nft-price-analysis-data-challenge

April 26, 2023

1 NFT Price Analysis Data Challenge

The objective of this notebook is to explore the dataset available in the challenge proposed by the Ocean Protocol in order to understand the sale of NFTs in different contexts.

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Date: 2023-04-26

Challenge: https://blog.oceanprotocol.com/nft-price-analysis-data-challenge-ded2d64f8d59

1.1 Extracting and opening the dataset

A copy of the dataset was downloaded to make it easy to read at all times. This exploration uses Google Colab and Drive, but can be applied in any context with local files.

[2]:
```
from google.colab import drive
drive.mount('/content/drive')
```

```
Drive already mounted at /content/drive; to attempt to forcibly remount, call
drive.mount("/content/drive", force_remount=True).
```

[3]:
```
import pandas as pd
from datetime import datetime
import matplotlib.pyplot as plt
```

[4]:
```
nft_collections = pd.read_csv("/content/drive/MyDrive/Colab Notebooks/OCEAN/
↪Azuki_BAYC_MAYC_Otherdeed_Moonbirds.csv")
```

```
<ipython-input-4-080fccacae09>:1: DtypeWarning: Columns (14,26,29) have mixed
types. Specify dtype option on import or set low_memory=False.
  nft_collections = pd.read_csv("/content/drive/MyDrive/Colab
Notebooks/OCEAN/Azuki_BAYC_MAYC_Otherdeed_Moonbirds.csv")
```

1.2 Selection of NFT collections

For this challenge, the "MutantApeYachtClub" and "Otherdeed" collections have been selected

[5]:
```
mutantapeyatchclub_collection = nft_collections[nft_collections.collection_name␣
↪== "MutantApeYachtClub"]
otherdeed_collection = nft_collections[nft_collections.collection_name ==␣
↪"Otherdeed"]
```

2 Evaluation

2.1 1. Analyze how the number of daily transactions for the collections has changed over time.

a. We transform the timestamp into a date (without time) in order to generate a line graph exploring the evolution of each NFT transaction in the collections.

[6]:
```
mutantapeyatchclub_collection['timestamp_justdate'] = pd.
↪to_datetime(mutantapeyatchclub_collection['timestamp']).dt.date
otherdeed_collection['timestamp_justdate'] = pd.
↪to_datetime(otherdeed_collection['timestamp']).dt.date
```

```
<ipython-input-6-0160743ad67a>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  mutantapeyatchclub_collection['timestamp_justdate'] =
pd.to_datetime(mutantapeyatchclub_collection['timestamp']).dt.date
<ipython-input-6-0160743ad67a>:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  otherdeed_collection['timestamp_justdate'] =
pd.to_datetime(otherdeed_collection['timestamp']).dt.date
```

b. We show and graph the daily transactions for "MutantApeYachtClub".

As can be seen in the graph, there was an initial peak in transactions, due to the appearance of this collection and the expectations generated, but with a strong decrease due to the bear market since 2021, with a small increase at the beginning of 2023 with the growth of cryptocurrencies and greater use of marketplaces.

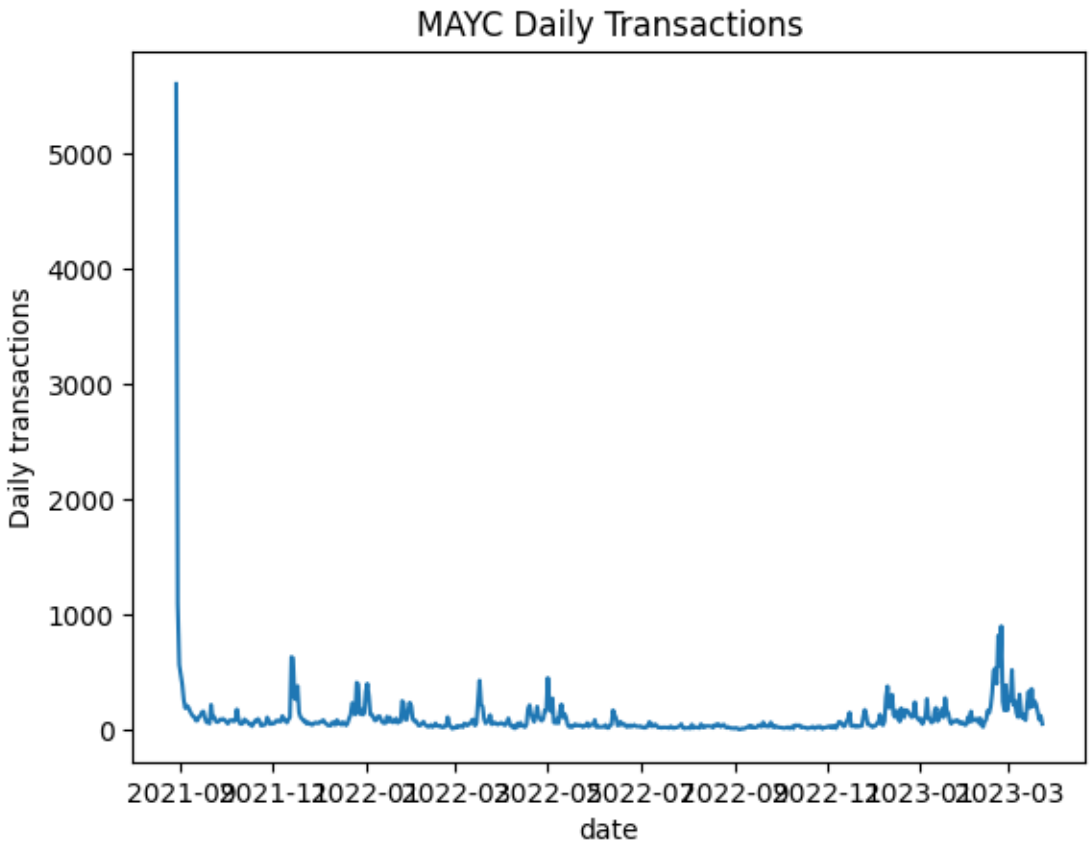
[7]:
```
mutantapeyatchclub_collection['transactions'] = 1
transacciones_diarias_mayc = mutantapeyatchclub_collection.
↪groupby('timestamp_justdate')['transactions'].sum()


# Graficar la serie temporal de transacciones diarias
```

```
transacciones_diarias_mayc.plot(kind='line')
plt.xlabel('date')
plt.ylabel('Daily transactions')
plt.title('MAYC Daily Transactions')
plt.show()
```

```
<ipython-input-7-c0efdae90634>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  mutantapeyatchclub_collection['transactions'] = 1
```



c. We show and graph the daily transactions for “Otherdeed”.

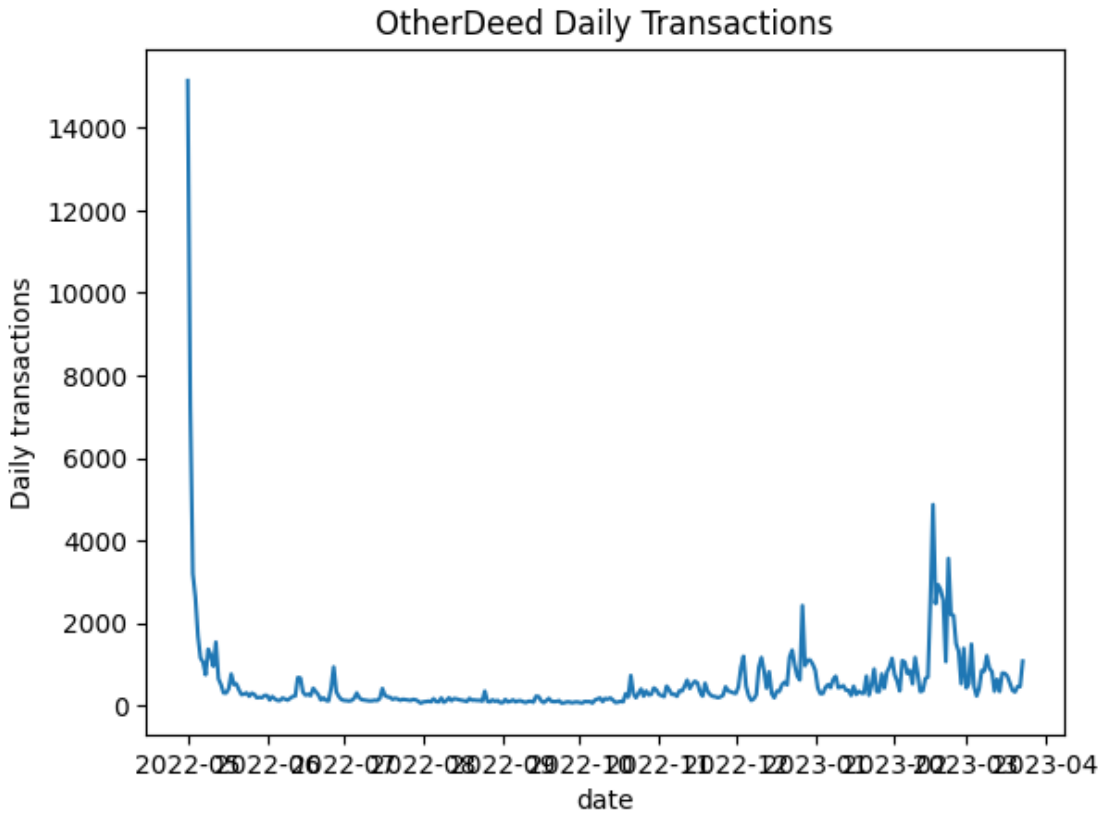
As can be seen in the graph, there was an initial peak in transactions, due to the appearance of this collection and the expectations generated, but with a sharp decline immediately after its initial transactions and a slight increase in 2023.

[8]:
```
otherdeed_collection['transactions'] = 1
transacciones_diarias_od = otherdeed_collection.
 ↪groupby('timestamp_justdate')['transactions'].sum()


# Graficar la serie temporal de transacciones diarias
transacciones_diarias_od.plot(kind='line')
plt.xlabel('date')
plt.ylabel('Daily transactions')
plt.title('OtherDeed Daily Transactions')
plt.show()
```

```
<ipython-input-8-9aaac391fbc2>:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-
docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  otherdeed_collection['transactions'] = 1
```

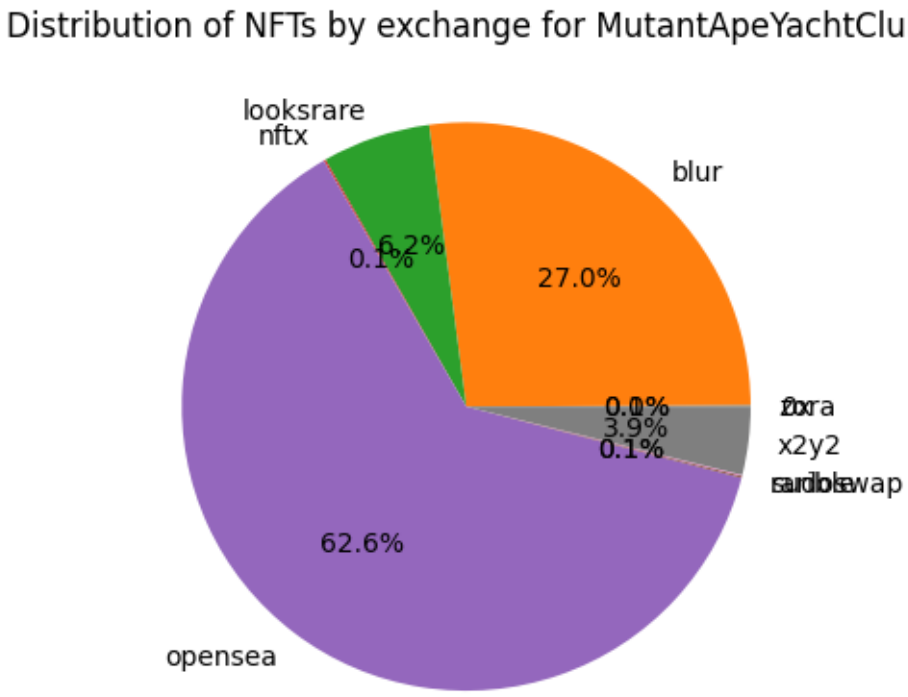


2.2 2. Provide a visual overview of the NFT collections of your choice and its characteristics (e.g. size, type of NFTs, date range)?

For this exploration, I decided to use the most representative and understandable columns for both experts and non-experts in NFT, which are: exchange_name, aggregator_name and ___indexer_id (collection indexer)

2.2.1 By exchange_name

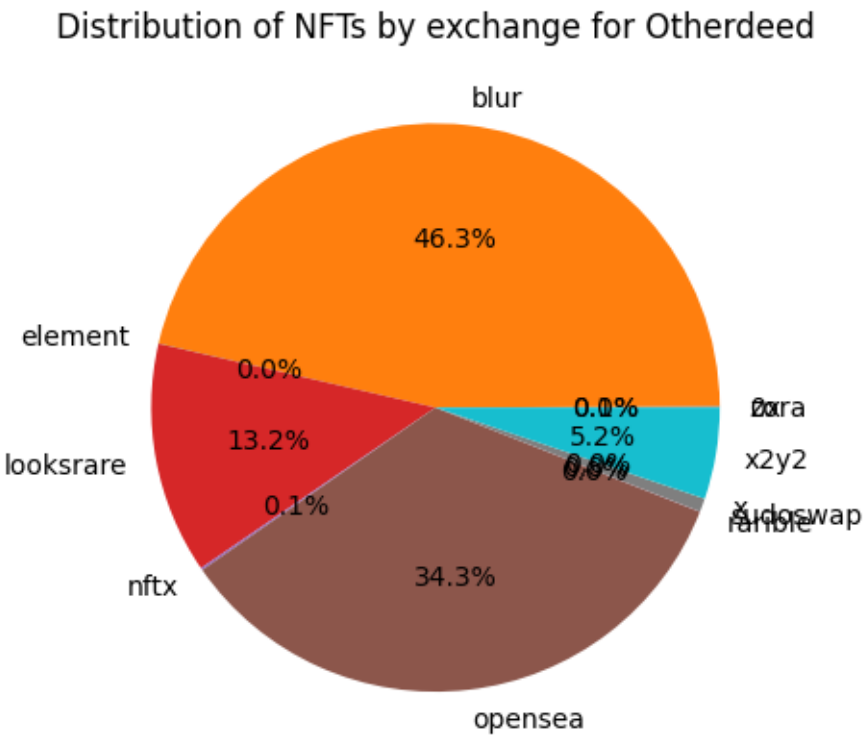
[9]:
```
mutantapeyatchclub_collection_exchangegrouped = mutantapeyatchclub_collection.
 ↪groupby(['exchange_name']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(mutantapeyatchclub_collection_exchangegrouped['counts'],␣
 ↪labels=mutantapeyatchclub_collection_exchangegrouped['exchange_name'],␣
 ↪autopct='%1.1f%%')
ax.set_title('Distribution of NFTs by exchange for MutantApeYachtClub')
plt.show()
print(mutantapeyatchclub_collection_exchangegrouped)
```



