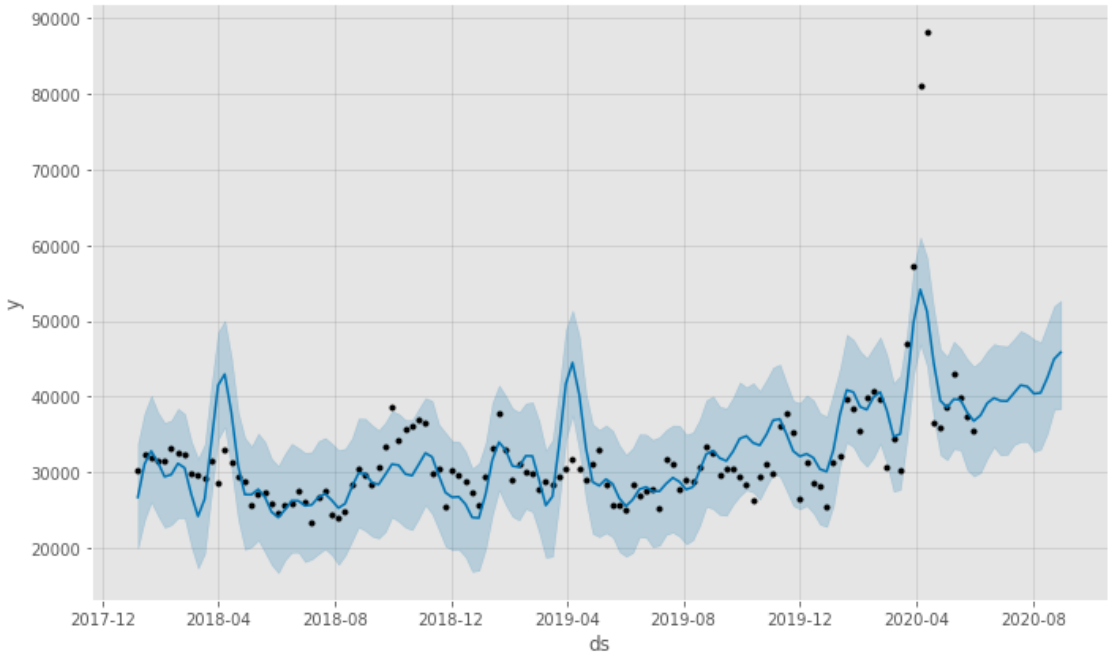
```
------------------------------------------------------------------------
corr -0.18593407530994555
p-value 0.03711309926232385
------------------------------------------------------------------------
                            OLS Regression Results
```

```
==============================================================================
Dep. Variable:              no_clicks   R-squared:                       0.035
Model:                            OLS   Adj. R-squared:                  0.027
Method:                 Least Squares   F-statistic:                     4.440
Date:                Sun, 19 Jul 2020   Prob (F-statistic):             0.0371
Time:                        19:47:27   Log-Likelihood:                -1313.5
No. Observations:                 126   AIC:                             2631.
Df Residuals:                     124   BIC:                             2637.
Df Model:                           1
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
Intercept   3.411e+04   1251.227     27.259      0.000    3.16e+04    3.66e+04
no_catalogs    -0.0122      0.006     -2.107      0.037      -0.024      -0.001
==============================================================================
Omnibus:                      148.639   Durbin-Watson:                   0.654
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             3468.200
Skew:                           4.325   Prob(JB):                         0.00
Kurtosis:                      27.203   Cond. No.                     3.69e+05
==============================================================================

Warnings:
[1] Standard Errors assume that the covariance matrix of the errors is correctly
specified.
[2] The condition number is large, 3.69e+05. This might indicate that there are
strong multicollinearity or other numerical problems.
```

[7]:
```
# make predictions
clicks_ts(nbf_catalogs_paid_ts, n_forecast_weeks, freq)
```

```
---------------------------------------------------------------------
            ds          yhat    yhat_lower    yhat_upper
126 2020-06-07  37531.292718  29987.473368  44728.153361
127 2020-06-14  39134.449166  31882.826176  46043.446386
128 2020-06-21  39827.490713  33366.085037  46965.513970
129 2020-06-28  39461.584008  32304.926242  46759.850545
130 2020-07-05  39426.385422  32361.828469  46674.558248
131 2020-07-12  40456.717413  33651.119048  47615.997672
132 2020-07-19  41522.426582  34063.091204  48686.417429
133 2020-07-26  41346.114662  34084.265275  48257.590866
134 2020-08-02  40397.277379  32749.064948  47569.563201
135 2020-08-09  40511.806655  33077.738282  47207.444821
136 2020-08-16  42508.475297  35169.164891  49558.205339
137 2020-08-23  44962.260040  38311.456436  51994.393794
138 2020-08-30  45865.986841  38417.203175  52665.231473
```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y
2017-12
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2019-12
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ds

[ ]: