

# BTC-FBProphet-TechIndicators

September 29, 2021

## 1 BTC - Facebook Prophet

### 1.0.1 Importing libraries

```
[2]: import warnings
warnings.filterwarnings('ignore')
import pandas as pd
import matplotlib.pyplot as plt
import matplotlib
import seaborn as sns
%matplotlib inline
from matplotlib.pylab import rcParams
plt.style.use('ggplot')
import _pickle as pickle

from fbprophet import Prophet as proph
```

### 1.0.2 Loading in the Data

```
[3]: with open("df_indicators.pkl", 'rb') as fp:
      df = pickle.load(fp)
```

### 1.0.3 Shifting the Data

Done so that the technical indicators would be seen in the “past”

```
[4]: df = df[['Close']].join(df[df.columns[1:]].shift(-1)).dropna()
df
```

```
[4]:
```

	Close	volume_adi	volume_obv	volume_cmf	\
Date					
2014-09-17	457.334015	-2.454020e+07	-1.342640e+07	-0.441847	
2014-09-18	424.440002	-4.448391e+07	-5.134610e+07	-0.475969	
2014-09-19	394.795990	-3.937687e+07	-1.448250e+07	-0.302148	
2014-09-20	408.903992	-5.037763e+07	-4.106260e+07	-0.321074	
2014-09-21	398.821014	-4.974146e+07	-1.693500e+07	-0.274768	
2014-09-22	402.152008	-1.610777e+07	2.816450e+07	-0.071232	
2014-09-23	435.790985	-3.825869e+07	-2.463200e+06	-0.149007	

2014-09-24	423.204987	-5.703557e+07	-2.927760e+07	-0.201132
2014-09-25	411.574005	-6.580018e+07	-5.073840e+07	-0.215715
2014-09-26	404.424988	-7.385019e+07	-6.576770e+07	-0.230737
2014-09-27	399.519989	-9.242139e+07	-8.938100e+07	-0.268920
2014-09-28	377.181000	-1.087491e+08	-1.218787e+08	-0.289093
2014-09-29	375.467010	-9.000780e+07	-8.717140e+07	-0.219061
2014-09-30	386.944000	-1.022057e+08	-1.134008e+08	-0.233821
2014-10-01	383.614990	-1.166056e+08	-1.351785e+08	-0.254105
2014-10-02	375.071991	-1.423567e+08	-1.660797e+08	-0.290649
2014-10-03	359.511993	-1.822998e+08	-2.133162e+08	-0.339462
2014-10-04	328.865997	-1.665553e+08	-2.966243e+08	-0.268493
2014-10-05	320.510010	-1.434237e+08	-2.176125e+08	-0.205083
2014-10-06	330.079010	-1.102698e+08	-1.684126e+08	-0.140683
2014-10-07	336.187012	-6.126977e+07	-1.136763e+08	-0.049121
2014-10-08	352.940002	-6.213157e+07	-3.003519e+07	-0.022241
2014-10-09	365.026001	-7.182317e+07	-7.370089e+07	-0.040544
2014-10-10	361.562012	-7.009444e+07	-6.035569e+07	-0.025052
2014-10-11	362.299011	-5.387418e+07	-4.280289e+07	-0.005295
2014-10-12	378.549011	-3.559150e+07	-7.581492e+06	-0.025285
2014-10-13	390.414001	-3.801354e+07	3.091001e+07	0.000315
2014-10-14	400.869995	-4.072957e+07	5.642908e+06	0.020989
2014-10-15	394.773010	-4.782394e+07	-2.134709e+07	0.022975
2014-10-16	382.556000	-3.886061e+07	-7.746392e+06	0.044801
...	...	...	...	...
2020-02-12	10326.054688	8.775369e+11	6.258967e+11	0.255428
2020-02-13	10214.379883	9.165162e+11	6.692350e+11	0.306716
2020-02-14	10312.116211	8.754678e+11	6.253699e+11	0.209350
2020-02-15	9889.424805	8.875694e+11	6.687447e+11	0.196351
2020-02-16	9934.433594	8.805105e+11	6.227464e+11	0.136835
2020-02-17	9690.142578	9.242217e+11	6.700174e+11	0.204697
2020-02-18	10141.996094	8.808182e+11	6.230254e+11	0.113443
2020-02-19	9633.386719	9.026752e+11	5.781001e+11	0.145818
2020-02-20	9608.475586	9.211409e+11	6.190307e+11	0.157686
2020-02-21	9686.441406	9.312132e+11	5.831927e+11	0.168945
2020-02-22	9663.181641	9.686016e+11	6.243778e+11	0.239247
2020-02-23	9924.515625	9.481172e+11	5.792973e+11	0.223677
2020-02-24	9650.174805	9.145725e+11	5.367821e+11	0.153098
2020-02-25	9341.705078	8.821537e+11	4.863620e+11	0.097671
2020-02-26	8820.522461	8.896827e+11	4.408918e+11	0.093664
2020-02-27	8784.494141	8.853651e+11	3.962864e+11	0.051889
2020-02-28	8672.455078	8.495727e+11	3.604940e+11	-0.026877
2020-02-29	8599.508789	8.394622e+11	3.251448e+11	-0.010338
2020-03-01	8562.454102	8.709320e+11	3.680025e+11	-0.017061
2020-03-02	8869.669922	8.642452e+11	3.256158e+11	-0.039484
2020-03-03	8787.786133	8.522222e+11	2.908691e+11	-0.029679
2020-03-04	8755.246094	8.788612e+11	3.305671e+11	-0.044336
2020-03-05	9078.762695	8.925038e+11	3.713940e+11	0.020131

