Unit 12 - Tales from the Crypto

1. Sentiment Analysis

Use the newsapi to pull the latest news articles for Bitcoin and Ethereum and create a DataFrame of sentiment scores for each coin.

Use descriptive statistics to answer the following questions:

1. Which coin had the highest mean positive score?
2. Which coin had the highest negative score?
3. Which coin had the highest positive score?

In [1]:
```python
# Initial imports
import os
import pandas as pd
from dotenv import load_dotenv
import nltk as nltk
nltk.download('vader_lexicon')
from nltk.sentiment.vader import SentimentIntensityAnalyzer
analyzer = SentimentIntensityAnalyzer()

%matplotlib inline
```

```
[nltk_data] Downloading package vader_lexicon to
[nltk_data]     /Users/syedahasan/nltk_data...
[nltk_data]   Package vader_lexicon is already up-to-date!
```

In [3]:
```python
# Read your api key environment variable
load_dotenv()
api_key = os.getenv("NEWS_API")
type(api_key)
```

Out[3]: `str`

In [4]:
```python
# Create a newsapi client
from newsapi import NewsApiClient
newsapi = NewsApiClient(api_key=api_key)
```

In [8]:
```python
# Fetch the Bitcoin news articles
bitcoin_news = newsapi.get_everything(q="bitcoin", language="en")
bitcoin_news.keys()
```

Out[8]: `dict_keys(['status', 'totalResults', 'articles'])`

In [12]:
```python
print(f"Total articles about Bitcoin: {bitcoin_news['totalResults']}")
```

```
Total articles about Bitcoin: 9561
```

In [13]:
```python
# Fetch the Ethereum news articles
eth_news = newsapi.get_everything(q="Ethereum", language="en")
eth_news.keys()
```

Out[13]: `dict_keys(['status', 'totalResults', 'articles'])`

In [15]:
```python
print(f"Total articles about Ethereum: {eth_news['totalResults']}")
```

```
Total articles about Ethereum: 2400
```

In [16]:
```python
# Create the Bitcoin sentiment scores DataFrame
# classnote 12.2
btc_sentiments = []
for article in bitcoin_news["articles"]:
    try:
        text = article["content"]
        date = article["publishedAt"][:10]
        sentiment = analyzer.polarity_scores(text)
        compound = sentiment["compound"]
        pos = sentiment["pos"]
        neu = sentiment["neu"]
        neg = sentiment["neg"]
        # append each element of each iteration to the btc_sentiments empty list
        btc_sentiments.append({
            "text": text,
            "date": date,
            "compound": compound,
            "positive": pos,
            "negative": neg,
            "neutral": neu
        })
    except AttributeError:
        pass

btc_df = pd.DataFrame(btc_sentiments)
cols = ["date", "text", "compound", "positive", "negative", "neutral"]
btc_df = btc_df[cols]

btc_df.head()
```

Out[16]:

	date	text	compound	positive	negative	neutral
0	2021-06-09	El Salvador's President Nayib Bukele has made ...	0.8402	0.282	0.000	0.718
1	2021-06-09	El Salvador has become the first country in th...	0.1280	0.043	0.000	0.957
2	2021-06-14	It's all about clean energy, it seems. \r\nElo...	0.6908	0.169	0.000	0.831
3	2021-07-05	Filed under:\r\nThe supply chain attack has re...	-0.5719	0.111	0.184	0.705
4	2021-06-09	image captionThe move means bitcoin will be ac...	0.2732	0.060	0.000	0.940

In [17]:
```python
# Create the Ethereum sentiment scores DataFrame
eth_sentiments = []
for article in eth_news["articles"]:
    try:
        text = article["content"]
        date = article["publishedAt"][:10]
        sentiment = analyzer.polarity_scores(text)
        compound = sentiment["compound"]
        pos = sentiment["pos"]
        neu = sentiment["neu"]
        neg = sentiment["neg"]
        # append each element of each iteration to the eth_sentiments empty list
        eth_sentiments.append({
            "text": text,
            "date": date,
            "compound": compound,
            "positive": pos,
            "negative": neg,
            "neutral": neu
        })
    except AttributeError:
        pass

eth_df = pd.DataFrame(eth_sentiments)
cols = ["date", "text", "compound", "positive", "negative", "neutral"]
eth_df = eth_df[cols]

eth_df.head()
```

Out[17]:

	date	text	compound	positive	negative	neutral
0	2021-06-17	TL;DR: The Cryptocurrency with Ethereum and So...	0.0000	0.000	0.000	1.000
1	2021-06-20	It wasn't long ago that your average person ha...	-0.2960	0.000	0.061	0.939
2	2021-06-10	This article was translated from our Spanish e...	-0.3400	0.000	0.066	0.934
3	2021-07-02	Bitcoin and Ethereum\r\nYuriko Nakao\r\nEther ...	0.3612	0.110	0.041	0.849
4	2021-07-05	Ether holders have "staked" more than $13 bill...	0.7717	0.194	0.000	0.806

In [18]:
```python
# Describe the Bitcoin Sentiment
btc_df.describe()
```

Out[18]:

	compound	positive	negative	neutral
count	20.000000	20.000000	20.000000	20.000000
mean	0.136730	0.076250	0.036750	0.886895
std	0.409336	0.070288	0.054092	0.08129
min	-0.612400	0.000000	0.000000	0.70500
25%	-0.050575	0.032250	0.000000	0.84025
50%	0.128000	0.065500	0.000000	0.90500
75%	0.369700	0.107250	0.064750	0.94375
max	0.840200	0.282000	0.184000	1.00000

In [19]:
```python
# Describe the Ethereum Sentiment
eth_df.describe()
```

Out[19]:

	compound	positive	negative	neutral
count	20.000000	20.000000	20.000000	20.000000
mean	0.063475	0.040500	0.025150	0.934350
std	0.356132	0.058708	0.032347	0.053135
min	-0.381800	0.000000	0.000000	0.806000
25%	-0.273200	0.000000	0.000000	0.920000
50%	0.000000	0.000000	0.000000	0.936500
75%	0.361200	0.074750	0.060250	0.961000
max	0.771700	0.194000	0.080000	1.000000

Questions:

Q: Which coin had the highest mean positive score?

A: Bitcoin has the highest mean positive score 0.076250

Q: Which coin had the highest compound score?

A: Bitcoin has the highest coumpound score 0.840200

Q. Which coin had the highest positive score?

A: Bitcoin has the highest positive score 0.282000

2. Natural Language Processing

Tokenizer

In this section, we use NLTK and Python to tokenize the text for each coin. Make sure to:

1. Lowercase each word.
2. Remove Punctuation.
3. Remove Stopwords.

In [47]:
```python
from nltk.tokenize import word_tokenize, sent_tokenize
from nltk.corpus import stopwords
from nltk.stem import WordNetLemmatizer, PorterStemmer
from string import punctuation
import re
```

In [48]:
```python
# Instantiate the lemmatizer
# class note 12.1
lemmatizer = WordNetLemmatizer()

# Create a list of stopwords
sw = set(stopwords.words('english'))

# Expand the default stopwords list if necessary
sw_addon = {"."}
```

In [50]:
```python
# Complete the tokenizer function
def tokenizer(text):
    """Tokenizes text."""

    # Remove the punctuation from text
    regex = re.compile("[^a-zA-Z ]")
    re_clean = regex.sub('', text)

    # Create a tokenized list of the words
    words = word_tokenize(re_clean)

    # Lemmatize words into root words
    lem = [lemmatizer.lemmatize(word) for word in words]

    # Convert the words to lowercase
    # Remove the stop words
    tokens = [word.lower() for word in lem if word.lower() not in sw.union(sw_addon)]

    return tokens
```

In [51]:
```python
# Create a new tokens column for Bitcoin
#tokenizer(btc_df['text'][0])

btc_tokens = []
for text in btc_df['text']:
    tokens = tokenizer(text)
    btc_tokens.append(tokens)
btc_df['tokens'] = btc_tokens
btc_df.head()
```

Out[51]:

	date	text	compound	positive	negative	neutral	tokens
0	2021-06-09	El Salvador's President Nayib Bukele has made ...	0.8402	0.282	0.000	0.718	[el, salvadors, president, nayib, bukele, ha, ...
1	2021-06-09	El Salvador has become the first country in th...	0.1280	0.043	0.000	0.957	[el, salvador, ha, become, first, country, wor...
2	2021-06-14	It's all about clean energy, it seems. \r\nElo...	0.6908	0.169	0.000	0.831	[clean, energy, seemselon, musk, tesla, caused...
3	2021-07-05	Filed under:\r\nThe supply chain attack has re...	-0.5719	0.111	0.184	0.705	[filed, underthe, supply, chain, attack, ha, r...
4	2021-06-09	image captionThe move means bitcoin will be ac...	0.2732	0.060	0.000	0.940	[image, captionthe, move, mean, bitcoin, accep...

In [52]:
```python
# Create a new tokens column for Ethereum
#tokenizer(eth_df['text'][0])

eth_tokens = []
for text in eth_df['text']:
    tokens = tokenizer(text)
    eth_tokens.append(tokens)
eth_df['tokens'] = eth_tokens
eth_df.head()
```

Out[52]:

	date	text	compound	positive	negative	neutral	tokens
0	2021-06-17	TL;DR: The Cryptocurrency with Ethereum and So...	0.0000	0.000	0.000	1.000	[tldr, cryptocurrency, ethereum, solidity, blo...
1	2021-06-20	It wasn't long ago that your average person ha...	-0.2960	0.000	0.061	0.939	[wasnt, long, ago, average, person, clue, nft,...
2	2021-06-10	This article was translated from our Spanish e...	-0.3400	0.000	0.066	0.934	[article, wa, translated, spanish, edition, us...
3	2021-07-02	Bitcoin and Ethereum\r\nYuriko Nakao\r\nEther ...	0.3612	0.110	0.041	0.849	[bitcoin, ethereumyuriko, nakaoether, overtook...
4	2021-07-05	Ether holders have "staked" more than $13 bill...	0.7717	0.194	0.000	0.806	[ether, holder, staked, billion, worth, crypto...

NGrams and Frequency Analysis

In this section we will look at the ngrams and word frequency for each coin.

