MOHAMMAD ALQUDAH
PROFESSOR PRANAY ANCHURI
IW 11
MARCH 16 2022

TECHNICAL ANALYSIS OF CRYPTOCURRENCIES

PROGRESS SUMMARY

- Gathered datasets and filtered for time period (2020)
  - Familiarized with data manipulation/pandas
- Chose Python library for analysis
- Narrowed down TA methods to categories: Volume, Volatility, Trend, Momentum
- Completed Volatility analysis
- Briefly started Volume analysis

FILTERED DATASETS

```
eth
# print(btc)
```

[148] ✓ 0.2s

	Date	Open	High	Low	Close	Adj Close	Volume
1608	2020-01-01	129.630661	132.835358	129.198288	130.802002	130.802002	7.935230e+09
1609	2020-01-02	130.820038	130.820038	126.954910	127.410179	127.410179	8.032709e+09
1610	2020-01-03	127.411263	134.554016	126.490021	134.171707	134.171707	1.047685e+10
1611	2020-01-04	134.168518	136.052719	133.040558	135.069366	135.069366	7.430905e+09
1612	2020-01-05	135.072098	139.410202	135.045624	136.276779	136.276779	7.526675e+09
...	...	...	...	...	...	...	...
1969	2020-12-27	635.887146	711.393555	628.334961	682.642334	682.642334	2.609355e+10
1970	2020-12-28	683.205811	745.877747	683.205811	730.397339	730.397339	2.422257e+10
1971	2020-12-29	730.358704	737.952881	692.149414	731.520142	731.520142	1.871068e+10
1972	2020-12-30	731.472839	754.303223	720.988892	751.618958	751.618958	1.729457e+10
1973	2020-12-31	751.626648	754.299438	726.511902	737.803406	737.803406	1.392685e+10

366 rows × 7 columns

```
btc
```

[150] ✓ 0.2s

	Date	Open	High	Low	Close	Adj Close	Volume
1932	2020-01-01	7194.892090	7254.330566	7174.944336	7200.174316	7200.174316	18565664997
1933	2020-01-02	7202.551270	7212.155273	6935.270020	6985.470215	6985.470215	20802083465
1934	2020-01-03	6984.428711	7413.715332	6914.996094	7344.884277	7344.884277	28111481032
1935	2020-01-04	7345.375488	7427.385742	7309.514160	7410.656738	7410.656738	18444271275
1936	2020-01-05	7410.451660	7544.497070	7400.535645	7411.317383	7411.317383	19725074095
...	...	...	...	...	...	...	...
2293	2020-12-27	26439.373047	28288.839844	25922.769531	26272.294922	26272.294922	66479895605
2294	2020-12-28	26280.822266	27389.111328	26207.640625	27084.808594	27084.808594	49056742893
2295	2020-12-29	27081.810547	27370.720703	25987.298828	27362.437500	27362.437500	45265946774
2296	2020-12-30	27360.089844	28937.740234	27360.089844	28840.953125	28840.953125	51287442704
2297	2020-12-31	28841.574219	29244.876953	28201.992188	29001.720703	29001.720703	46754964848

366 rows × 7 columns

TA INDICATORS

```
%%capture
featuresETH = ta.add_all_ta_features(eth, "Open", "High", "Low", "Close", "Volume", fillna=True)
featuresBTC = ta.add_all_ta_features(btc, "Open", "High", "Low", "Close", "Volume", fillna=True)
```

[105] ✓ 0.6s Python

```
# featuresETH
featuresBTC
```

[106] ✓ 0.3s Python

	Close	Adj Close	Volume	volume_adi	volume_obv	volume_cmf	...	momentum_ppo	momentum_ppo_signal	momentum_ppo_hist	momentum_pvo	momentum_pvo_signal	momentum_pvo_hi
	7200.174316	7200.174316	18565664997	-6.764844e+09	18565664997	-0.364374	...	0.000000	0.000000	0.000000	0.000000	0.000000	0.0000(
	6985.470215	6985.470215	20802083465	-2.002396e+10	-2236418468	-0.508639	...	-0.238401	-0.047680	-0.190721	0.952435	0.190487	0.7619
	7344.884277	7344.884277	28111481032	3.278762e+08	25875062564	0.004859	...	-0.023344	-0.042813	0.019469	4.628974	1.078184	3.5507
	7410.656738	7410.656738	18444271275	1.353672e+10	44319333839	0.157544	...	0.217536	0.009257	0.208279	3.526827	1.567913	1.9589
	7411.317383	7411.317383	19725074095	-3.233808e+09	64044407934	-0.030609	...	0.403645	0.088134	0.315510	3.132972	1.880925	1.2520
	...	...	...	...	...	...	...	...	...	...	...	...	
	26272.294922	26272.294922	66479895605	2.047746e+12	1453829721050	0.307291	...	8.768312	7.457946	1.310366	11.285755	6.405187	4.8805(
	27084.808594	27084.808594	49056742893	2.071532e+12	1502886463943	0.365603	...	9.184618	7.803280	1.381338	10.843421	7.292834	3.5505
	27362.437500	27362.437500	45265946774	2.116256e+12	1548152410717	0.382213	...	9.463787	8.135382	1.328405	9.718010	7.777869	1.9401

TA BROAD CATEGORIES

Volume

- Money Flow Index (MFI)
- Accumulation/Distribution Index (ADI)
- On-Balance Volume (OBV)
- Chaikin Money Flow (CMF)
- Force Index (FI)
- Ease of Movement (EoM, EMV)
- Volume-price Trend (VPT)
- Negative Volume Index (NVI)
- Volume Weighted Average Price (VWAP)

Volatility

- Average True Range (ATR)
- Bollinger Bands (BB)
- Keltner Channel (KC)
- Donchian Channel (DC)
- Ulcer Index (UI)

Trend

- Simple Moving Average (SMA)
- Exponential Moving Average (EMA)
- Weighted Moving Average (WMA)
- Moving Average Convergence Divergence (MACD)
- Average Directional Movement Index (ADX)
- Vortex Indicator (VI)
- Trix (TRIX)
- Mass Index (MI)
- Commodity Channel Index (CCI)
- Detrended Price Oscillator (DPO)
- KST Oscillator (KST)
- Ichimoku Kinkō Hyō (Ichimoku)
- Parabolic Stop And Reverse (Parabolic SAR)
- Schaff Trend Cycle (STC)

Momentum

- Relative Strength Index (RSI)
- Stochastic RSI (SRSI)
- True strength index (TSI)
- Ultimate Oscillator (UO)
- Stochastic Oscillator (SR)
- Williams %R (WR)
- Awesome Oscillator (AO)
- Kaufman's Adaptive Moving Average (KAMA)
- Rate of Change (ROC)
- Percentage Price Oscillator (PPO)
- Percentage Volume Oscillator (PVO)

SAMPLE ANALYSIS

- Included research/info about each to incorporate into paper/for reference
- Only completed standalone methods, no combinations yet (sort of iffy on this)
- Implemented high degree of modularity and separated each indicatory into its own function - can easily be used for other datasets of similar format

```
# bollinger bands - volatility
def bollinger_bands(df):
    # bollinger bands are a TA tool defined by using three trendlines: an upper band, a lower band, and a moving average band
    # bollinger bands fall under the volatility class of TA methods
    # the closer the prices move to the upper band, the more overbought the market, and the closer the prices move to the lower band, the more oversold the market
    # as seen across the yearly data
    # When the bands come close together, constricting the moving average, it is called a squeeze. A squeeze signals a period of low volatility and is considered by
    # traders to be a potential sign of future increased volatility and possible trading opportunities. Conversely, the wider apart the bands move, the more likely the
    # chance of a decrease in volatility and the greater the possibility of exiting a trade. However, these conditions are not trading signals. The bands give no indication
    # when the change may take place or in which direction the price could move.
    plt.plot(df.volatility_bbh, label='Upper Band')
    plt.plot(df.volatility_bbl, label='Lower Band')
    plt.plot(df.volatility_bbm, label='Moving Average Band')
    plt.title('Bollinger Bands ' + df.name)
    plt.legend()
    plt.show()
```

[109] ✓ 0.2s

```
bollinger_bands(featuresETH)
bollinger_bands(featuresBTC)
```

[110] ✓ 0.2s