2020-03-06	9122.545898	8.613936e+11	3.351771e+11	-0.031195
2020-03-07	8909.954102	8.217034e+11	2.952040e+11	-0.070590
2020-03-08	8108.116211	8.197206e+11	2.482670e+11	-0.125490
2020-03-09	7923.644531	8.023926e+11	2.060531e+11	-0.094721
2020-03-10	7909.729492	8.311826e+11	2.447358e+11	-0.087003
2020-03-11	7911.430176	7.810874e+11	1.907555e+11	-0.167774
2020-03-12	4970.788086	7.906391e+11	2.615307e+11	-0.161633

	volume_fi	volume_em	volume_sma_em	volume_vpt	\
Date					
2014-09-17	-1.134291e+09	-3212.366691	-3212.366691	-2.109752e+07	
2014-09-18	-1.132834e+09	-3288.687640	-3250.527166	-5.128636e+06	
2014-09-19	-8.967045e+08	36.798834	-2154.751832	-1.331094e+06	
2014-09-20	-8.068905e+08	-274.120355	-1684.593963	6.618911e+05	
2014-09-21	-6.801392e+08	-31.656617	-1354.006494	-4.539104e+05	
2014-09-22	-3.662477e+08	1695.136068	-845.816067	3.973973e+06	
2014-09-23	-3.689952e+08	476.627823	-656.895511	2.887904e+06	
2014-09-24	-3.608356e+08	-635.564367	-654.229118	-1.621496e+06	
2014-09-25	-3.312053e+08	-627.501292	-651.259360	-1.109716e+06	
2014-09-26	-2.944215e+08	-337.063812	-619.839805	-5.550532e+05	
2014-09-27	-3.277180e+08	-1618.618146	-710.637836	-1.502608e+06	
2014-09-28	-2.888584e+08	-357.187199	-681.183616	-1.468004e+06	
2014-09-29	-1.906879e+08	176.035474	-615.243686	9.132299e+05	
2014-09-30	-1.759207e+08	156.362329	-560.128971	8.352460e+05	
2014-10-01	-1.773673e+08	-395.241741	-358.905760	-7.106437e+05	
2014-10-02	-2.207181e+08	-734.641854	-176.473918	-1.766931e+06	
2014-10-03	-3.959883e+08	-1846.065618	-310.964236	-5.308544e+06	
2014-10-04	-4.388645e+08	-1867.937739	-424.808335	-6.143329e+06	
2014-10-05	-2.681604e+08	447.149313	-390.607911	2.422075e+05	
2014-10-06	-1.869213e+08	229.509613	-495.295515	3.269368e+06	
2014-10-07	-2.921876e+07	541.745022	-490.644287	3.638066e+06	
2014-10-08	1.193677e+08	1023.445024	-372.143616	5.591826e+06	
2014-10-09	8.070694e+07	-60.315468	-331.630343	2.449813e+06	
2014-10-10	7.058243e+07	-205.846382	-322.257669	-3.871721e+05	
2014-10-11	1.012468e+08	824.937812	-147.717958	8.144887e+05	
2014-10-12	1.464832e+08	1228.425980	-34.459874	1.891242e+06	
2014-10-13	1.830523e+08	976.552879	22.719941	2.134828e+06	
2014-10-14	1.348944e+08	-320.421918	-11.336077	6.465751e+05	
2014-10-15	6.851845e+07	-911.425792	-48.206366	-1.219554e+06	
2014-10-16	6.106553e+07	-408.360819	-24.900578	-7.925239e+05	
...	...	...	...	...	
2020-02-12	2.270028e+12	-7.683225	50.028022	-3.236642e+07	
2020-02-13	2.550842e+12	-28.617726	49.097370	-1.190965e+08	
2020-02-14	-4.623330e+11	-123.289499	40.289586	-1.383337e+09	
2020-02-15	-1.173931e+11	-168.038571	30.203590	-1.600612e+09	
2020-02-16	-1.705904e+12	-154.621530	15.710703	-9.337059e+08	
2020-02-17	1.589165e+12	194.847679	38.630816	1.073145e+09	

2020-02-18	-2.052228e+12	5.299720	16.064290	-1.523370e+08
2020-02-19	-1.918929e+12	-98.159507	-4.447305	-2.472768e+09
2020-02-20	-1.188913e+12	26.315414	-4.775144	2.159488e+08
2020-02-21	-1.138152e+12	-1.876960	-4.807551	2.460650e+08
2020-02-22	5.620254e+11	100.559627	-9.429918	1.027768e+09
2020-02-23	-1.285038e+12	-48.942456	-11.906144	-1.323240e+08
2020-02-24	-2.974986e+12	-217.154536	-26.918226	-2.605157e+09
2020-02-25	-6.303995e+12	-579.507359	-78.633495	-4.171991e+09
2020-02-26	-5.637455e+12	-214.773594	-93.425664	-2.998710e+09
2020-02-27	-5.546041e+12	-56.458865	-95.414317	-7.546338e+08
2020-02-28	-5.126738e+12	-2.029302	-86.752874	-8.699653e+08
2020-02-29	-4.581469e+12	-64.035192	-79.324062	-4.533763e+08
2020-03-01	-2.046037e+12	116.051760	-59.990255	1.385391e+09
2020-03-02	-2.249572e+12	35.402786	-71.379176	1.146399e+09
2020-03-03	-2.089727e+12	-9.569684	-72.441276	-5.199719e+08
2020-03-04	4.351646e+10	166.485743	-53.538044	1.338227e+09
2020-03-05	2.926615e+11	49.903434	-51.853186	1.663781e+09
2020-03-06	-8.490647e+11	-54.849611	-55.636946	-6.471077e+08
2020-03-07	-5.306619e+12	-1046.826168	-137.593074	-4.441318e+09
2020-03-08	-5.785466e+12	-598.335234	-176.835416	-4.665205e+09
2020-03-09	-5.042887e+12	31.985056	-159.039731	-1.142020e+09
2020-03-10	-4.313076e+12	-142.556797	-127.828976	-6.581640e+07
2020-03-11	-2.637362e+13	-7970.760717	-681.828056	-2.005593e+10
2020-03-12	-2.134905e+13	-3431.799535	-922.923818	-1.829423e+10

	volume_nvi	volatility_atr	...	momentum_uo	momentum_stoch	\
Date			...			
2014-09-17	1000.000000	0.000000	...	50.000000	20.584704	
2014-09-18	1000.000000	0.000000	...	50.000000	12.271320	
2014-09-19	1035.734917	0.000000	...	50.000000	29.138447	
2014-09-20	1010.195200	0.000000	...	50.000000	17.083524	
2014-09-21	1018.632454	0.000000	...	50.000000	21.065966	
2014-09-22	1018.632454	0.000000	...	50.000000	61.283773	
2014-09-23	989.213520	0.000000	...	50.000000	46.236311	
2014-09-24	962.026873	0.000000	...	50.000000	32.330638	
2014-09-25	945.316521	25.504999	...	50.000000	23.783477	
2014-09-26	933.851412	23.879596	...	50.000000	17.919199	
2014-09-27	933.851412	24.160136	...	50.000000	3.035953	
2014-09-28	933.851412	23.041224	...	50.000000	3.363791	
2014-09-29	933.851412	22.490501	...	50.000000	15.327211	
2014-09-30	925.817173	21.301351	...	50.000000	13.442449	
2014-10-01	905.199482	20.426315	...	50.000000	4.085578	
2014-10-02	905.199482	20.367284	...	50.000000	1.974939	
2014-10-03	905.199482	22.190657	...	50.000000	2.576281	
2014-10-04	905.199482	25.222091	...	50.000000	20.500336	
2014-10-05	932.224703	26.957283	...	50.000000	26.784939	
2014-10-06	949.475210	26.138056	...	50.000000	31.938630	

2014-10-07	949.475210	26.241853	...	50.000000	47.416269
2014-10-08	949.475210	27.121568	...	50.000000	60.274440
2014-10-09	940.464971	26.619808	...	50.000000	61.593686
2014-10-10	942.381991	25.081830	...	50.000000	65.344041
2014-10-11	942.381991	24.902547	...	50.000000	87.431809
2014-10-12	942.381991	25.245193	...	50.000000	93.688492
2014-10-13	942.381991	24.849073	...	50.000000	91.153737
2014-10-14	928.048943	23.710266	...	56.540246	86.172622
2014-10-15	928.048943	23.912939	...	55.805860	76.191569
2014-10-16	930.964885	22.530544	...	59.957246	77.173575
...	...	...	...	...	...
2020-02-12	395.164153	292.961014	...	63.219808	81.912234
2020-02-13	398.945282	283.311104	...	65.738248	89.179873
2020-02-14	398.945282	301.692787	...	54.687866	57.748689
2020-02-15	400.760963	304.681711	...	53.444037	61.095527
2020-02-16	400.760963	317.331314	...	55.707048	42.930133
2020-02-17	400.760963	338.553456	...	57.571597	75.606671
2020-02-18	380.663265	362.743325	...	48.267008	13.236889
2020-02-19	379.678901	340.000633	...	50.404628	10.614635
2020-02-20	382.759720	319.327718	...	49.132871	18.821656
2020-02-21	381.840611	297.145239	...	54.081452	16.373232
2020-02-22	381.840611	295.392043	...	56.219863	43.882384
2020-02-23	381.840611	307.323152	...	54.413135	15.004076
2020-02-24	369.635001	311.362418	...	40.672249	3.182667
2020-02-25	369.635001	345.261333	...	41.019850	6.621931
2020-02-26	368.125189	346.304535	...	42.023958	11.749039
2020-02-27	363.430052	351.426426	...	41.033552	9.711145
2020-02-28	360.373147	333.896088	...	39.461777	6.273825
2020-02-29	358.820324	326.064877	...	35.203111	5.303294
2020-03-01	358.820324	332.326163	...	41.761759	23.159874
2020-03-02	355.507736	318.754387	...	42.440774	18.400469
2020-03-03	354.191336	299.972405	...	47.867243	19.184521
2020-03-04	354.191336	308.656024	...	51.748405	41.035878
2020-03-05	354.191336	291.352043	...	53.564267	43.993137
2020-03-06	345.937262	289.464495	...	51.244736	29.634000
2020-03-07	345.937262	341.427127	...	37.800594	0.155066
2020-03-08	345.937262	356.053946	...	35.172298	11.899609
2020-03-09	345.329747	352.666764	...	34.430841	13.193606
2020-03-10	345.403997	348.200283	...	39.856198	17.615627
2020-03-11	345.403997	620.256475	...	20.638760	2.563857
2020-03-12	345.403997	729.830193	...	27.714073	19.296816

Date	momentum_stoch_signal	momentum_wr	momentum_ao	momentum_kama \
2014-09-17	25.884066	-79.415296	0.000000	424.440002
2014-09-18	21.346484	-87.728680	0.000000	394.795990
2014-09-19	20.664824	-70.861553	0.000000	408.903992

2014-09-20	19.497764	-82.916476	0.000000	398.821014
2014-09-21	22.429312	-78.934034	-8.296951	402.152008
2014-09-22	33.144421	-38.716227	-11.527058	435.790985
2014-09-23	42.862017	-53.763689	-8.264314	423.204987
2014-09-24	46.616907	-67.669362	-5.888602	411.574005
2014-09-25	34.116809	-76.216523	-3.736702	404.424988
2014-09-26	24.677771	-82.080801	-2.247520	404.034545
2014-09-27	14.912876	-96.964047	-6.049202	402.288769
2014-09-28	8.106314	-96.636209	-13.276501	401.599367
2014-09-29	7.242318	-84.672789	-18.023336	401.146576
2014-09-30	10.711151	-86.557551	-20.731467	400.771869
2014-10-01	10.951746	-95.914422	-23.483704	399.707420
2014-10-02	6.500989	-98.025061	-25.199150	388.527846
2014-10-03	2.878933	-97.423719	-28.639430	370.557029
2014-10-04	8.350519	-79.499664	-37.488265	355.667673
2014-10-05	16.620519	-73.215061	-46.314571	350.509179
2014-10-06	26.407968	-68.061370	-53.197108	348.345401
2014-10-07	35.379946	-52.583731	-56.376136	348.519717
2014-10-08	46.543113	-39.725560	-51.406301	348.741326
2014-10-09	56.428132	-38.406314	-40.778008	349.244453
2014-10-10	62.404056	-34.655959	-32.275256	349.664140
2014-10-11	71.456512	-12.568191	-24.045325	349.858515
2014-10-12	82.154781	-6.311508	-15.556549	351.914502
2014-10-13	90.758013	-8.846263	-8.925149	365.042089
2014-10-14	90.338284	-13.827378	-3.007538	373.820089
2014-10-15	84.505976	-23.808431	1.831121	375.173189
2014-10-16	79.845922	-22.826425	4.505106	376.405387
...	...	...	...	...
2020-02-12	92.157375	-18.087766	1006.084326	9699.998864
2020-02-13	88.605847	-10.820127	991.096764	9812.052833
2020-02-14	76.280265	-42.251311	958.737770	9813.879100
2020-02-15	69.341363	-38.904473	890.980625	9816.018640
2020-02-16	53.924783	-57.069867	740.349443	9814.838461
2020-02-17	59.877444	-24.393329	629.358151	9820.830220
2020-02-18	43.924564	-86.763111	530.419436	9815.026854
2020-02-19	33.152732	-89.385365	401.643423	9811.674610
2020-02-20	14.224393	-81.178344	333.618546	9805.941974
2020-02-21	15.269841	-83.626768	296.596912	9796.045182
2020-02-22	26.359091	-56.117616	243.020919	9798.761576
2020-02-23	25.086564	-84.995924	179.425141	9790.536901
2020-02-24	20.689709	-96.817333	137.618454	9770.159292
2020-02-25	8.269558	-93.378069	-2.998883	9676.953244
2020-02-26	7.184545	-88.250961	-192.600169	9605.119583
2020-02-27	9.360705	-90.288855	-423.026669	9393.403332
2020-02-28	9.244669	-93.726175	-640.968589	9247.937968
2020-02-29	7.096088	-94.696706	-811.399000	9121.348779
2020-03-01	11.578998	-76.840126	-859.968244	9096.180299