	exchange_name	counts
0	0x	46
1	blur	16355
2	looksrare	3726

3	nftx	66
4	opensea	37905
5	rarible	67
6	sudoswap	36
7	x2y2	2341
8	zora	2

[10]:
```
otherdeed_collection_exchangegrouped = otherdeed_collection.
  ↪groupby(['exchange_name']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(otherdeed_collection_exchangegrouped['counts'],␣
  ↪labels=otherdeed_collection_exchangegrouped['exchange_name'], autopct='%1.
  ↪1f%%')
ax.set_title('Distribution of NFTs by exchange for Otherdeed')
plt.show()
print(otherdeed_collection_exchangegrouped)
```

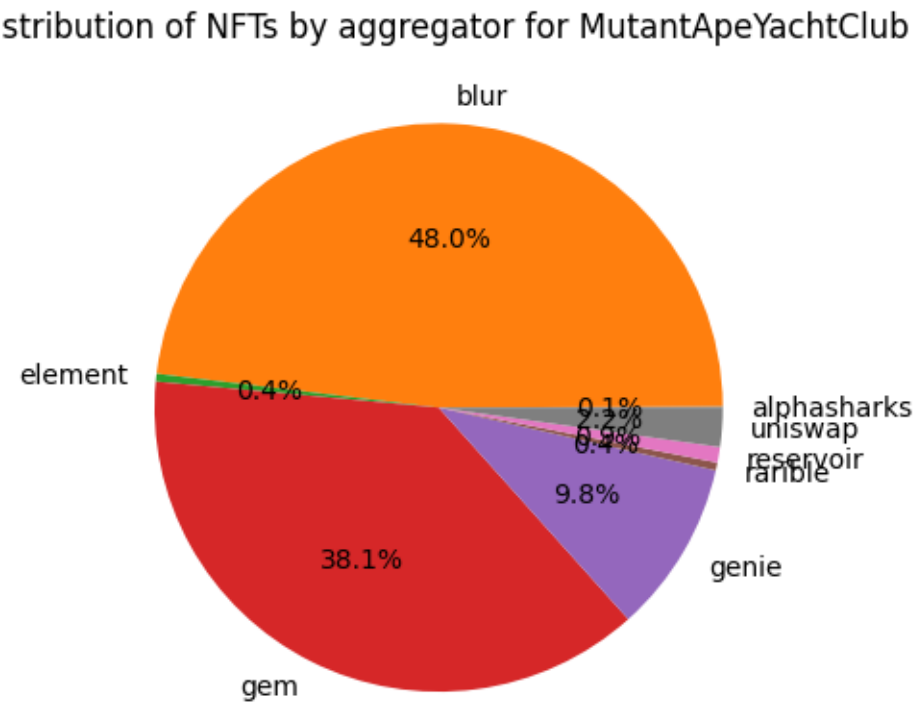


	exchange_name	counts
0	0x	127
1	blur	81355
2	element	18
3	looksrare	23139
4	nftx	226

5	opensea	60322
6	rarible	20
7	sudoswap	1345
8	x	8
9	x2y2	9129
10	zora	1

2.2.2 By aggregator_name

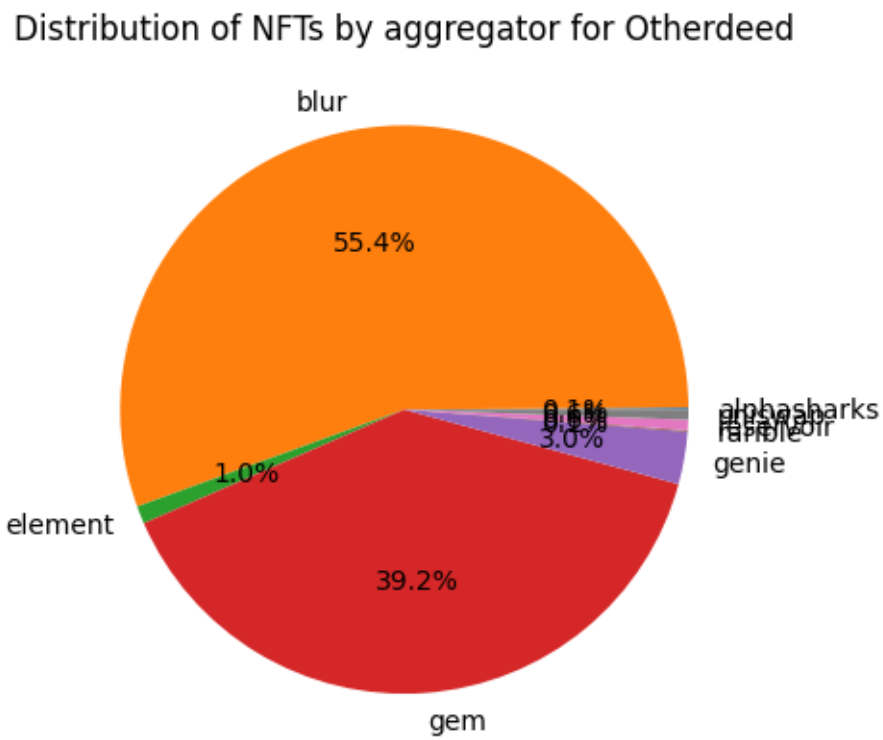
[11]:
```
mutantapeyatchclub_collection_aggregatorgrouped = mutantapeyatchclub_collection.
↪groupby(['aggregator_name']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(mutantapeyatchclub_collection_aggregatorgrouped['counts'],␣
↪labels=mutantapeyatchclub_collection_aggregatorgrouped['aggregator_name'],␣
↪autopct='%1.1f%%')
ax.set_title('Distribution of NFTs by aggregator for MutantApeYachtClub')
plt.show()
print(mutantapeyatchclub_collection_aggregatorgrouped)
```



	aggregator_name	counts
0	alphasharks	1
1	blur	758
2	element	7

```
3             gem     601
4           genie     155
5         rarible       7
6       reservoir      14
7         uniswap      35
```

[12]:
```
otherdeed_collection_aggregatorgrouped = otherdeed_collection.
 ↪groupby(['aggregator_name']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(otherdeed_collection_aggregatorgrouped['counts'],␣
 ↪labels=otherdeed_collection_aggregatorgrouped['aggregator_name'],␣
 ↪autopct='%1.1f%%')
ax.set_title('Distribution of NFTs by aggregator for Otherdeed')
plt.show()
print(otherdeed_collection_aggregatorgrouped)
```

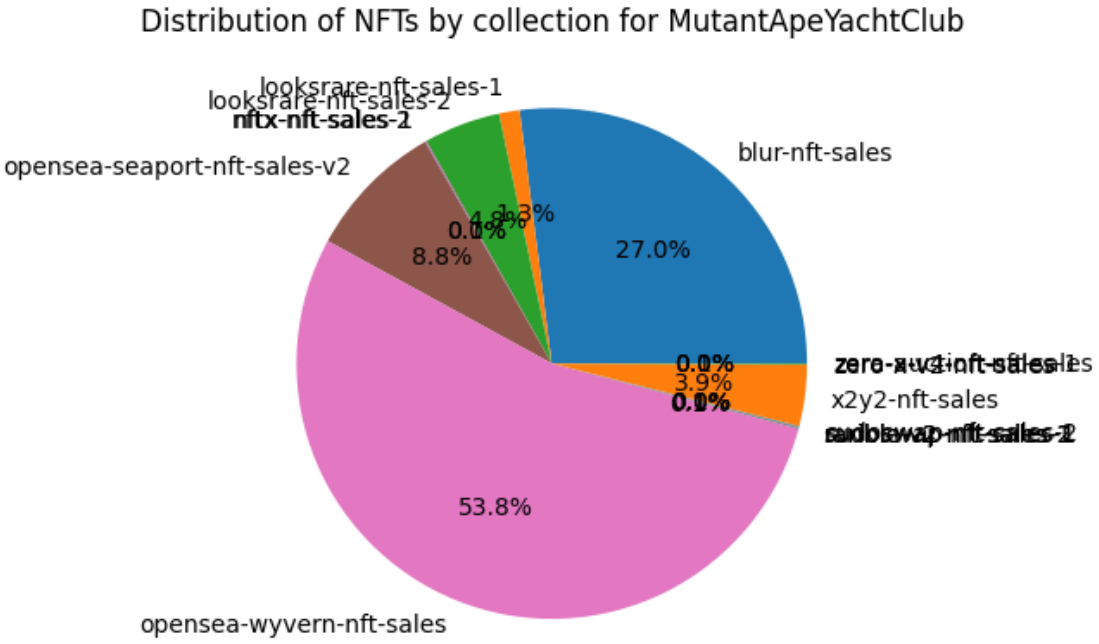



```
  aggregator_name  counts
0     alphasharks      21
1            blur   10311
2         element     188
3             gem    7296
4           genie     553
5         rarible      17
```

```
6       reservoir     110
7         uniswap     106
```

