

Unveiling GitHub Developer Influence on Token Values

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Introduction

Cryptocurrency projects are often judged by their token prices, which can fluctuate dramatically based on market sentiment and real-world developments. However, one key factor that may influence token values is the activity and engagement of the developers behind the projects. This report aims to analyze the relationship between GitHub developer metrics and token prices for five prominent cryptocurrency projects: Ocean Protocol, Bittensor, Fetch.AI, Oraichain, Numerai, and SingularityNET. By examining data points such as commit frequency, repository creation, and other indicators of developer activity, we will uncover potential correlations with token price movements.

```
dimension of bittensor_repos : (31, 50)
dimension of fetchai_repos : (57, 50)
dimension of numerai_repos : (21, 50)
dimension of oceanprotocol_repos : (81, 50)
dimension of oraichain_repos : (119, 50)
dimension of singularitynet_repos : (125, 50)
```

```
dimension of bittensor_issues : (3373, 42)
dimension of fetchai_issues : (9209, 60)
dimension of numerai_issues : (594, 42)
dimension of oceanprotocol_issues : (17739, 60)
dimension of oraichain_issues : (2854, 60)
dimension of singularitynet_issues : (9355, 60)
```

```
dimension of bittensor_commits : (25005, 30)
dimension of fetchai_commits : (44432, 30)
dimension of numerai_commits : (2731, 30)
dimension of oceanprotocol_commits : (36042, 30)
dimension of oraichain_commits : (22681, 30)
dimension of singularitynet_commits : (28138, 30)
```

Preprocessing, EDA

1. **Convert json files to csv:** in the first step json files converted to flatten csv files. Since the json files had irregular nested architecture, within a recursive function we obtained a regular nested architecture and then using `df = pd.json_normalize(result)` we flatten the data and turn it to CSV.
2. **Remove URL columns :** Most column of the obtained csv files had URL data which were useless in analysis. Therefor we removed all these column to achieve a lighter and useful dataset.
3. **Encoding the categorical values:** values like `author.type` and `committer.type` (commits), `owner.type` (repo), `user.type` (issue) , `has_issues` , `archived`, `has_projects` , `has_wiki` , `has_pages` , `has_discussions`, `is_template` had categorical values as is shown in the next page. These values converted to numeric values.
4. **Grouping the remaining columns:** fields of all dataset were not reported daily and their time interval were irregular, because of that I grouped the dataset records daily to have a unique date time in dataset. I grouped repos and issues based on `created_at` and grouped commits based on `commit.committer.date`

```
import json

def replace_in_dict(data):
    if isinstance(data, dict):
        for key, value in data.items():
            if isinstance(value, (dict, list)):
                replace_in_dict(value)
            else:
                data[key] = str(value).replace('\r\n\r\n\r\n*', ' ').replace(
                    '\r\r\n\r\n', ' ').replace('\r\r\n\r', ' ').replace(
                    '\r\r', ' ').replace('\r', ' ').replace('\n', ' ').replace(
                    '*', ' ').replace('\"', ' ')
    elif isinstance(data, list):
        for i, item in enumerate(data):
            if isinstance(item, (dict, list)):
                replace_in_dict(item)
            else:
                data[i] = str(item).replace('\r\n\r\n\r\n*', ' ').replace(
                    '\r\r\n\r\n', ' ').replace('\r\r\n\r', ' ').replace(
                    '\r\r', ' ').replace('\r', ' ').replace('\n', ' ').replace(
                    '|*', ' ').replace('\"', ' ')
    return data
```

Figure1. recursive function to convert irregular nested data to regular one

Preprocessing, EDA

encoding categorical values

Values of remaining columns of three repo, issue and commits datasets are listed in below:

- author.type and committer.type(commits), owner.type(repo), user.type(issue) : ['User' nan 'Bot' 'Organization']

we then convert it to Boolean type with {1: User, org} {0: nan , Bot}

- has_issues , archived, has_projects , has_wiki , has_pages , has_discussions, is_template (repos) : ['True' , 'False']

we then convert it to Boolean type with {1: True} {0: False}

Grouping the remaining columns

In order to group the irregular samples in daily intervals I used the following aggregation function for each column.

- All kind of 'id's : count non-zero values to obtain the number of individuals
`(lambda x: np.count_nonzero(np.unique(x)))`
- 'repo.size', 'comments', 'reactions.total_count': sum
- All count numbers like 'stargazers_count' , 'watchers_count' , 'forks_count' , ... : sum,
- All boolean values like 'has_issues', 'user_type', 'has_pages' , ...: calculate the portion of True values, by counting them and dividing to the number of samples
`(lambda x: (x == 1).sum() / len(x))`

Preprocessing, EDA

```
df = pd.read_csv('remove_equal_columns_repo/bittensor.csv')
df.head()
✓ 0.0s
```

	id	size	stargazers_count	forks_count	open_issues_count	has_issues	archived	has_wiki	has_discussions	is_template
0	1	164	7	54	16	1.0	0.0	1.0	0.0	0.0
1	1	1871	5	9	0	1.0	0.0	1.0	0.0	0.0
2	2	152	1	2	1	1.0	0.0	1.0	0.0	0.0
3	2	124	1	3	0	1.0	0.0	0.5	0.0	0.0
4	1	336	44	58	19	1.0	0.0	1.0	0.0	1.0



The left table shows the bittensor repo dataset. In repositories only these 9 columns have been chosen to analyze, however the number of sample in repos dataset is low and one can not accurately predict and analysis the trends and correlations. id is the number of repos per day

```
df = pd.read_csv('remove_equal_columns_commit/bittensor.csv')
df.head()
✓ 0.0s
```

	node_id	commit.comment_count	author.id	committer.id	author.type	committer.type
0	2	0	2	1	1.000000	1.000000
1	30	0	12	3	0.800000	0.800000
2	35	0	19	4	0.971429	0.971429
3	29	0	8	5	0.931034	0.931034
4	39	0	10	3	0.538462	0.589744



The right table shows the bittensor commits dataset. Node_id , author_id and committers_id show the number of commits, commit authors and commit committers per day respectively.

```
df = pd.read_csv('remove_equal_columns_issue/bittensor.csv')
df.head()
✓ 0.0s
```

	id	comments	reactions.total_count	reactions.+1	reactions.-1	reactions.confused	reactions.heart	reactions.rocket	reactions.laugh	reactions.hooray	user.type
0	4	0	0	0	0	0	0	0	0	0	1.0
1	5	3	0	0	0	0	0	0	0	0	1.0
2	11	0	0	0	0	0	0	0	0	0	1.0
3	25	3	0	0	0	0	0	0	0	0	1.0
4	6	0	0	0	0	0	0	0	0	0	1.0



The left table shows the bittensor issue dataset. As can be seen the reaction columns are very sparse and they are ignored in the nest analysis and only the 4 columns of id , comments, total_reaction and user.type will be analyzed. Where id is the number of issues per day