2020-03-02	15.621212	-81.599531	-834.593382	9063.316932
2020-03-03	20.248288	-80.815479	-799.290323	8998.343282
2020-03-04	26.206956	-58.964122	-734.326853	9003.459999
2020-03-05	34.737846	-56.006863	-626.021151	9006.092071
2020-03-06	38.221005	-70.366000	-556.714829	9004.985849
2020-03-07	24.594068	-99.844934	-589.393325	8941.716660
2020-03-08	13.896225	-88.100391	-720.298868	8862.213221
2020-03-09	8.416094	-86.806394	-872.216298	8793.680300
2020-03-10	14.236281	-82.384373	-1077.377948	8733.955214
2020-03-11	11.124364	-97.436143	-1504.250212	7507.742890
2020-03-12	13.158767	-80.703184	-2069.215316	6804.988914

	momentum_roc	others_dr	others_dlr	others_cr
Date				
2014-09-17	0.000000	-7.192558	-7.464335	-7.192558
2014-09-18	0.000000	-6.984264	-7.240151	-13.674475
2014-09-19	0.000000	3.573492	3.511124	-10.589639
2014-09-20	0.000000	-2.465855	-2.496766	-12.794369
2014-09-21	0.000000	0.835210	0.831742	-12.066019
2014-09-22	0.000000	8.364742	8.033259	-4.710568
2014-09-23	0.000000	-2.888081	-2.930607	-7.462604
2014-09-24	0.000000	-2.748309	-2.786782	-10.005818
2014-09-25	0.000000	-1.736994	-1.752257	-11.569012
2014-09-26	0.000000	-1.212833	-1.220248	-12.641532
2014-09-27	0.000000	-5.591457	-5.753862	-17.526143
2014-09-28	-17.900922	-0.454421	-0.455457	-17.900922
2014-09-29	-8.834229	3.056724	3.010937	-15.391380
2014-09-30	-2.832096	-0.860334	-0.864056	-16.119296
2014-10-01	-8.273825	-2.226972	-2.252144	-17.987296
2014-10-02	-9.856306	-4.148536	-4.237045	-21.389623
2014-10-03	-18.223460	-8.524332	-8.909717	-28.090633
2014-10-04	-26.453272	-2.540849	-2.573686	-29.917741
2014-10-05	-22.004934	2.985554	2.941854	-27.825397
2014-10-06	-18.316753	1.850467	1.833554	-26.489830
2014-10-07	-12.730417	4.983235	4.863049	-22.826645
2014-10-08	-8.633858	3.424378	3.367051	-20.183938
2014-10-09	-4.140980	-0.948970	-0.953502	-20.941369
2014-10-10	-3.507099	0.203838	0.203630	-20.780218
2014-10-11	-2.169562	4.485245	4.387568	-17.227016
2014-10-12	1.772353	3.134334	3.086217	-14.632634
2014-10-13	6.878147	2.678181	2.642946	-12.346342
2014-10-14	9.808022	-1.520938	-1.532623	-13.679500
2014-10-15	16.325799	-3.094692	-3.143589	-16.350854
2014-10-16	19.733545	0.314201	0.313709	-16.088027
...	...	...	...	...
2020-02-12	8.746043	-1.081486	-1.087376	2133.461660
2020-02-13	10.356519	0.956850	0.952302	2154.832545

2020-02-14	6.412029	-4.098978	-4.185355	2062.407449
2020-02-15	8.206881	0.455120	0.454088	2072.249006
2020-02-16	0.798038	-2.459033	-2.489772	2018.832682
2020-02-17	4.236410	4.663022	4.557569	2117.634324
2020-02-18	-1.659428	-5.014884	-5.144998	2006.422528
2020-02-19	-2.601525	-0.258592	-0.258927	2000.975495
2020-02-20	-4.252706	0.811428	0.808153	2018.023390
2020-02-21	-1.962436	-0.240127	-0.240416	2012.937443
2020-02-22	-2.779331	2.704430	2.668507	2070.080357
2020-02-23	-6.545384	-2.764274	-2.803199	2010.093387
2020-02-24	-8.543591	-3.196520	-3.248724	1942.643838
2020-02-25	-14.464478	-5.579095	-5.740769	1828.682795
2020-02-26	-11.172851	-0.408460	-0.409297	1820.804894
2020-02-27	-12.703075	-1.275418	-1.283622	1796.306593
2020-02-28	-11.255085	-0.841126	-0.844684	1780.356262
2020-02-29	-15.574271	-0.430893	-0.431824	1772.253937
2020-03-01	-7.927812	3.587941	3.525074	1839.429308
2020-03-02	-8.541308	-0.923189	-0.927476	1821.524716
2020-03-03	-9.613389	-0.370287	-0.370974	1814.409558
2020-03-04	-6.047894	3.695117	3.628484	1885.149234
2020-03-05	-8.080694	0.482260	0.481100	1894.722806
2020-03-06	-7.670542	-2.330400	-2.357983	1848.237789
2020-03-07	-13.205179	-8.999349	-9.430353	1672.909065
2020-03-08	-10.168082	-2.275148	-2.301429	1632.572752
2020-03-09	-9.958054	-0.175614	-0.175769	1629.530110
2020-03-10	-8.775196	0.021501	0.021499	1629.901979
2020-03-11	-42.196837	-37.169539	-46.473018	986.905396
2020-03-12	-40.494834	2.500900	2.470140	1014.087816