1. Use NLTK to produce the n-grams for N = 2.
2. List the top 10 words for each coin.

In [53]:
```python
from collections import Counter
from nltk import ngrams
```

In [54]:
```python
# Generate the Bitcoin N-grams where N=2
btc_ngram_counts = []
for tokens in btc_df['tokens']:
    ngram_counts = dict(Counter(ngrams(tokens, n=2)))
    btc_ngram_counts.append(ngram_counts.items())
btc_ngram_counts
```

Out[54]:

```
[dict_items([(('el', 'salvadors'), 1), (('salvadors', 'president'), 1), (('president', 'nayib'), 1), (('nayib', 'bukele'), 1), (('bukele', 'ha'), 1), (('ha', 'made'), 1), (('made', 'good'), 1), (('good', 'promise'), 1), ...
```

In [55]:
```python
# Generate the Ethereum N-grams where N=2
eth_ngram_counts = []
for tokens in eth_df['tokens']:
    ngram_counts = dict(Counter(ngrams(tokens, n=2)))
    eth_ngram_counts.append(ngram_counts.items())
eth_ngram_counts
```

Out[55]:

```
[dict_items([(('tldr', 'cryptocurrency'), 1), (('cryptocurrency', 'ethereum'), 1), (('ethereum', 'solidity'), 1), (('solidity', 'blockchain'), 1), ...
```

In [56]:
```python
# Function token_count generates the top 10 words for a given coin
def token_count(tokens, N=3):
    """Returns the top N tokens from the frequency count"""
    return Counter(tokens).most_common(N)
```

In [61]:
```python
# Use token_count to get the top 10 words for Bitcoin
btc_wordmap = {}
for btc_token in btc_df['tokens']:
    top = dict(token_count(btc_token, 10))
    for key in top:
        if(key in btc_wordmap):
            btc_wordmap[key] += top[key]
        else:
            btc_wordmap[key] = top[key]
btc_word_list = list(btc_wordmap.items())
x = sorted(btc_word_list, key=lambda x:x[1], reverse=True)
btc_top_10 = []

for i in range(0,10):
    btc_top_10.append(x[i])
btc_top_10
```

Out[61]:

```
[('bitcoin', 13),
 ('salvador', 7),
 ('el', 6),
 ('reuters', 6),
 ('ha', 4),
 ('cryptocurrency', 4),
 ('us', 4),
 ('world', 3),
 ('attack', 3),
 ('week', 3)]
```

In [62]:
```python
# Use token_count to get the top 10 words for Ethereum
eth_wordmap = {}
for eth_token in eth_df['tokens']:
    top = dict(token_count(eth_token, 10))
    for key in top:
        if(key in eth_wordmap):
            eth_wordmap[key] += top[key]
        else:
            eth_wordmap[key] = top[key]
eth_word_list = list(eth_wordmap.items())
y = sorted(eth_word_list, key=lambda x:x[1], reverse=True)
eth_top_10 = []

for i in range(0,10):
    eth_top_10.append(y[i])
eth_top_10
```

Out[62]:

```
[('bitcoin', 9),
 ('world', 8),
 ('cryptocurrency', 7),
 ('previous', 7),
 ('closebitcoin', 7),
 ('ethereum', 6),
 ('network', 6),
 ('gmt', 6),
 ('reuters', 6),
 ('adding', 5)]
```