Covered time for each dataset and their overlap

Repos dataset

```
bittensor : start_year : 2023-03-23    end_year : 2024-04-30
fetchai :  start_year : 2019-03-21    end_year : 2024-04-04
numerali : start_year : 2018-09-27    end_year : 2023-12-20
singularitynet : start_year : 2018-03-26    end_year : 2024-05-02
oceanprotocol : start_year : 2019-05-14    end_year : 2024-05-02
oraichain :  start_year : 2020-11-27    end_year : 2024-05-08
2018-03-26
2024-05-08
Overlap years: 2023-03-23 to 2023-12-20
```

commits dataset

```
bittensor : start_year : 2023-03-05    end_year : 2024-05-08
fetchai :  start_year : 2019-03-02    end_year : 2024-04-30
numerali : start_year : 2017-11-09    end_year : 2024-05-07
singularitynet : start_year : 2018-02-12    end_year : 2024-05-08
oceanprotocol : start_year : 2019-05-06    end_year : 2024-05-07
oraichain :  start_year : 2020-10-28    end_year : 2024-05-08
2017-11-09
2024-05-08
Overlap years: 2023-03-05 to 2024-04-30
```

issues dataset

```
bittensor : start_year : 2023-03-06    end_year : 2024-05-08
fetchai :  start_year : 2019-03-02    end_year : 2024-05-07
numerali : start_year : 2017-11-11    end_year : 2024-05-06
singularitynet : start_year : 2018-01-29    end_year : 2024-05-07
oceanprotocol : start_year : 2019-05-06    end_year : 2024-05-08
oraichain :  start_year : 2020-10-30    end_year : 2024-05-08
2017-11-11
2024-05-08
Overlap years: 2023-03-06 to 2024-05-06
```

In repo dataset, bittensor has the least recorded data and is the newest tokens which was started in 2023. numerali and singularitynet are the oldest tokens with more than 5 years of github activity.

The exact start date is different for each project in the 3 dataset for at most 1 month.

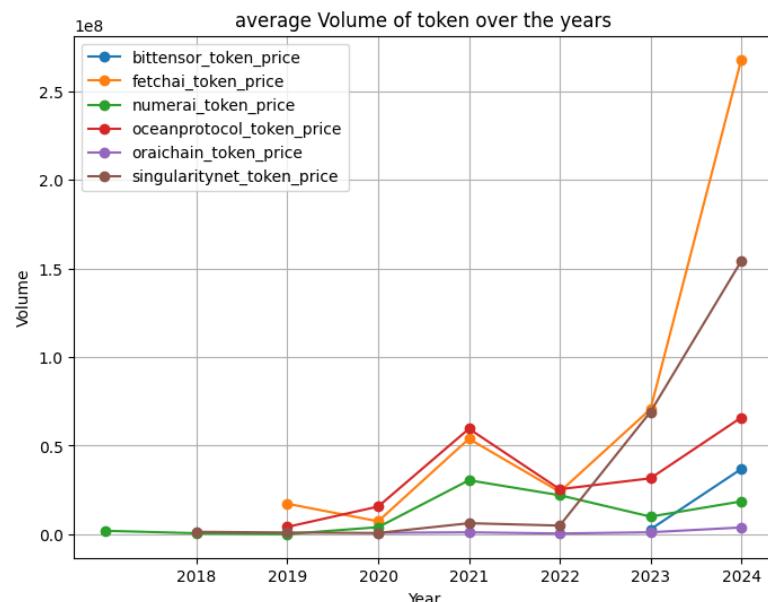
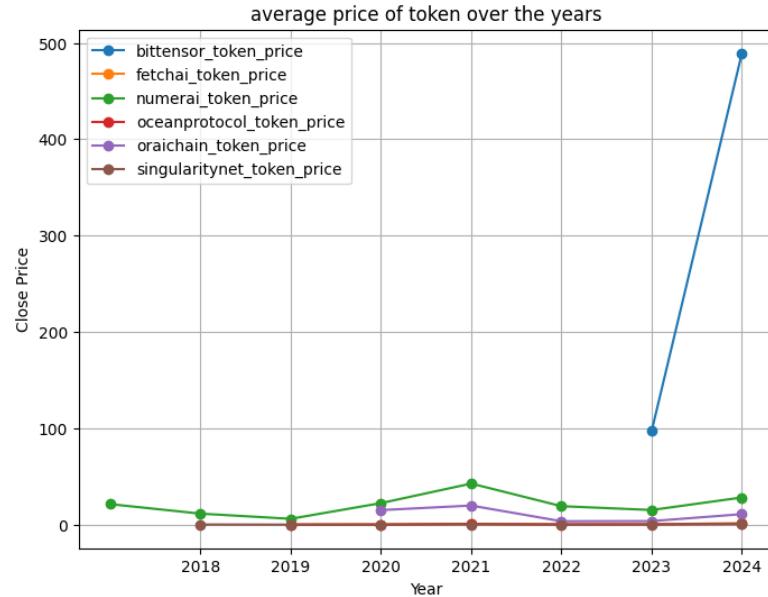
The overlap time for all projects is about 1 year

- For repositories 2023-3 to 2023-12
- For commits 2023-3 to 2024-04
- For issues 2023-03 to 2024-05

Key finding

Find and incorporate data on social media activity related to the project, or data on partnerships and collaborations to add another layer of insights to your analysis.

EDA (average price and volume of tokens over the years)



Its pretty interesting and bizarre, while bittensor is the newest token but its average increases very rapidly and has reached from 100 \$ to 450\$ just in less than a year which means nearly 350% growth!!!!!!

The other 5 tokens havent change significantly and they have changed slow and uniformly ...

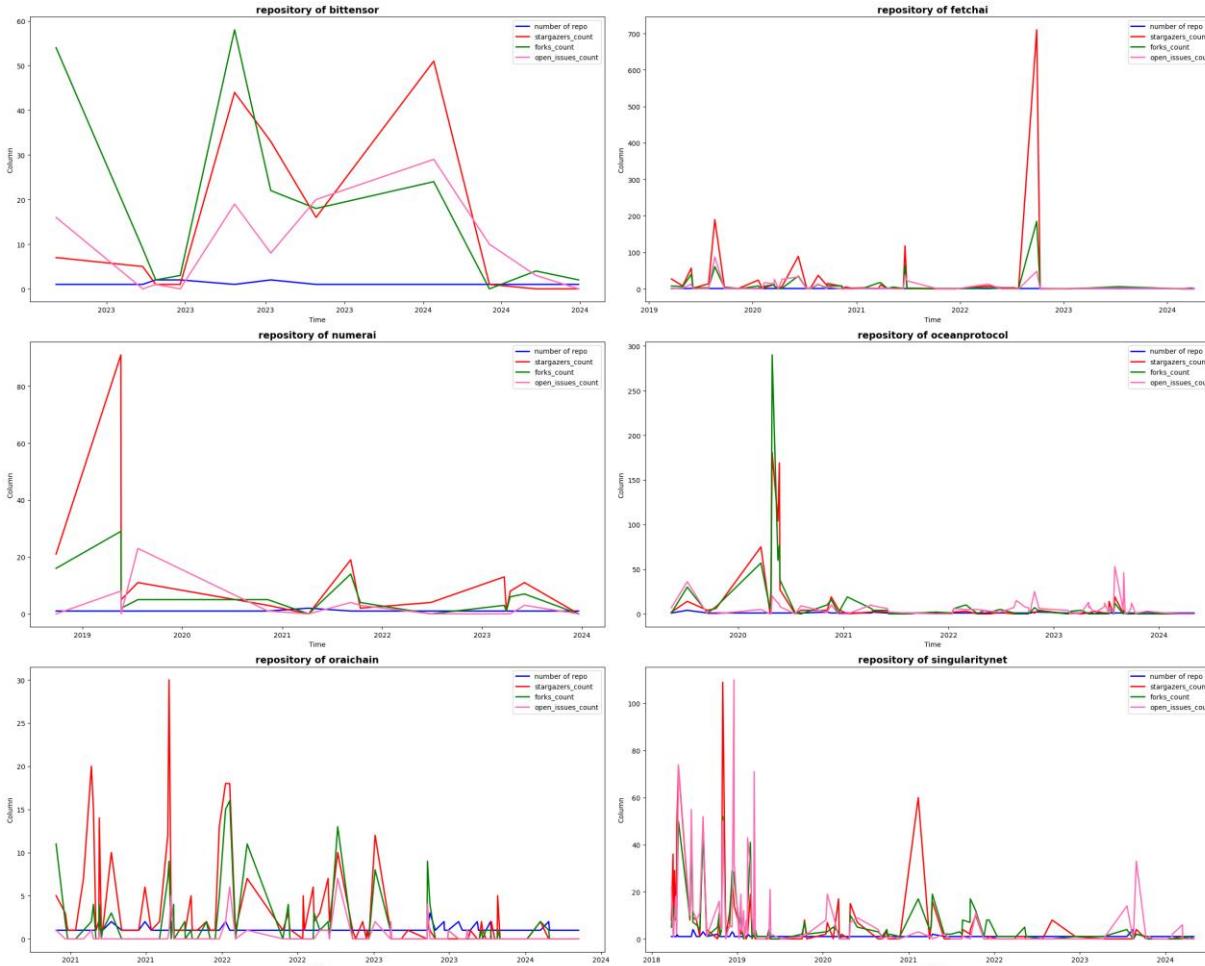
The average volume trend for the datasets is however different form the price. All the 6 tokens have a rise in the amount of volume transactions since 2022.

Fetchai is in the lead in 2024 with more than 250 million and the second one is singularitynet with 150 million.

Oraichai and numerai stand at the last of the list with less than 50 million

Rank Projects by Activity (repos)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.

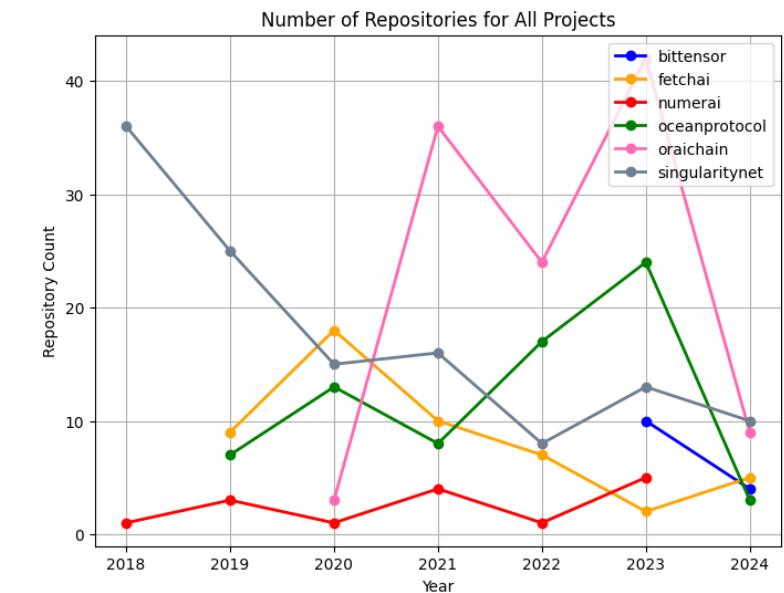
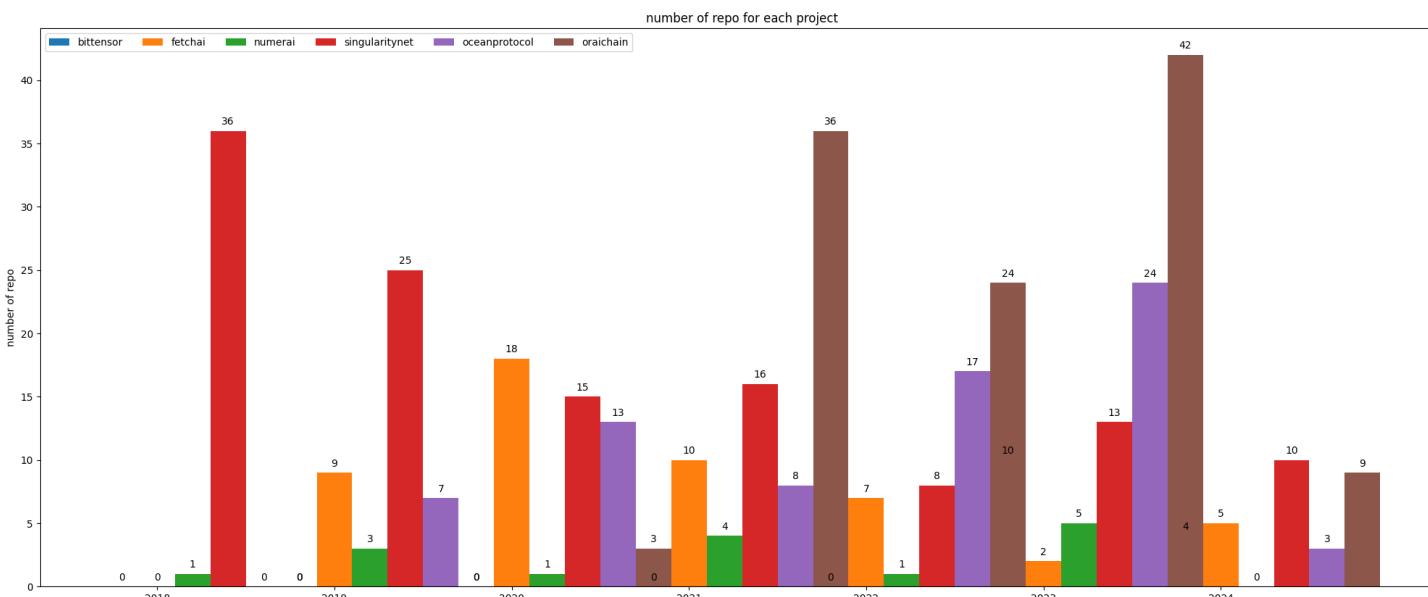