[2004 rows x 69 columns]

#### 1.0.4 Formatting the data for Facebook Prophet

```
[5]: ts = df[["Close"]]
```

```
[6]: # Resetting the index back so Dates are no longer indexed
ts.reset_index(inplace=True)

# Renaming the columns for use in FB prophet
ts.rename(columns={'Date': 'ds', 'Close': 'y'}, inplace=True)

ts.head()
```

```
[6]:      ds      y
0 2014-09-17  457.334015
1 2014-09-18  424.440002
2 2014-09-19  394.795990
```



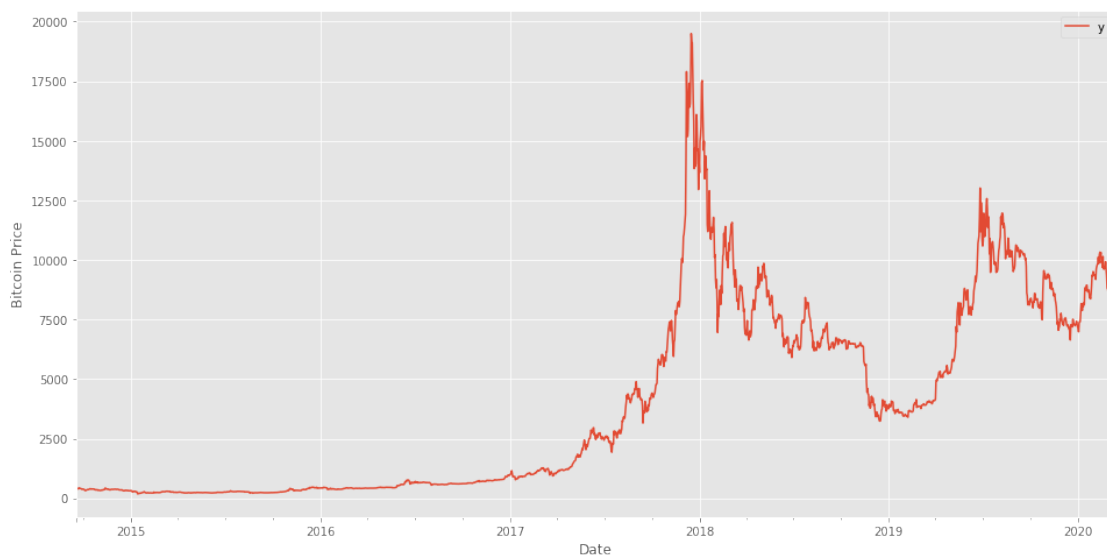
```
3 2014-09-20 408.903992
4 2014-09-21 398.821014
```

## Plotting

```
[7]: # Plotting the price
pd.plotting.register_matplotlib_converters()

ax = ts.set_index('ds').plot(figsize=(16,8))
ax.set_ylabel('Bitcoin Price')
ax.set_xlabel('Date')

plt.show()
```



## 1.0.5 Modeling

```
[5]: # Fitting and training
mod = proph(interval_width=0.95)
mod.fit(ts)
```

INFO:fbprophet:Disabling daily seasonality. Run prophet with daily\_seasonality=True to override this.

```
[5]: <fbprophet.forecaster.Prophet at 0x10eed9dd8>
```

## Creating future dates to forecast

```
[6]: # Setting up predictions to be made
future = mod.make_future_dataframe(periods=30, freq='D')
future.tail()
```

```
[6]:          ds
1024 2019-10-22
1025 2019-10-23
1026 2019-10-24
1027 2019-10-25
1028 2019-10-26
```