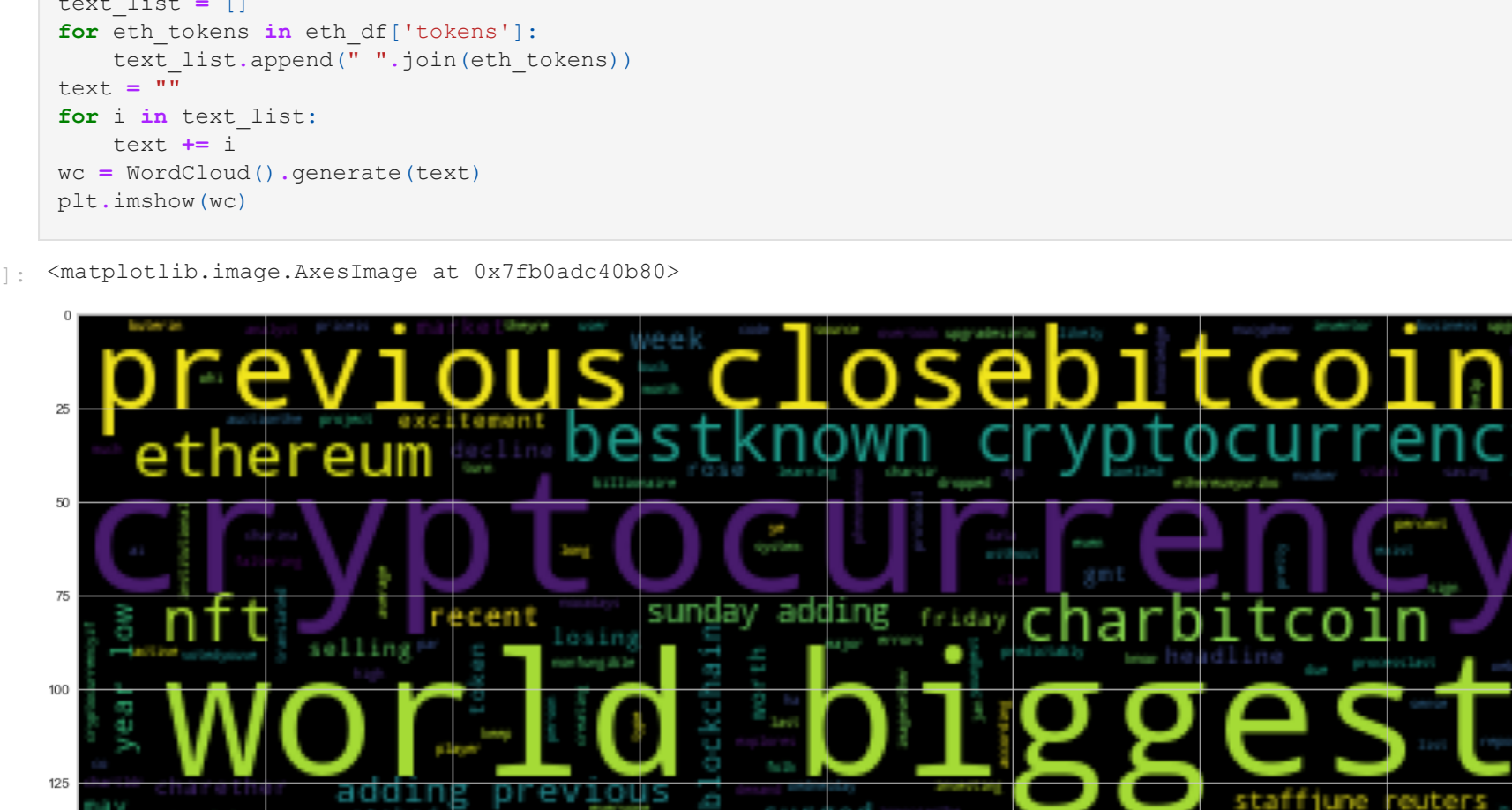
Word Clouds

In this section, you will generate word clouds for each coin to summarize the news for each coin

In [63]:
```python
from wordcloud import WordCloud
import matplotlib.pyplot as plt
plt.style.use('seaborn-whitegrid')
import matplotlib as mpl
mpl.rcParams['figure.figsize'] = [20.0, 10.0]
```

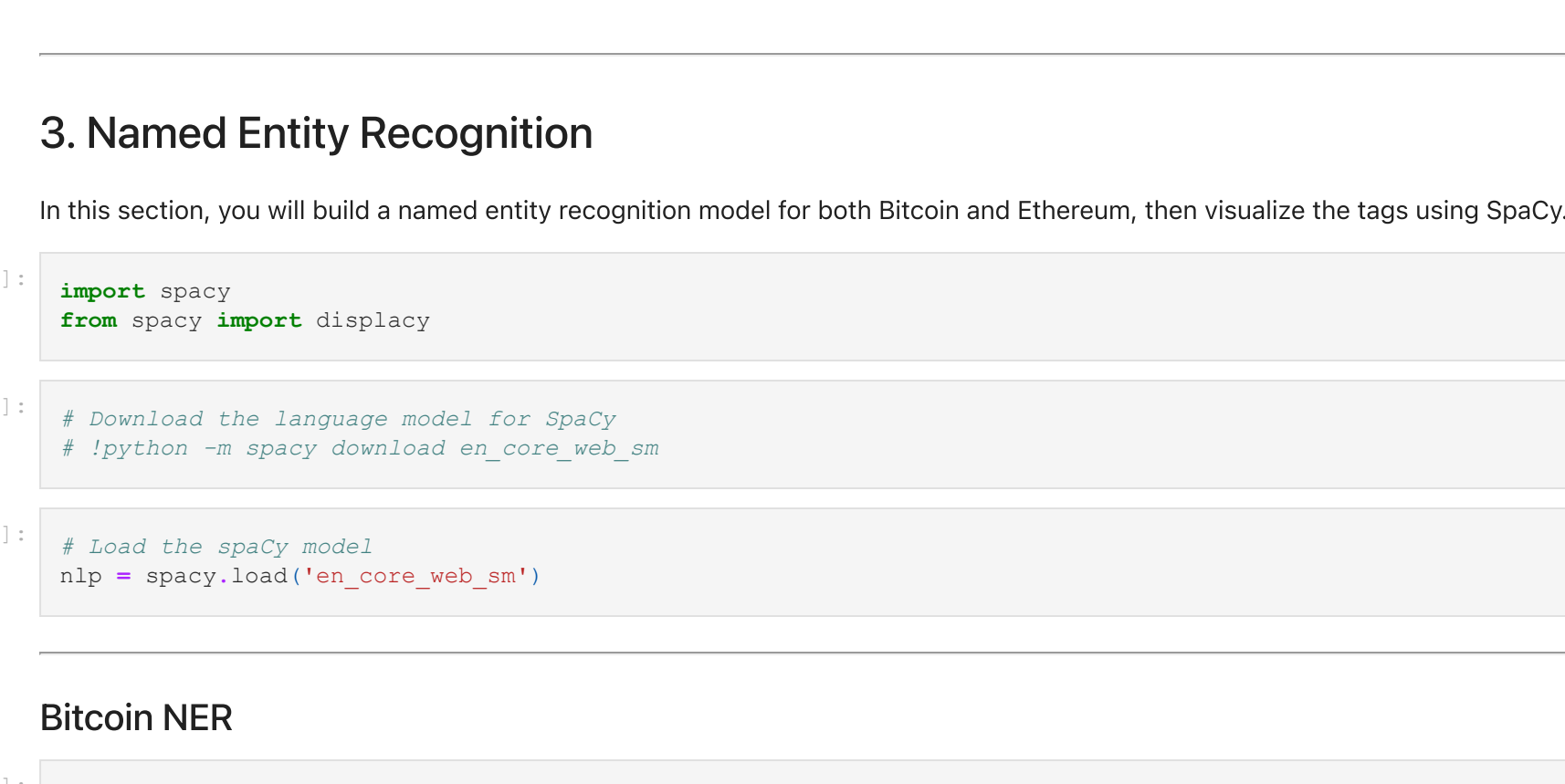
In [64]:
```python
# Generate the Bitcoin word cloud
text_list = []
for btc_tokens in btc_df['tokens']:
    text_list.append(" ".join(btc_tokens))
text = ""
for i in text_list:
    text += i
wc = WordCloud().generate(text)
plt.imshow(wc)
```

Out[64]: `<matplotlib.image.AxesImage at 0x7fb0adc0bdf0>`



In [65]:
```python
# Generate the Ethereum word cloud
text_list = []
for eth_tokens in eth_df['tokens']:
    text_list.append(" ".join(eth_tokens))
text = ""
for i in text_list:
    text += i
wc = WordCloud().generate(text)
plt.imshow(wc)
```

Out[65]: `<matplotlib.image.AxesImage at 0x7fb0adc40b80>`



3. Named Entity Recognition

In this section, you will build a named entity recognition model for both Bitcoin and Ethereum, then visualize the tags using SpaCy.

In [73]:
```python
import spacy
from spacy import displacy
```

In [74]:
```python
# Download the language model for SpaCy
# !python -m spacy download en_core_web_sm
```

In [75]:
```python
# Load the spaCy model
nlp = spacy.load('en_core_web_sm')
```

Bitcoin NER

In [76]:
```python
# Concatenate all of the Bitcoin text together
btc_text = ""
for text in btc_df['text']:
    btc_text += text
btc_text
```

Out[76]:

```
'El Salvador\'s President Nayib Bukele has made good on his promise to adopt Bitcoin as legal tender. Officials in the Central American country\'s congress voted to accept the cryptocurrency by a majori… [+1414 chars]El Salvador has become the first country in the world to recognize the cryptocurrency bitcoin as legal currency, according to President Nayib Bukele in a tweet on Wednesday. Citizens will be able to … [+3840 chars]It\'s all about clean energy, it seems. \xa0\r\nElon Musk and Tesla caused ripples in the cryptocurrency market in the past few weeks ...'
```

In [77]:
```python
# Run the NER processor on all of the text
doc = nlp(btc_text)

# Add a title to the document
doc.user_data["title"] = "Bitcoin text analysis"
```

In [78]:
```python
# Render the visualization
displacy.render(doc, style='ent')
```