These figures shows the trends and changes of repositories through the time. The following insights can be drawn from the figure

- **Bittensor:** the number of repos remains the same in all these years but forks , open issues and stragazers had two picks in early of 2023 and early of 2024. but to the last of 2024 they tends to zero
- **Fetchai:** the number of stragazers dramatically grew in the last of 2022 to 700 and also the fork_count increased in those times to 200 which were unprecedented. In the other times their trend was uniform
- **ocean:** the number of fork and stragazers dramatically grew in the mid of 2021-2022 to 300 and 150 respectively but in the other times it remains the same
- **The two singularity and oraicahin repo metrics except of the number of repos fluctuate heavily over these years however the rate of their fluctuations decreased slightly as time passed**

Rank Projects by Activity (repos)

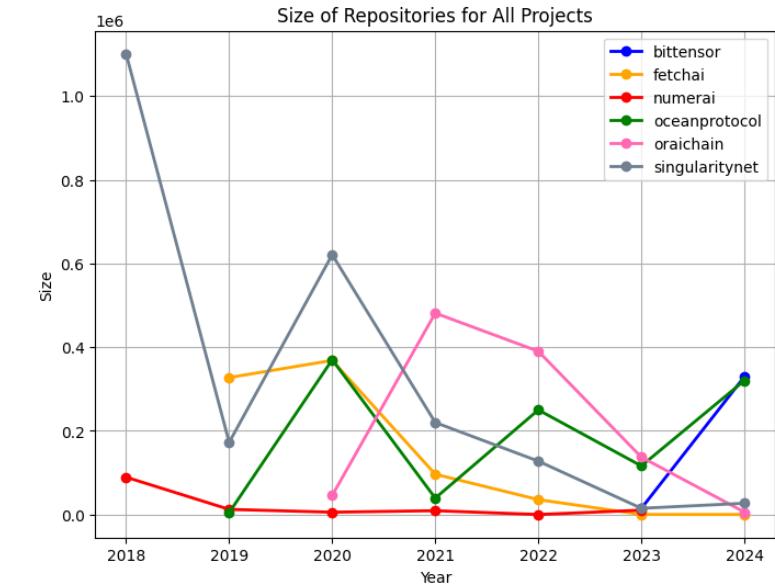
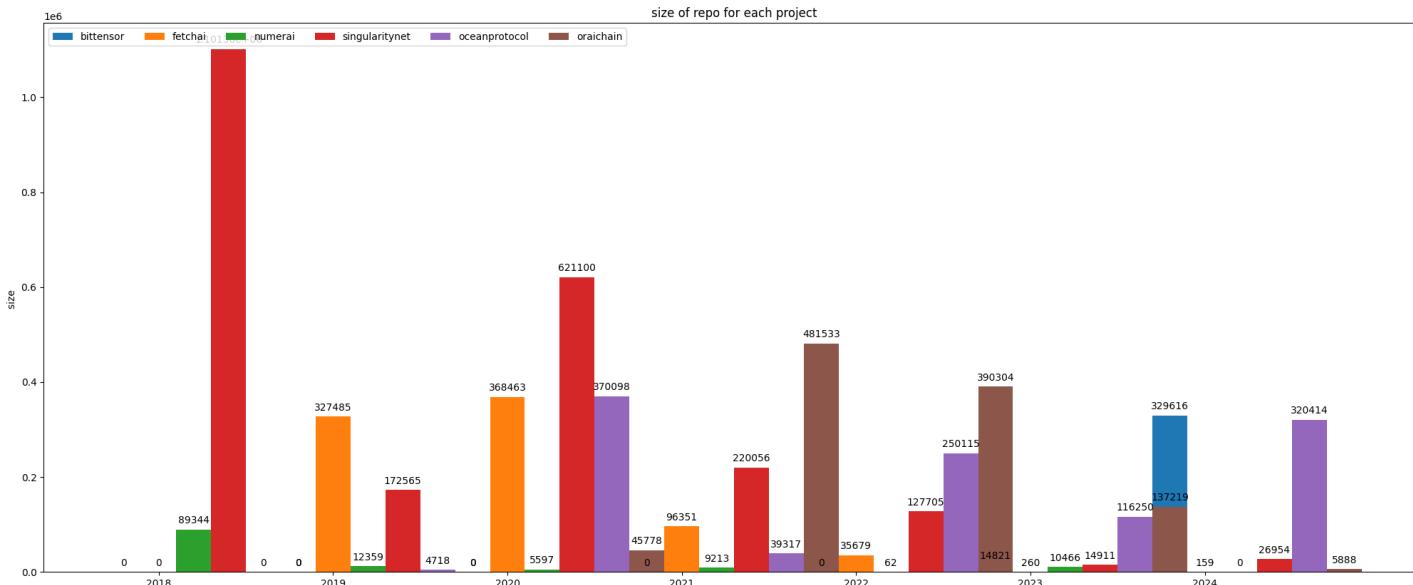
Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.



Based on the results, oraichain has the most number of repos with a significant fluctuations in each years but since 2021 to 2023 it stood in the first place regarding to the umber of repos. singularity repos number starts with 36 in 2018 but it fell down year by year. Numerai has the minimum number of repos (below10) with no significant changes through these years