2.2.3 By indexer_id

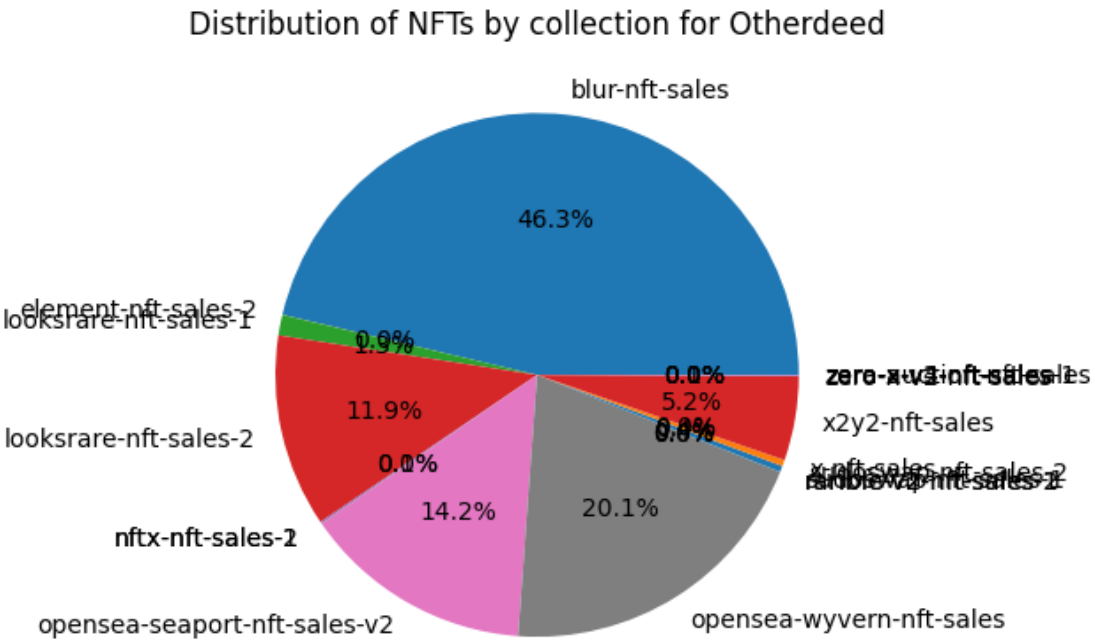
[13]:
```
mutantapeyatchclub_collection_indexedgrouped = mutantapeyatchclub_collection.
 ↪groupby(['__indexer_id']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(mutantapeyatchclub_collection_indexedgrouped['counts'],␣
 ↪labels=mutantapeyatchclub_collection_indexedgrouped['__indexer_id'],␣
 ↪autopct='%1.1f%%')
ax.set_title('Distribution of NFTs by collection for MutantApeYachtClub')
plt.show()
print(mutantapeyatchclub_collection_indexedgrouped)
```




```
                  __indexer_id  counts
0                blur-nft-sales   16355
1          looksrare-nft-sales-1     791
2          looksrare-nft-sales-2    2935
3               nftx-nft-sales-1      15
4               nftx-nft-sales-2      51
5   opensea-seaport-nft-sales-v2    5306
6       opensea-wyvern-nft-sales   32599
7         rarible-v2-nft-sales-1      64
8         rarible-v2-nft-sales-2       3
```

9	sudoswap-nft-sales-1	2
10	sudoswap-nft-sales-2	34
11	x2y2-nft-sales	2341
12	zero-x-v2-nft-sales	44
13	zero-x-v4-nft-sales-1	2
14	zora-auction-nft-sales	2

[14]:
```
otherdeed_collection_indexedgrouped = otherdeed_collection.
 ↪groupby(['__indexer_id']).size().reset_index(name='counts')
fig, ax = plt.subplots()
ax.pie(otherdeed_collection_indexedgrouped['counts'],␣
 ↪labels=otherdeed_collection_indexedgrouped['__indexer_id'], autopct='%1.
 ↪1f%%')
ax.set_title('Distribution of NFTs by collection for Otherdeed')
plt.show()
print(otherdeed_collection_indexedgrouped)
```