### Forecasting future values

```
[7]: # Making predictions
forecast = mod.predict(future)
forecast.tail()
```

```
[7]:          ds          trend  yhat_lower  yhat_upper  trend_lower  \
1024 2019-10-22  13426.529950  11230.521604  15556.067398  13073.006208
1025 2019-10-23  13464.816732  11228.470609  15557.780822  13092.609796
1026 2019-10-24  13503.103514  11350.928631  15837.016573  13111.056576
1027 2019-10-25  13541.390296  11629.524726  15669.706178  13113.968539
1028 2019-10-26  13579.677078  11611.517797  15950.098957  13125.231789

          trend_upper  additive_terms  additive_terms_lower  \
1024  13765.663926      -56.780055      -56.780055
1025  13822.528647      -19.827599      -19.827599
1026  13876.456549       -5.488892       -5.488892
1027  13942.419261       77.735934       77.735934
1028  14002.384971      129.802920      129.802920

          additive_terms_upper  weekly  weekly_lower  weekly_upper  yearly  \
1024          -56.780055  -9.705904   -9.705904   -9.705904  -47.074151
1025          -19.827599 -15.840328  -15.840328  -15.840328   -3.987271
1026           -5.488892 -40.385119  -40.385119  -40.385119  34.896228
1027           77.735934   8.777916   8.777916   8.777916  68.958018
1028          129.802920  32.185743   32.185743   32.185743  97.617178

          yearly_lower  yearly_upper  multiplicative_terms  \
1024      -47.074151   -47.074151              0.0
1025      -3.987271   -3.987271              0.0
1026      34.896228   34.896228              0.0
1027      68.958018   68.958018              0.0
1028      97.617178   97.617178              0.0

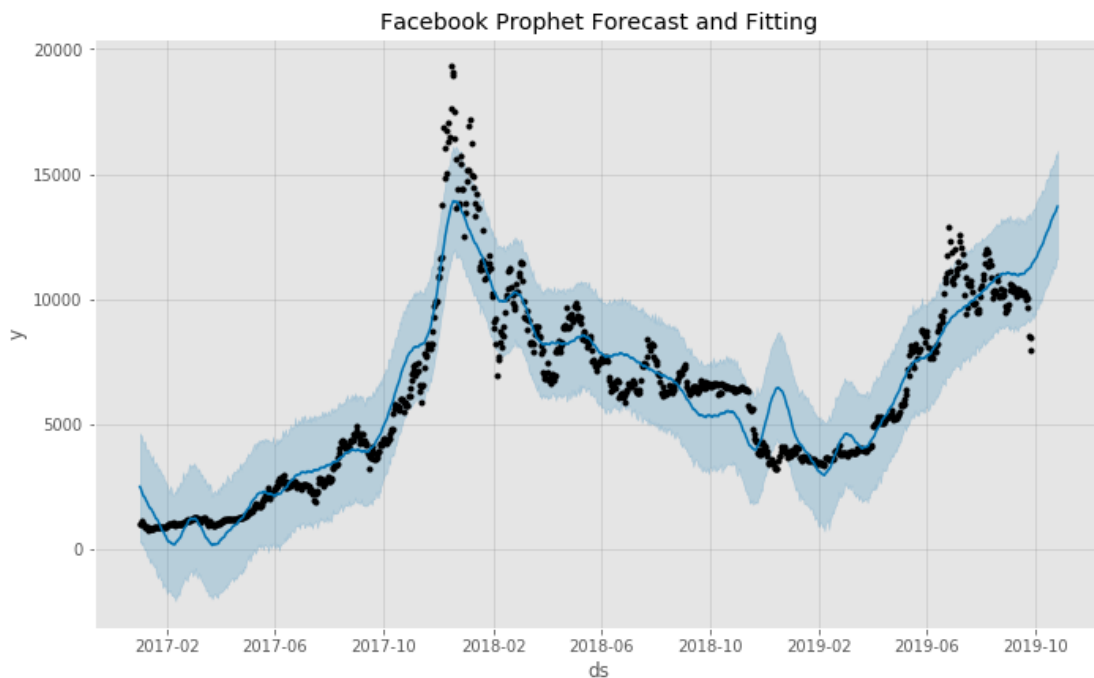
          multiplicative_terms_lower  multiplicative_terms_upper  yhat
1024                                0.0                        0.0  13369.749895
```

1025	0.0	0.0	13444.989133
1026	0.0	0.0	13497.614622
1027	0.0	0.0	13619.126230
1028	0.0	0.0	13709.479998

### 1.0.6 Plotting Values

- Blue line = forecasted values
- Black dots = observed values
- Uncertainty intervals = blue shaded region

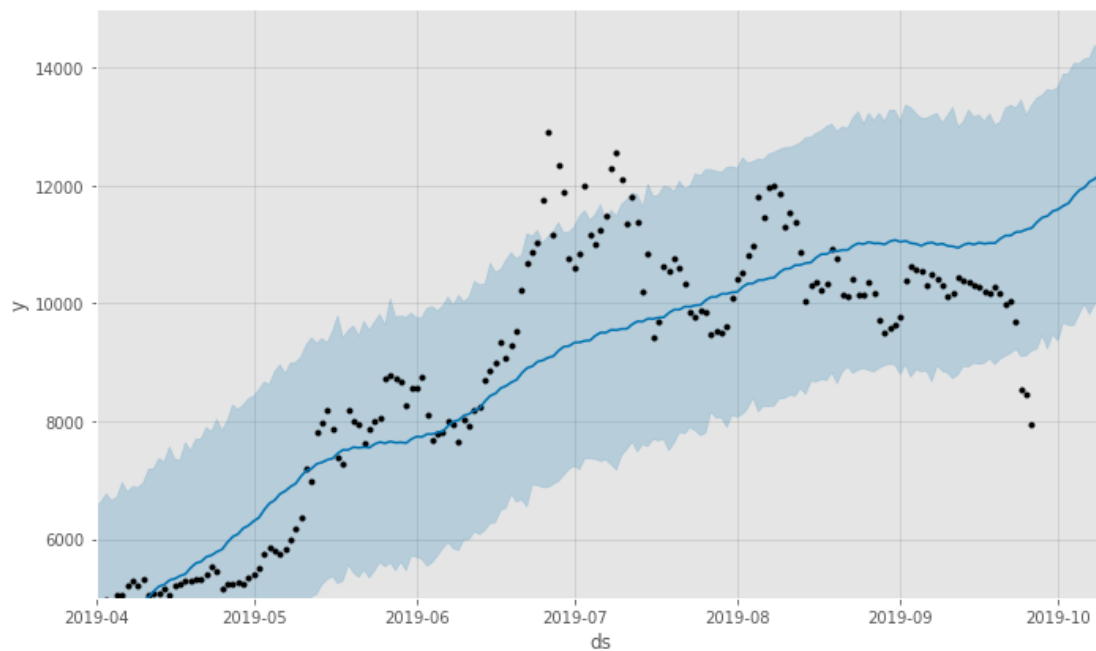
```
[17]: mod.plot(forecast, uncertainty=True)
plt.title('Facebook Prophet Forecast and Fitting')
plt.show()
```