Bitcoin text analysis

El Salvador's GPE President Nayib Bukele PERSON has made good on his promise to adopt Bitcoin GPE as legal tender.
Officials in the Central American NORP country's congress ORG voted to accept the cryptocurrency by a majori... [+1414
chars]El Salvador has become the first ORDINAL country in the world to recognize the cryptocurrency bitcoin as legal currency,
according to President Nayib Bukele PERSON in a tweet on Wednesday DATE . Citizens ORG will be able to ... [+3840
chars]It's all about clean energy, it seems.
Elon Musk and Tesla ORDINAL caused ripples in the cryptocurrency market in the past few months DATE , first ORDINAL
by announcing that Tesla ORDINAL had bought $1.5 billion MONEY worth of bitcoi... [+2508 chars]Filed under:
The supply chain attack has reached over a thousand CARDINAL organizations.
Illustration by Alex Castro PERSON / The Verge ORG
Three days DATE after ransomware attackers started the holiday weekend DATE by comprom... [+3376 chars]image
captionThe move means bitcoin GPE will be accepted everywhere for goods and services, alongside the US NORP dollar
El Salvador GPE has become the first ORDINAL country in the world to officially classify Bitcoin GPE as a... [+2233
chars]Several crypto fans that descended on Miami GPE in Florida GPE last weekend DATE for the largest bitcoin
conference in history are now saying theyve tested positive for covid-19 DATE .
Larry Cermak PERSON , research director ... [+2389 chars]Hello friends, and welcome back to Week in Review ORG !
Last week DATE , I wrote about tech taking on Disney ORG . This week DATE , I'm talking about the search for a new
crypto messiah.
If youre reading this on the Tec... [+7741 chars]By Mary-Ann RussonBusiness PERSON reporter, BBC News ORG
image copyrightGetty Images
Former US GPE President Donald Trump PERSON has told Fox Business ORG that he sees Bitcoin GPE as a "scam"
affecting the value of the US GPE dolla... [+3638 chars]image
The gang behind a "colossal" ransomware attack has demanded $70m MONEY (£50.5m MONEY) paid in Bitcoin GPE in
return for a "universal decryptor" that it says will unlock the files of all ... [+4140 chars]SAN SALVADOR, June 16 DATE (
Reuters ORG) - El Salvador GPE will not replace the U.S. GPE dollar with bitcoin as the legal tender, Finance Minister
Alejandro Zelaya PERSON said on Wednesday DATE , as the Central American NORP nation so... [+1266 chars]LONDON,
June 23 DATE (Reuters ORG) - El Salvador GPE is determined to push ahead with making bitcoin legal tender, a process
that will bring only small risks and prove a "leap forward for humanity, the country's... [+2764 chars]LONDON, June 23 DATE (
Reuters ORG) - El Salvador GPE is determined to push ahead with making bitcoin legal tender, a process that will bring only
small risks and prove a leap forward for humanity, the country's Pr... [+2648 chars]Representations of the virtual currency Bitcoin GPE
stand on a motherboard in this picture illustration taken May 20, 2021 DATE . REUTERS/ ORG Dado
Ruvic/Illustration/File PhotoMicroStrategy Inc (MSTR.O), a major b... [+954 chars]By Reuters ORG Staff
SAN SALVADOR (Reuters ORG) - El Salvador GPE will not replace the U.S. GPE dollar with bitcoin as the legal tender,
Finance Minister Alejandro Zelaya PERSON said on Wednesday DATE , as the Central American NORP ... [+1110
chars]Other than Colonial Pipeline LOC , the biggest recent ransomware attack targeted JBS ORG , a meat supplier that's
responsible for up to one quarter DATE of all meat processing in the US GPE . Late last week DATE the company ...
[+876 chars]Hello and welcome back to Equity, TechCrunchs ORG venture capital-focused podcast where we unpack the
numbers behind the headlines.
This is Equity Monday ORG , our morning TIME coffee shot that is all ab... [+2045 chars]This story originally
appeared on MarketBeatWhen GPE meme coins surged earlier this year DATE (remember Dogecoin PERSON mania?) it
might've been easy to dump everything you owned — stocks, bonds, gold — for crypto. ... [+6151 chars]Bitcoin surged 8.54 %
PERCENT to $ 36,265 MONEY on Wednesday DATE , adding $ 2,853.31 MONEY to its previous close.
Bitcoin GPE , the world's biggest and best-known cryptocurrency, is up 30.8% PERCENT from the year DATE 's low of $
27,734 MONEY on Jan. ... [+191 chars]By Reuters ORG Staff
FILE PHOTO: Representations of the Bitcoin GPE cryptocurrency are seen in this picture illustration taken June 7, 2021 DATE
. REUTERS/Edgar Su/Illustration ORG
(Reuters ORG) - Bitcoin GPE dropped 5.71% PERCENT ... [+336 chars]Bitcoin dropped 5.71% PERCENT to $
35,210 MONEY at 0600 GMT on Saturday DATE , losing $ 2,131.11 MONEY from its previous close.
Bitcoin GPE , the world's biggest and best-known cryptocurrency, is down 45.7% PERCENT from its 2021 DATE high of $
6 MONEY ... [+215 chars]

In [79]:

```
# List all Entities
doc.ents
```

Out[79]:

```
(El Salvador's,
 Nayib Bukele,
 Bitcoin,
 Central American,
 congress,
 first,
 Nayib Bukele,
 Wednesday,
 Citizens,
 Tesla,
 the past few months,
 first,
 Tesla,
 $1.5 billion,
 thousand,
 Alex Castro,
 The Verge,
 Three days,
 the holiday weekend,
 bitcoin,
 US,
 El Salvador,
 first,
 Bitcoin,
 Miami,
 Florida,
 last weekend,
 covid-19,
 Larry Cermak,
 Review,
 Last week,
 Disney,
 This week,
 Mary-Ann RussonBusiness,
 BBC News,
 US,
 Donald Trump,
 Fox Business,
 Bitcoin,
 US,
 $70m,
 £50.5m,
 Bitcoin,
 June 16,
 Reuters,
 El Salvador,
 U.S.,
 Alejandro Zelaya,
 Wednesday,
 Central American,
 June 23,
 Reuters,
 El Salvador,
 June 23,
 Reuters,
 El Salvador,
 Bitcoin,
 May 20, 2021,
 REUTERS/,
 Reuters,
 Reuters,
 El Salvador,
 U.S.,
 Alejandro Zelaya,
 Wednesday,
 the Central American,
 Colonial Pipeline,
 JBS,
 US,
 up to one quarter,
 US,
 Late last week,
 TechCrunchs,
 Equity Monday,
 our morning,
 MarketBeatWhen,
 earlier this year,
 Dogecoin,
 8.54 %,
 36,265,
 Wednesday,
 2,853.31,
 Bitcoin,
 30.8%,
 year,
 27,734,
 Reuters,
 Bitcoin,
 June 7, 2021,
 REUTERS/Edgar Su/Illustration,
 Reuters,
 Bitcoin,
 5.71%,
 5.71%,
 35,210,
 Saturday,
 2,131.11,
 Bitcoin,
 45.7%,
 2021,
 6)
```

Ethereum NER

In [81]:

```
# Concatenate all of the Ethereum text together
eth_text = ""
for text in eth_df['text']:
    eth_text += text
eth_text
```

Out[81]:

```
'TL;DR: The Cryptocurrency with Ethereum and Solidity Blockchain Developer Bundle is on sale for £21.25 as of J
une 17, saving you 97% on list price.\r\nIs everyone you know investing in cryptocurrency? … [+949 chars]It was
n\'t long ago that your average person had no clue what an NFT was. Nowadays, they\'re making headlines for sel
ling for hundreds of thousands of bucks. Predictably, folks are learning about NFTs … [+3056 chars]This article
was translated from our Spanish edition using AI technologies. Errors may exist due to this process.\r\nLast Ma
y, VitaliK Buterin became the youngest billionaire in the world at just 27 ye… [+2422 chars]Bitcoin and Ethereu
m\r\nYuriko Nakao\r\nEther overtook bitcoin in the number of active addresses on its network on Friday, a sign
that demand is faltering for the world\'s biggest cryptocurrency as its co… [+2727 chars]Ether holders have "st
aked" more than $13 billion worth of the cryptocurrency on the ethereum 2.0 network, as excitement builds aroun
d the overhaul of the system and the potential growth of the staki… [+1851 chars]Ether is the cryptocurrency of
the ethereum network.\r\nPhotothek/Getty Images\r\nEther holders have "staked" more than $13 billion worth of t
he cryptocurrency on the ethereum 2.0 network, as excitement … [+1935 chars]Major upgrades to the ethereum netw
ork could help turn crypto staking into a $40 billion business by 2025, according to analysts at JPMorgan.\r\nT
he staking industry in which users earn cryptocurrency … [+2320 chars]Sir Tim Berners-Lee, credited as the inve
ntor of the World Wide Web, is selling the source code for his invention as an NFT at a Sotheby\'s auction.\xa0
\r\nThe NFT, or non-fungible token, is a type of cryp… [+2698 chars]Two Ethereum-based protocols, Keep Network
and NuCypher, are getting upgradesinto a single network. Last week, token holders in the projects voted toYou'v
e likely seen the headlines surrounding the pretty major decline in NFT sales from the market's recent peak, wi
th some reports indicating as much as a 90 percent decline in recent weeks. And whi… [+2025 chars]While the amb
itions of crypto investors have swelled even faster than the market has in recent months, institutional players
have had a mountain of blockchain data to try to make sense of without par… [+2313 chars]Bitcoin surged 8.54 %
to $36,265 on Wednesday, adding $2,853.31 to its previous close.\r\nBitcoin, the world\'s biggest and best-know
n cryptocurrency, is up 30.8% from the year\'s low of $27,734 on Jan. … [+191 chars]Bitcoin dropped 5.71% to $3
5,210 at 0600 GMT on Saturday, losing $2,131.11 from its previous close.\r\nBitcoin, the world\'s biggest and b
est-known cryptocurrency, is down 45.7% from its 2021 high of $6… [+215 chars]TLDR: The Cryptocurrency with Eth
ereum and Solidity Blockchain Developer Bundle explains the entire crypto phenomenon and also explores creating
your own real world cryptocurrency.\r\nIf your knowledge… [+2367 chars]INA FASSBENDER/AFP via Getty Images\r\nI
nvestors have pulled money out of digital assets for the third week running, making this the longest series of
consecutive outflows since February 2018, a CoinSh… [+2312 chars]Bitcoin surged 9.83 % to $39,035.47 at 22:05 G
MT on Sunday, adding $3,492.71 to its previous close.\r\nBitcoin, the world\'s biggest and best-known cryptocur
rency, is up 40.7% from the year\'s low of $27… [+205 chars]By Reuters Staff\r\nJune 25 (Reuters) - Bitcoin dip
ped 8.51% to $31,699.83 at 22:04 GMT on Friday, losing $2,937.27 from its previous close.\r\nBitcoin, the world
s biggest and best-known cryptocurrency, … [+258 chars]By Reuters Staff\r\nJune 13 (Reuters) - Bitcoin rose 5.1
1 % to $37,360.63 at 18:10 GMT on Sunday, adding $1,817.87 to its previous close.\r\nBitcoin, the worlds bigges
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$1,817.87 to its previous close.\r\nBitcoin, the world\'s biggest and best-known cryptocurrency, is up 34.7% fr
om the year\'s low of $27,7… [+210 chars]'
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In [82]:

```
# Run the NER processor on all of the text
doc = nlp(eth_text)

# Add a title to the document
doc.user_data["title"] = "Ethereum text analysis"
```

In [83]:

```
# Render the visualization
displacy.render(doc, style='ent')
```

Ethereum text analysis

TL;DR: The Cryptocurrency with Ethereum and Solidity Blockchain Developer Bundle is on sale for £ 21.25 MONEY as of June
17 DATE , saving you 97% PERCENT on list price.
Is everyone you know investing in cryptocurrency? ... [+949 chars]It wasn't long ago that your average person had no clue what an
NFT ORG was. Nowadays, they're making headlines for selling for hundreds of thousands CARDINAL of bucks. Predictably,
folks are learning about NFTs ... [+3056 chars]This article was translated from our Spanish NORP edition using AI GPE
technologies. Errors may exist due to this process.
Last May DATE , VitaliK Buterin PERSON became the youngest billionaire in the world at just 27 ye... [+2422 chars]Bitcoin
and Ethereum
Yuriko Nakao ORG
Ether overtook bitcoin in the number of active addresses on its network on Friday DATE , a sign that demand is faltering for the
world's biggest cryptocurrency as its co... [+2727 chars]Ether holders have "staked" more than $13 billion MONEY worth of the
cryptocurrency on the ethereum 2.0 network, as excitement builds around the overhaul of the system and the potential growth of
the staki... [+1851 chars]Ether is the cryptocurrency of the ethereum network.
Photothek PERSON /Getty Images
Ether holders have "staked" more than $13 billion MONEY worth of the cryptocurrency on the ethereum 2.0 network, as
excitement ... [+1935 chars]Major upgrades to the ethereum network could help turn crypto staking into a $40 billion MONEY
business by 2025 DATE , according to analysts at JPMorgan ORG .
The staking industry in which users earn cryptocurrency ... [+2320 chars]Sir Tim Berners-Lee PERSON , credited as the inventor
of the World Wide Web ORG , is selling the source code for his invention as an NFT ORG at a Sotheby's ORG auction.
The NFT ORG , or non-fungible token, is a type of cryp... [+2698 chars]Two Ethereum-based protocols, Keep Network and
NuCypher, are getting upgradesinto a single network. Last week DATE , token ORG holders in the projects voted toYou've
likely seen the headlines surrounding the pretty major decline in NFT ORG sales from the market's recent peak, with some
reports indicating as much as a 90 percent PERCENT decline in recent weeks DATE . And whi... [+2025 chars]While the
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36,265 MONEY on Wednesday DATE , adding $ 2,853.31 MONEY to its previous close.
Bitcoin GPE , the world's biggest and best-known cryptocurrency, is up 30.8% PERCENT from the year DATE 's low of $
27,734 MONEY on Jan. ... [+191 chars]Bitcoin dropped 5.71% PERCENT to $ 35,210 MONEY at 0600 GMT on Saturday
DATE , losing $ 2,131.11 MONEY from its previous close.
Bitcoin GPE , the world's biggest and best-known cryptocurrency, is down 45.7% PERCENT from its 2021 DATE high of $
6 MONEY ... [+215 chars]TLDR: The Cryptocurrency with Ethereum ORG and Solidity Blockchain Developer Bundle explains
the entire crypto phenomenon and also explores creating your own real world cryptocurrency.
If your knowledge... [+2367 chars]INA FASSBENDER/AFP via Getty Images
Investors have pulled money out of digital assets for the third week DATE running, making this the longest series of consecutive
outflows since February 2018 DATE , a CoinSh CARDINAL ... [+2312 chars]Bitcoin DATE surged 9.83 % PERCENT to
$ 39,035.47 MONEY at 22:05 GMT TIME on Sunday DATE , adding $ 3,492.71 MONEY to its previous close.
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37,360.63 MONEY at 18:10 GMT TIME on Sunday DATE , adding $ 1,817.87 MONEY to its previous close.
Bitcoin GPE , the world's biggest and best-known cryptocurrency, is up 34.7% PERCENT from the year DATE 's low of
$27,7...

In [84]:

```
# List all Entities
doc.ents
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Out[84]:

```
(21.25,
 June 17,
 97%,
 NFT,
 hundreds of thousands,
 Spanish,
 AI,
 Last May,
 VitaliK Buterin,
 Yuriko Nakao,
 Friday,
 more than $13 billion,
 Photothek,
 more than $13 billion,
 $40 billion,
 2025,
 JPMorgan,
 Tim Berners-Lee,
 the World Wide Web,
 NFT,
 Sotheby's,
 NFT,
 Last week,
 token,
 NFT,
 90 percent,
 recent weeks,
 recent months,
 8.54 %,
 36,265,
 Wednesday,
 2,853.31,
 Bitcoin,
 30.8%,
 year,
 27,734,
 5.71%,
 35,210,
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 2,131.11,
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 6,
 The Cryptocurrency with Ethereum,
 the third week,
 February 2018,
 CoinSh,
 chars]Bitcoin,
 9.83 %,
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 3,492.71,
 Bitcoin,
 40.7%,
 year,
 27,
 Reuters,
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 8.51%,
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 Bitcoin,
 Reuters,
 June 13,
 Reuters,
 5.11 %,
 37,360.63,
 18:10 GMT,
 Sunday,
 1,817.87,
 Bitcoin,
 Reuters,
 June 13,
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 9.83 %,
 39,035.47,
 22:05 GMT,
 Sunday,
 3,492.71,
 Bitcoin,
 5.11 %,
 37,360.63,
 18:10 GMT,
 Sunday,
 1,817.87,
 Bitcoin,
 34.7%,
 year)
```