	__indexer_id	counts
0	blur-nft-sales	81355
1	element-nft-sales-2	18
2	looksrare-nft-sales-1	2217
3	looksrare-nft-sales-2	20922
4	nftx-nft-sales-1	186
5	nftx-nft-sales-2	40

```
6   opensea-seaport-nft-sales-v2   25000
7       opensea-wyvern-nft-sales   35322
8         rarible-v2-nft-sales-1      13
9         rarible-v2-nft-sales-2       7
10          sudoswap-nft-sales-1     673
11          sudoswap-nft-sales-2     672
12                   x-nft-sales       8
13                x2y2-nft-sales    9129
14           zero-x-v2-nft-sales     116
15           zero-x-v3-nft-sales       4
16         zero-x-v4-nft-sales-1       7
17        zora-auction-nft-sales       1
```

2.3 3. Determine the correlation between the number of transactions in a collection and its floor price

For this case, I did a manual analysis and understand each of the columns, but in itself there is not a strong correlation between the price and any attribute. This is due to several factors:

to. The expectation generated by the collections at the moment of appearing, generating very high prices for the demand, and then a substantial drop (but the data cannot explain that, since it would be biased to only use dates). b. The issues with the bear market in 2021 and 2022 that reduced NFT movements. c. The problems and scams in the crypto world in 2022, which discouraged many transactions for a while.

[15]:
```
mutantapeyatchclub_collection_grouped = mutantapeyatchclub_collection.
 ↪groupby('__indexer_id').agg({'usd_price': 'min', 'transactions': 'sum'})
mutantapeyatchclub_collection_grouped = mutantapeyatchclub_collection_grouped.
 ↪rename(columns={'usd_price': 'min_usd_price', 'transactions':␣
 ↪'total_transactions'})
correlation = mutantapeyatchclub_collection_grouped['total_transactions'].
 ↪corr(mutantapeyatchclub_collection_grouped['min_usd_price'])
print("Correlation for mutantapeyatchclub (-1 without correlation, and 1 with␣
 ↪much correlation): "+str(correlation))
```

```
Correlation for mutantapeyatchclub (-1 without correlation, and 1 with much
correlation): -0.3241059271106382
```

[16]:
```
otherdeed_collection_grouped = otherdeed_collection.groupby('__indexer_id').
 ↪agg({'usd_price': 'min', 'transactions': 'sum'})
otherdeed_collection_grouped = otherdeed_collection_grouped.
 ↪rename(columns={'usd_price': 'min_usd_price', 'transactions':␣
 ↪'total_transactions'})
correlation = otherdeed_collection_grouped['total_transactions'].
 ↪corr(otherdeed_collection_grouped['min_usd_price'])
print("Correlation for otherdeed (-1 without correlation, and 1 with much␣
 ↪correlation): "+str(correlation))
```

```
Correlation for otherdeed (-1 without correlation, and 1 with much correlation):
-0.364446383761314
```

2.4 4. Determine the correlation between the number of transactions in a collection and the price of ETH

This case is similar to the third question, but here I am using the ETH price column.

[17]:
```
mutantapeyatchclub_collection_grouped = mutantapeyatchclub_collection.
 ↪groupby('__indexer_id').agg({'eth_price': 'min', 'transactions': 'sum'})
mutantapeyatchclub_collection_grouped = mutantapeyatchclub_collection_grouped.
 ↪rename(columns={'eth_price': 'min_eth_price', 'transactions':␣
 ↪'total_transactions'})
correlation = mutantapeyatchclub_collection_grouped['total_transactions'].
 ↪corr(mutantapeyatchclub_collection_grouped['min_eth_price'])
print("Correlation for mutantapeyatchclub (-1 without correlation, and 1 with␣
 ↪much correlation): "+str(correlation))
```

```
Correlation for mutantapeyatchclub (-1 without correlation, and 1 with much
correlation): -0.29847069648971963
```

[18]:
```
otherdeed_collection_grouped = otherdeed_collection.groupby('__indexer_id').
 ↪agg({'eth_price': 'min', 'transactions': 'sum'})
otherdeed_collection_grouped = otherdeed_collection_grouped.
 ↪rename(columns={'eth_price': 'min_eth_price', 'transactions':␣
 ↪'total_transactions'})
correlation = otherdeed_collection_grouped['total_transactions'].
 ↪corr(otherdeed_collection_grouped['min_eth_price'])
print("Correlation for otherdeed (-1 without correlation, and 1 with much␣
 ↪correlation): "+str(correlation))
```

```
Correlation for otherdeed (-1 without correlation, and 1 with much correlation):
-0.38757877204817787
```

2.5 5. What are the most liquid traits (those with the most sales) for each collection?

A simple analysis was made to obtain for each indexer, the NFT (by ID) that had the most sales. That was valued instead of the amount of the sale, because an NFT that "moves" a lot in different transactions looks more valuable than an NFT with only one very high sale, but which is no longer liquid.

2.5.1 mutantapeyatchclub

[19]:
```
nft_most_sales = mutantapeyatchclub_collection.groupby(['__indexer_id',␣
 ↪'token_id']).agg({'eth_price': 'max', 'transactions': 'sum'})

nft_most_sales = nft_most_sales.reset_index()
```

```
for collection in nft_most_sales['__indexer_id'].unique():
    nft_most_sales_collection = nft_most_sales[nft_most_sales['__indexer_id']␣
 ↪== collection]
    most_sales = nft_most_sales_collection['transactions'].max()
    best_seller =␣
 ↪nft_most_sales_collection[nft_most_sales_collection['transactions'] ==␣
 ↪most_sales]['token_id'].values[0]
    print(f"NFT with most sales in {collection} collection is: {best_seller}␣
 ↪with {most_sales} sales")
```

```
NFT with most sales in blur-nft-sales collection is: 2994 with 73 sales
NFT with most sales in looksrare-nft-sales-1 collection is: 7397 with 6 sales
NFT with most sales in looksrare-nft-sales-2 collection is: 2738 with 11 sales
NFT with most sales in nftx-nft-sales-1 collection is: 833 with 1 sales
NFT with most sales in nftx-nft-sales-2 collection is: 13608 with 3 sales
NFT with most sales in opensea-seaport-nft-sales-v2 collection is: 1294 with 10
sales
NFT with most sales in opensea-wyvern-nft-sales collection is: 5026 with 16
sales
NFT with most sales in rarible-v2-nft-sales-1 collection is: 3059 with 5 sales
NFT with most sales in rarible-v2-nft-sales-2 collection is: 5120 with 1 sales
NFT with most sales in sudoswap-nft-sales-1 collection is: 13914 with 1 sales
NFT with most sales in sudoswap-nft-sales-2 collection is: 17516 with 3 sales
NFT with most sales in x2y2-nft-sales collection is: 1911 with 9 sales
NFT with most sales in zero-x-v2-nft-sales collection is: 4526 with 3 sales
NFT with most sales in zero-x-v4-nft-sales-1 collection is: 13676 with 1 sales
NFT with most sales in zora-auction-nft-sales collection is: 6721 with 1 sales
```

2.5.2 Otherdeed

[20]:
```
nft_most_sales = otherdeed_collection.groupby(['__indexer_id', 'token_id']).
 ↪agg({'eth_price': 'max', 'transactions': 'sum'})

nft_most_sales = nft_most_sales.reset_index()

for collection in nft_most_sales['__indexer_id'].unique():
    nft_most_sales_collection = nft_most_sales[nft_most_sales['__indexer_id']␣
 ↪== collection]
    most_sales = nft_most_sales_collection['transactions'].max()
    best_seller =␣
 ↪nft_most_sales_collection[nft_most_sales_collection['transactions'] ==␣
 ↪most_sales]['token_id'].values[0]
    print(f"NFT with most sales in {collection} collection is: {best_seller}␣
 ↪with {most_sales} sales")
```

```
NFT with most sales in blur-nft-sales collection is: 95769 with 95 sales
```

```
NFT with most sales in element-nft-sales-2 collection is: 51452 with 2 sales
NFT with most sales in looksrare-nft-sales-1 collection is: 87679 with 6 sales
NFT with most sales in looksrare-nft-sales-2 collection is: 30894 with 24 sales
NFT with most sales in nftx-nft-sales-1 collection is: 55593 with 2 sales
NFT with most sales in nftx-nft-sales-2 collection is: 25273 with 1 sales
NFT with most sales in opensea-seaport-nft-sales-v2 collection is: 52759 with 11
sales
NFT with most sales in opensea-wyvern-nft-sales collection is: 55343 with 18
sales
NFT with most sales in rarible-v2-nft-sales-1 collection is: 68043 with 2 sales
NFT with most sales in rarible-v2-nft-sales-2 collection is: 14507 with 1 sales
NFT with most sales in sudoswap-nft-sales-1 collection is: 45916 with 3 sales
NFT with most sales in sudoswap-nft-sales-2 collection is: 50505 with 4 sales
NFT with most sales in x-nft-sales collection is: 10057 with 1 sales
NFT with most sales in x2y2-nft-sales collection is: 93056 with 39 sales
NFT with most sales in zero-x-v2-nft-sales collection is: 10686 with 3 sales
NFT with most sales in zero-x-v3-nft-sales collection is: 8468 with 1 sales
NFT with most sales in zero-x-v4-nft-sales-1 collection is: 50706 with 1 sales
NFT with most sales in zora-auction-nft-sales collection is: 91008 with 1 sales
```