Graph above zoomed in

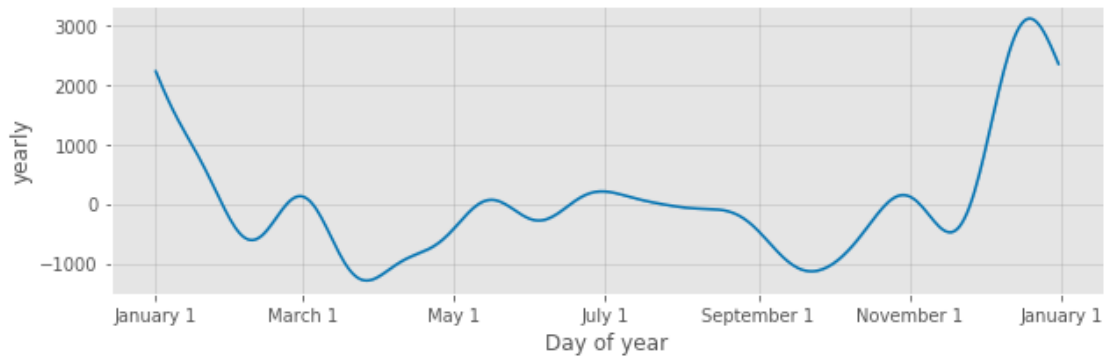
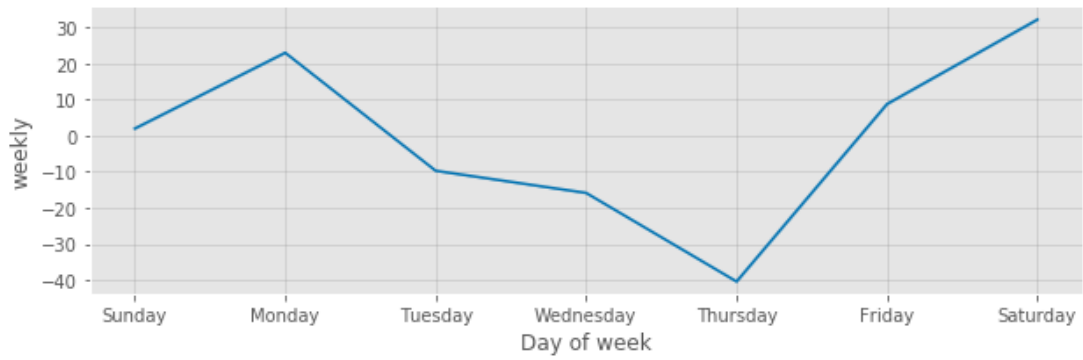
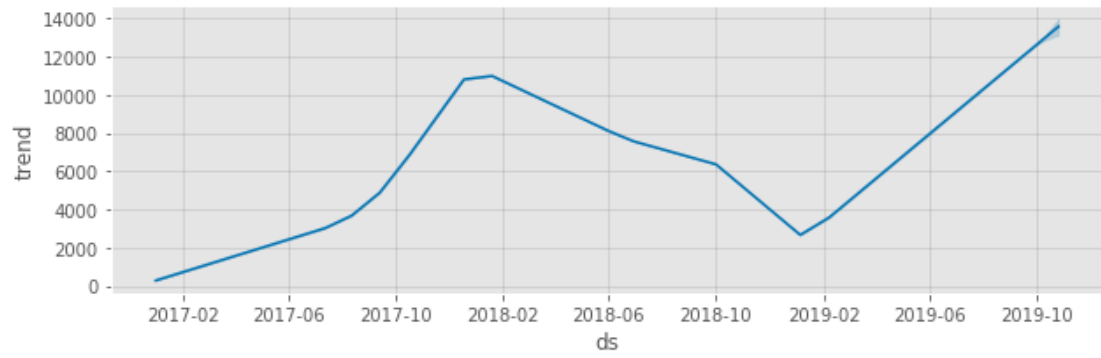
```
[13]: mod.plot(forecast, uncertainty=True)

plt.xlim(['2019-04-01', '2019-10-10'])
plt.ylim([5000, 15000])
plt.show()
```



### Plotted components of the forecasts

```
[10]: mod.plot_components(forecast)
      plt.show()
```



[ ]: