EtherDescent

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Outline

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Introduction

With the cryptocurrency field being a topic of major interest in our world these days, we have decided to do a time series analysis and forecasting project on the Ethereum blockchain.

We predicted the values of the Ethereum currency compared to USDT for the 1st week of september.

Problem

We took upon us the challenge to discover if AI will be a viable option to predict the market value of any currency related to another.

And for fun of course :)

Data Preparation

The dataset was fairly easy to work with,
it just needed some modifications to fit into our model input features.

Before

	Open Time	Open	High	Low	Close	Volume	Close Time	Quote Asset Volume	Number of Trades	TB Base Volume	TB Quote Volume	Ignore
0	2019-07-30 00:00:00.000000000	210.84	211.79	210.63	210.65	1830.97408	2019-07-30 00:29:59.999000064	386708.667897	1679	1025.79900	216674.576432	0
1	2019-07-30 00:30:00.000000000	210.65	210.81	210.20	210.26	1601.31347	2019-07-30 00:59:59.999000064	337120.236922	1905	811.06714	170774.314442	0
2	2019-07-30 01:00:00.000000000	210.26	210.32	208.40	208.40	2620.53119	2019-07-30 01:29:59.999000064	548495.155139	2706	1230.69309	257681.215674	0
3	2019-07-30 01:30:00.000000000	208.46	209.29	208.01	208.06	2819.70434	2019-07-30 01:59:59.999000064	588587.859421	2501	1428.37038	298200.399492	0
4	2019-07-30 02:00:00.000000000	208.06	208.96	207.26	208.19	3643.23339	2019-07-30 02:29:59.999000064	758269.878975	2793	1770.71053	368558.393990	0
...	...	...	...	...	...	...	...	...	...	...	...	...
1128	2019-08-22 20:00:00.000000000	191.89	192.74	191.72	192.30	3438.94060	2019-08-22 20:29:59.999000064	661584.469272	3026	1391.51662	267603.523187	0
1129	2019-08-22 20:30:00.000000000	192.28	193.82	192.22	192.25	3495.32754	2019-08-22 20:59:59.999000064	674570.588763	2905	1753.26476	338332.062703	0
1130	2019-08-22 21:00:00.000000000	192.24	192.43	190.87	191.93	4623.56473	2019-08-22 21:29:59.999000064	885731.784366	2994	2302.29068	440762.810550	0
1131	2019-08-22 21:30:00.000000000	191.93	192.12	190.85	192.04	1985.06907	2019-08-22 21:59:59.999000064	379970.766276	2282	952.15003	182290.148114	0
1132	2019-08-22 22:00:00.000000000	192.08	193.75	192.07	193.63	3577.27723	2019-08-22 22:29:59.999000064	691158.688849	2807	2119.16881	409471.196906	0

After

datetime	Open	High	Low	Close	Volume	Quote Asset Volume	Number of Trades	TB Base Volume	TB Quote Volume	AvgValues
2019-07-30	209.124374	209.778122	208.567078	209.099991	4639.245605	9.713977e+05	2688.395752	2635.730469	5.519243e+05	209.172607
2019-07-31	213.910629	214.685196	213.437500	214.092087	4316.949219	9.253466e+05	2561.895752	2335.060791	5.003183e+05	214.061340
2019-08-01	214.359573	214.814377	213.771255	214.331863	3891.795654	8.344792e+05	2435.812500	1913.535767	4.104563e+05	214.292816
2019-08-02	217.811661	218.348328	217.216446	217.823959	4309.729980	9.399312e+05	2574.395752	2245.724365	4.899948e+05	217.782379
2019-08-03	221.821671	222.408127	221.249588	221.911057	3783.165771	8.392862e+05	2305.395752	1955.689087	4.338803e+05	221.828857
...	...	...	...	...	...	...	...	...	...	...
2022-08-31	1576.061646	1586.334961	1567.500977	1576.677246	19775.576172	3.119992e+07	30660.228516	9840.998047	1.552980e+07	1576.917969
2022-09-01	1558.028809	1566.156738	1550.316284	1558.697754	15181.468750	2.360879e+07	24900.603516	7556.168457	1.175243e+07	1558.236572
2022-09-02	1592.843628	1599.764282	1585.176880	1592.617554	19146.033203	3.066366e+07	24184.541016	9698.657227	1.553523e+07	1592.470581
2022-09-03	1557.305298	1561.287231	1552.144897	1556.931763	6695.775391	1.041786e+07	11726.937500	3340.875000	5.198778e+06	1556.716064
2022-09-04	614.710388	615.987915	613.434143	614.726868	1777.535156	2.759566e+06	3530.729248	900.764648	1.398741e+06	614.711060

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Model training and testing

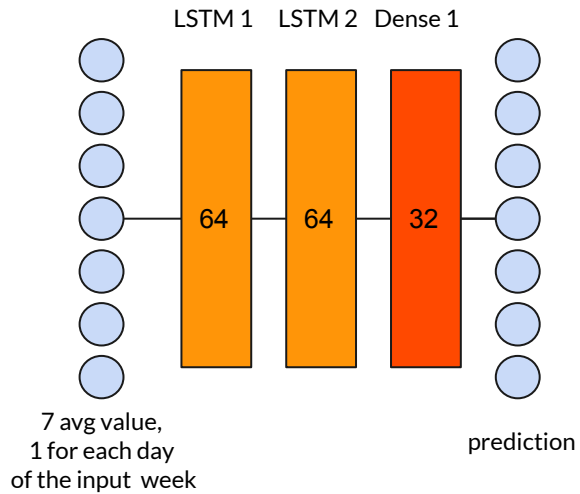
We divided the dataset as the following: 70% for training and 30% for testing.

For the supervised learning setup, we took the average of the high and low ETH values for each day as input and label because it's a univariate model.

Number of Epochs: **50**

Batch Size : **8**

Model Architecture



Prediction: we predict the Eth average value for each day of the next week.

Both LSTM layers have **64** cells.

Activation function of each layer is **ReLU**

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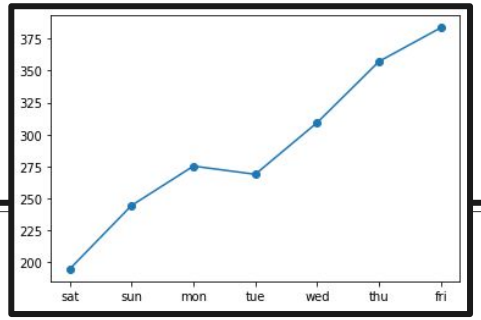
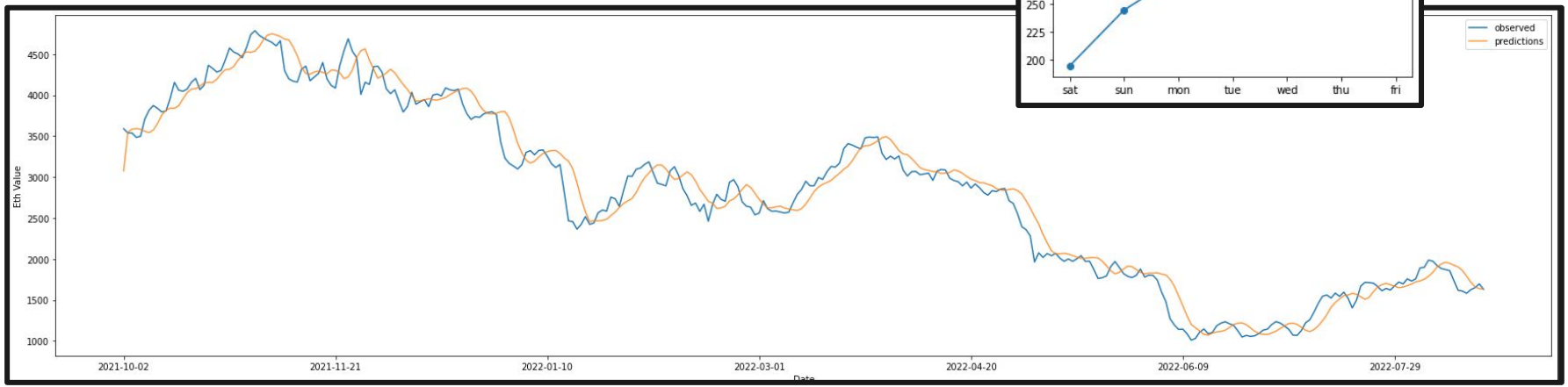
Results

Avg loss of each day of the week in the entire test





Predicted and Observed average Eth value

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Extra Results

	Sat 3/9/2022 (initial prediction)	Sun 4/9/2022	Mon 5/9/2022	Tue 6/9/2022	Wed 7/9/2022	Thur 8/9/2022	Fri 9/9/2022
$\hat{y}$	1554.0383	1571.7	1528.3032	1560.6823	1520.6327	1523.8074	1505.6569
y	1556	1560	1590	1620	1575	1625	1704

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Challenges

Existence of two timestamps in the dataset:

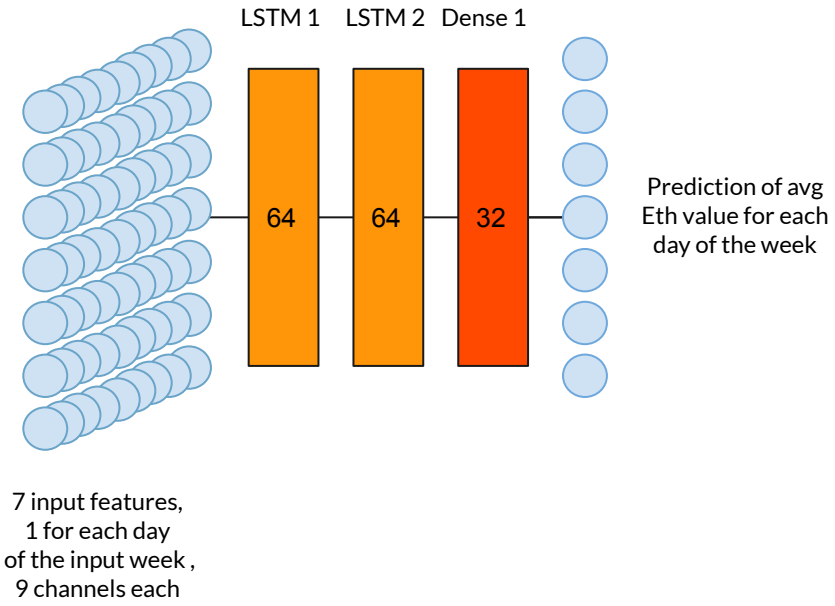
We had to drop one of them

Adding the Average value of ETH to the dataset

We had to append the dataframe after filling the numpy array of avgValues.

Next step

Make a multivariate model using more input features with higher accuracy



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