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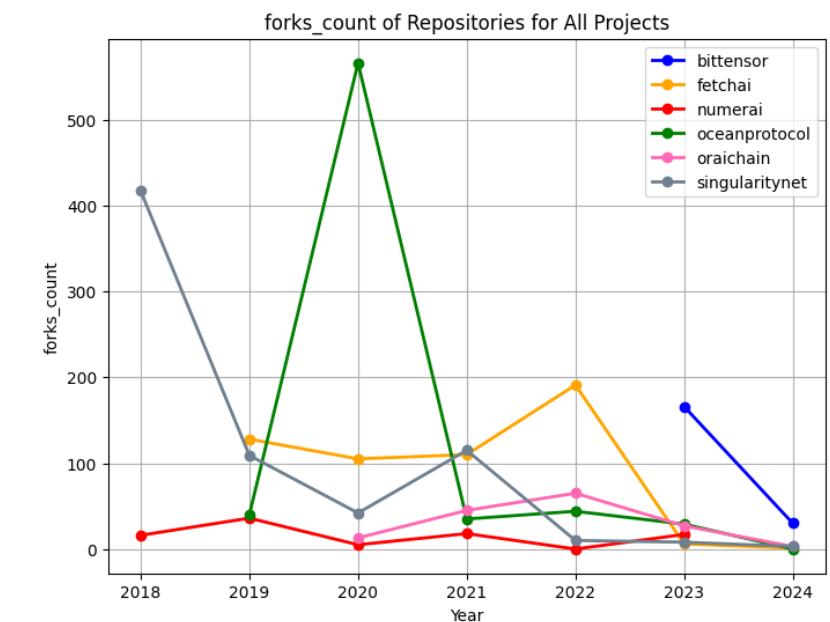
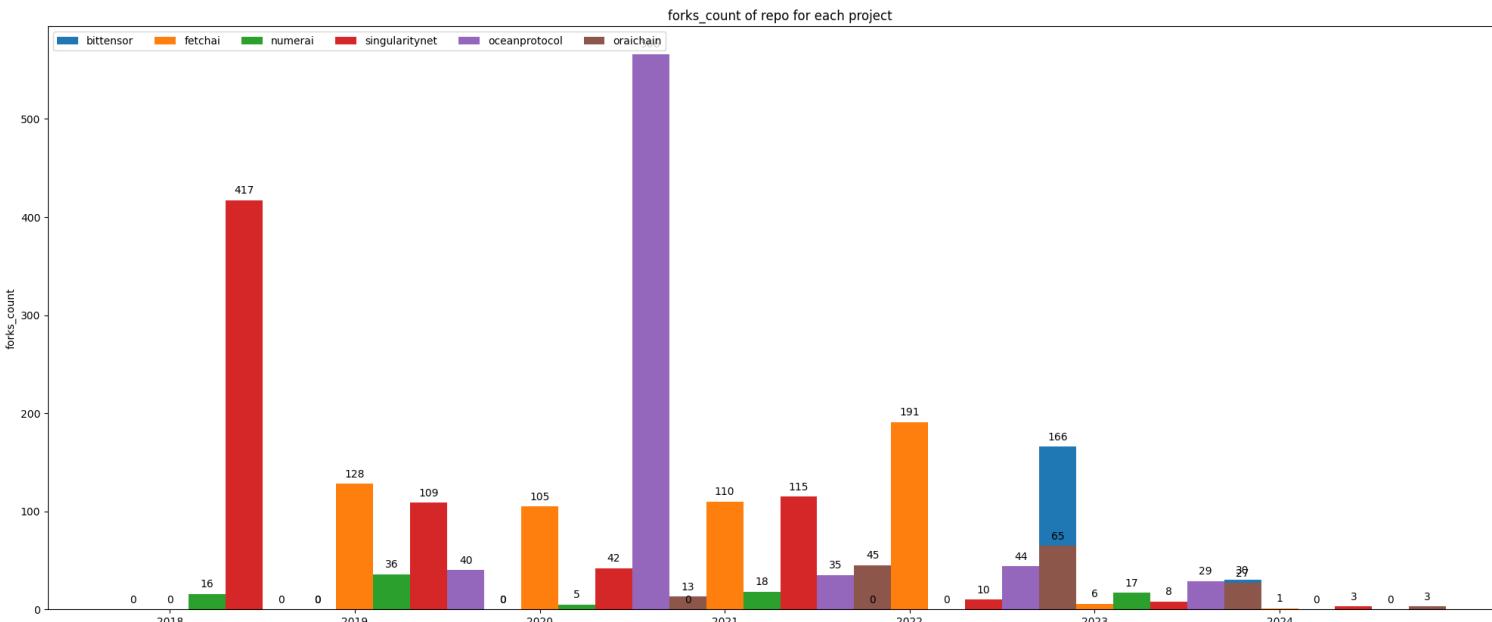


The above figures shows the size of repos over the last years

Based on the results, singularity had the biggest repo size in 2018 about 1 million but it reduced in the next yeas. Although none of the other tokens reached this size. The other tokens had fluctuations over these years but numerai has the lowest amount of size with no fluctuations at all !!!

Rank Projects by Activity (repos)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.

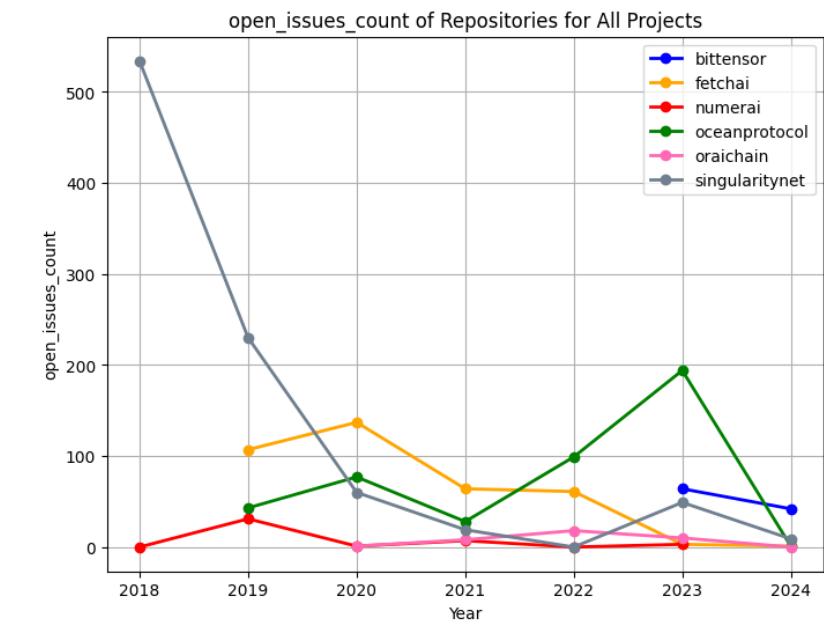
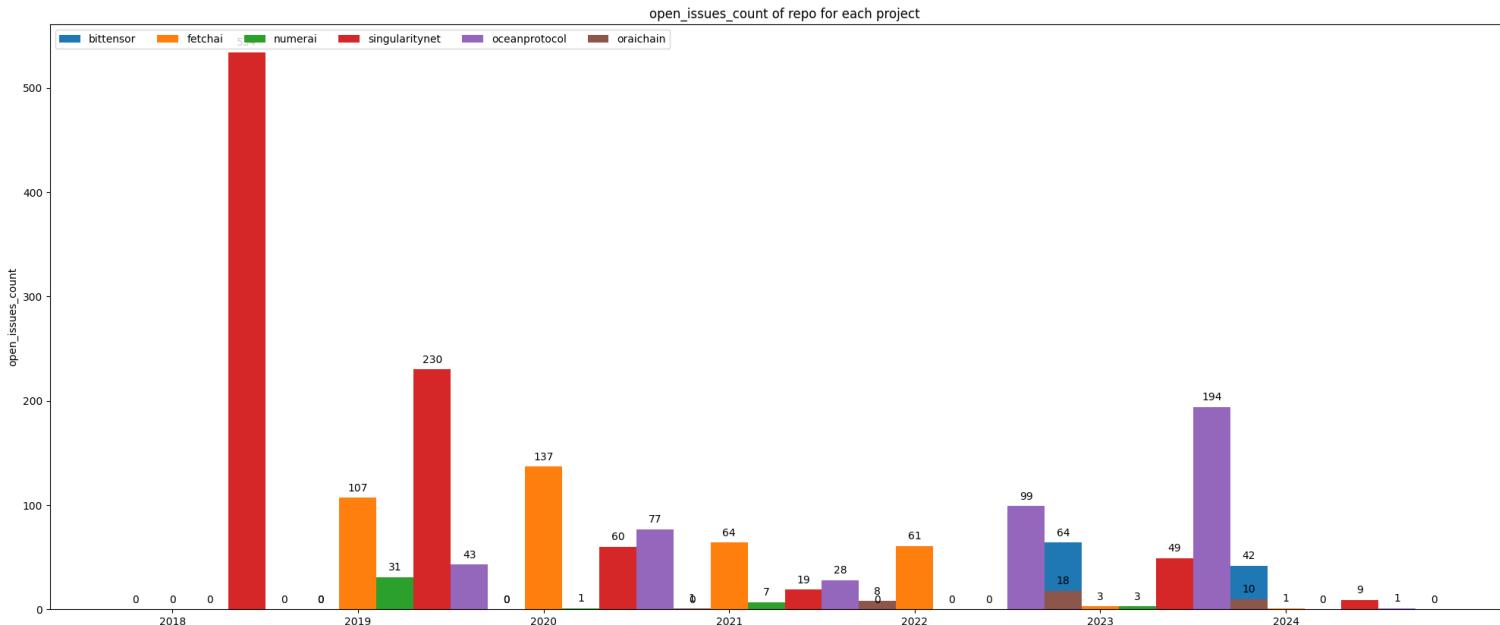


The above figures shows the number forks of repos over the last years

Ocean has been at the top in 2020 with more than 500 forks but in the next year it decreased to below 100 forks . In the second place singularity stands when its had mode than 417 fork in 2018 but then it fell down . The other tokens had below 200 fork over these years.

Rank Projects by Activity (repos)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.



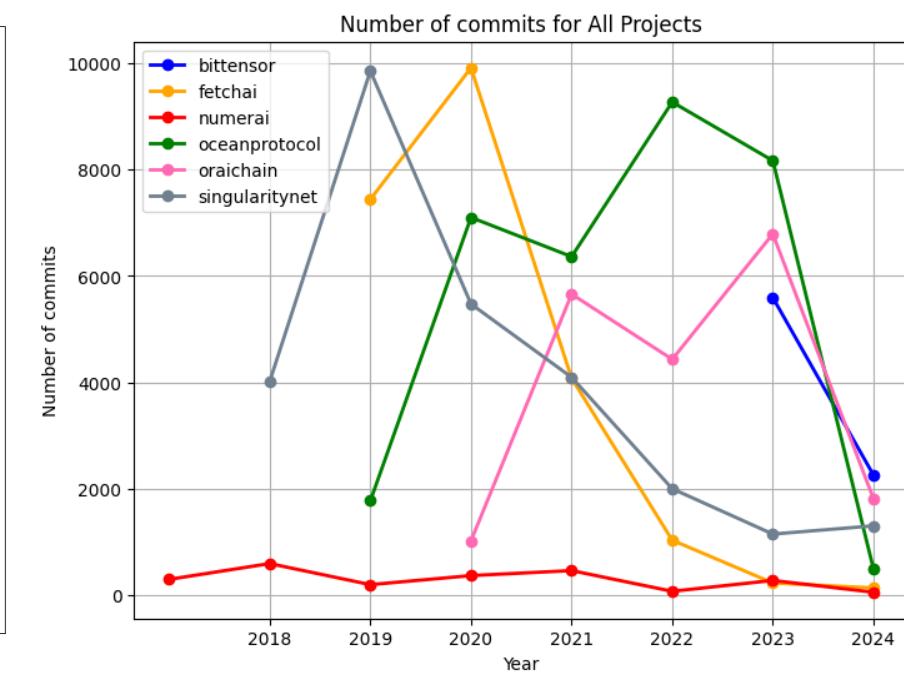
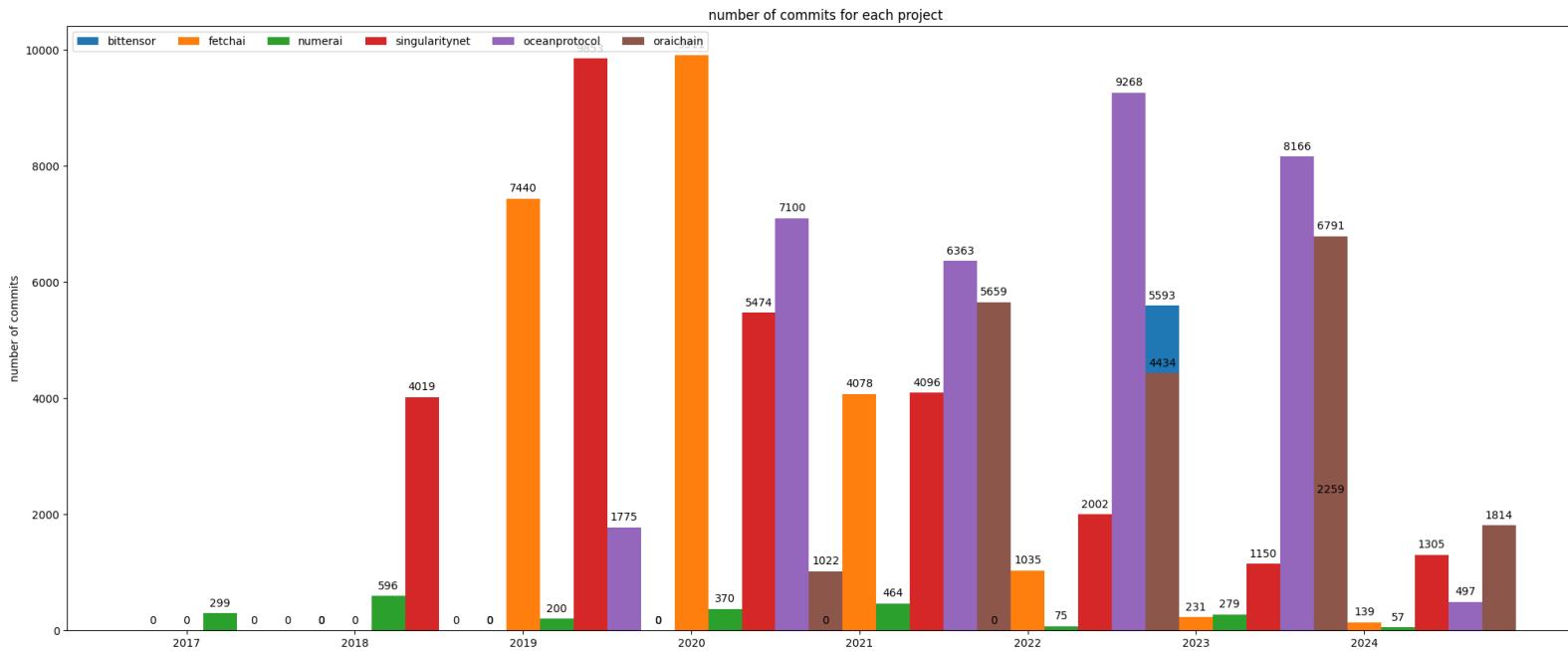
The above figures shows the number open issues of repos over the last years

Singularity has the most amount of open issues in 2018 with more than 500 and like the other previous metrics it decreased in the next years.

Ocean also had a pick in 2023 with 194 open issues, but the other tokens fluctuated gradually with no dramatic changes

Rank Projects by Activity (commits)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.



The above figures shows the number commits over the last years

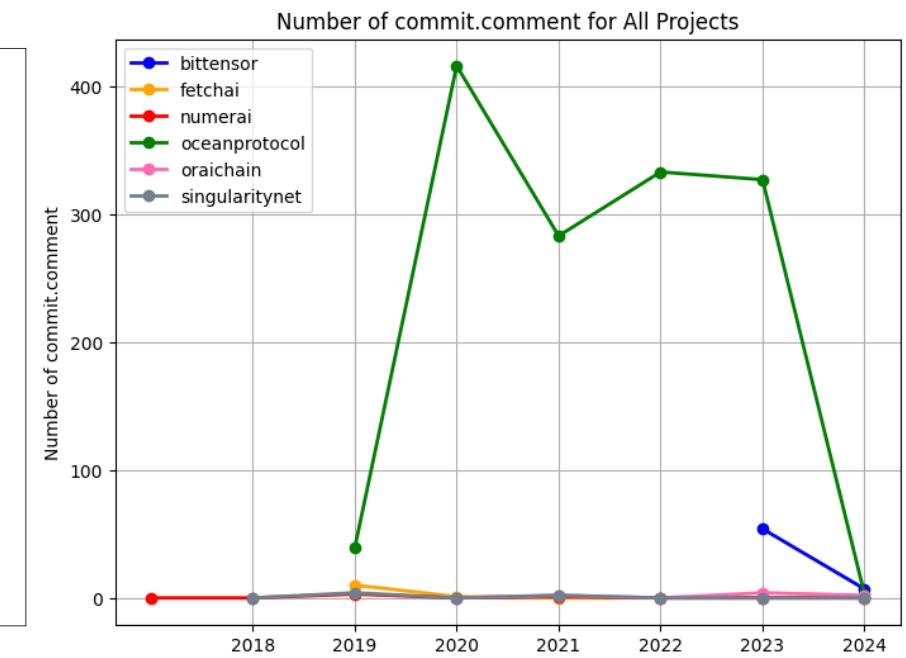
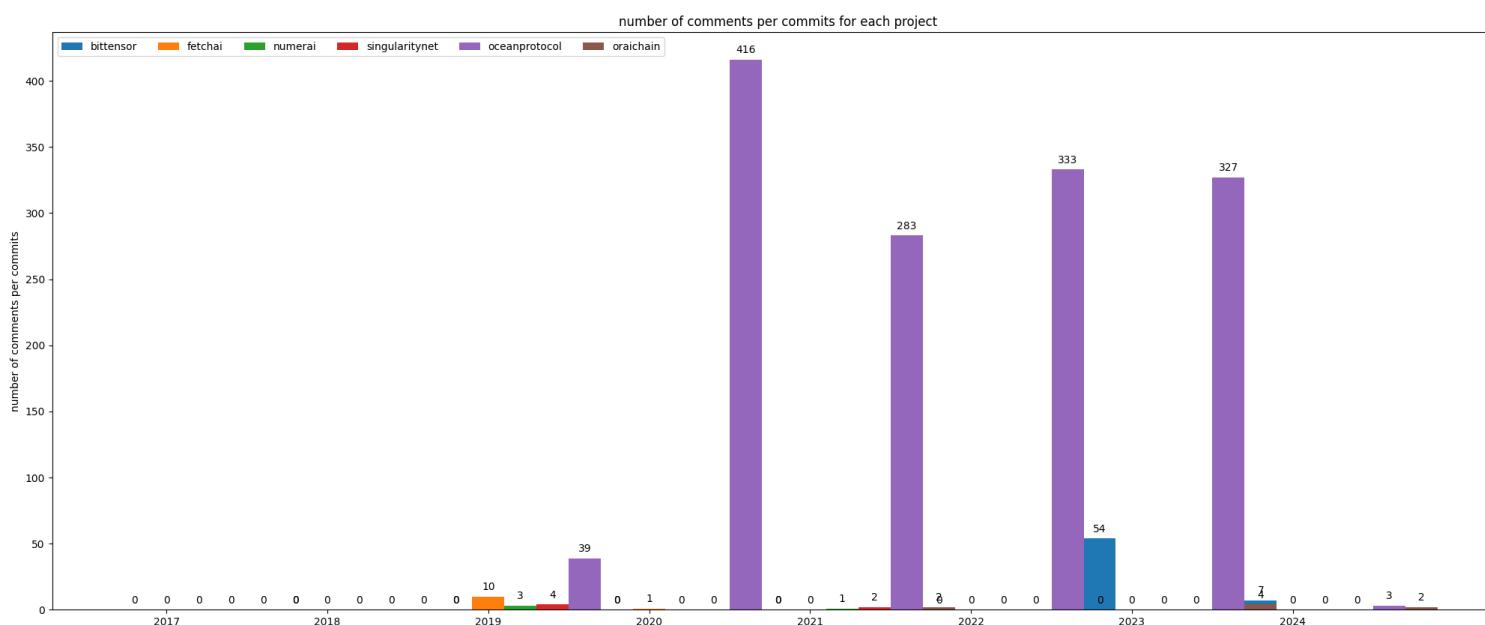
Singularity in 2019 and fetchai in 2020 had around 10000 commits while their commit docreased in the next years and it reached to below 2000 in 2024.

ocean also was at the pick with 9268 commits in 2022 and 8100 in 2023 but it also declined in 2024.

The numerai like before is the last token respect to its number of commits and remains without any changes during these time!!!

Rank Projects by Activity (commits)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.

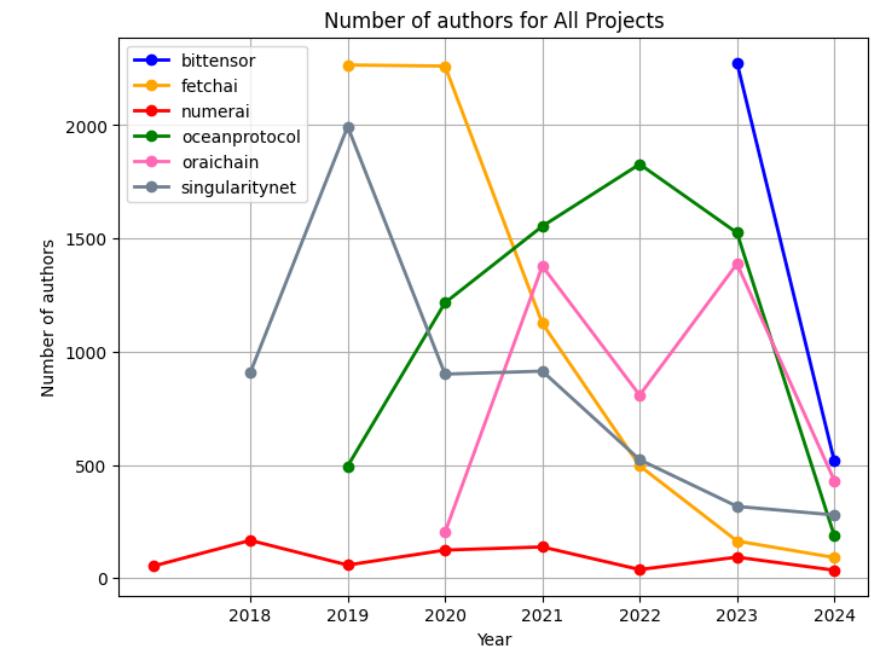
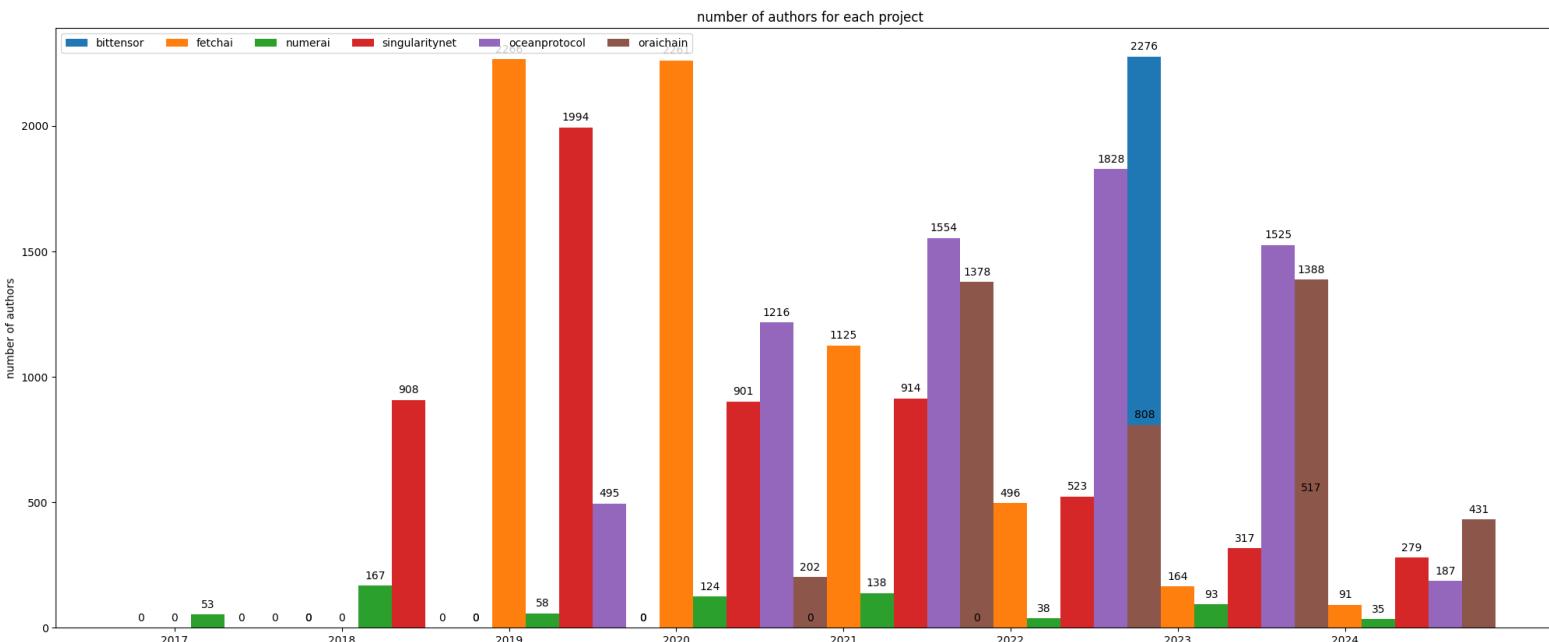


The above figures shows the number comments per commit over the last years

While the ocean is at the top with a great gap respect to the other tokens with at most 416 comments in 2020 and 317 in 2023, the other tokens had about zero comments per commit which is interesting !!! That could be the result of publicity status of the tokens

Rank Projects by Activity (commits)

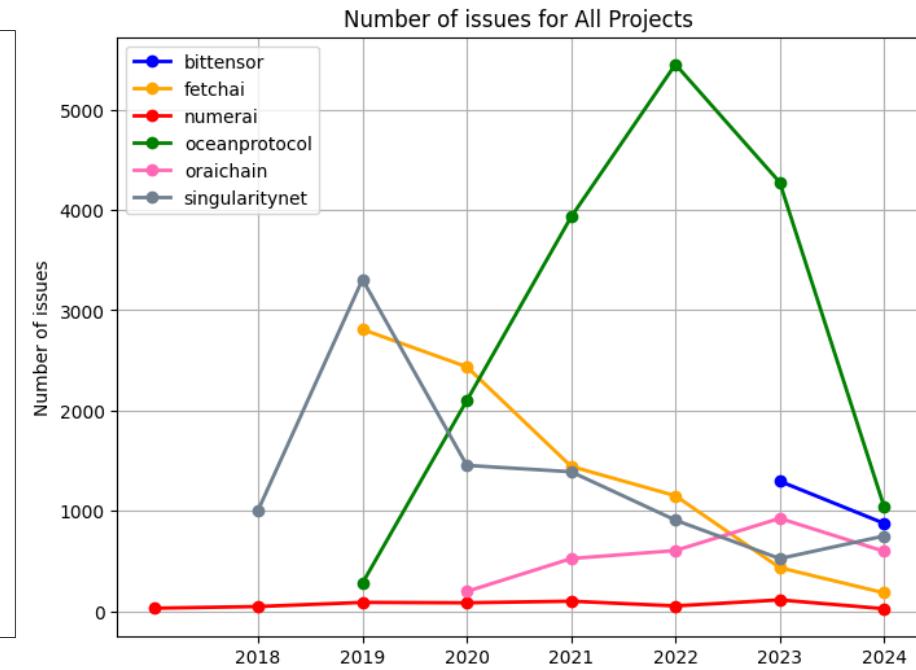
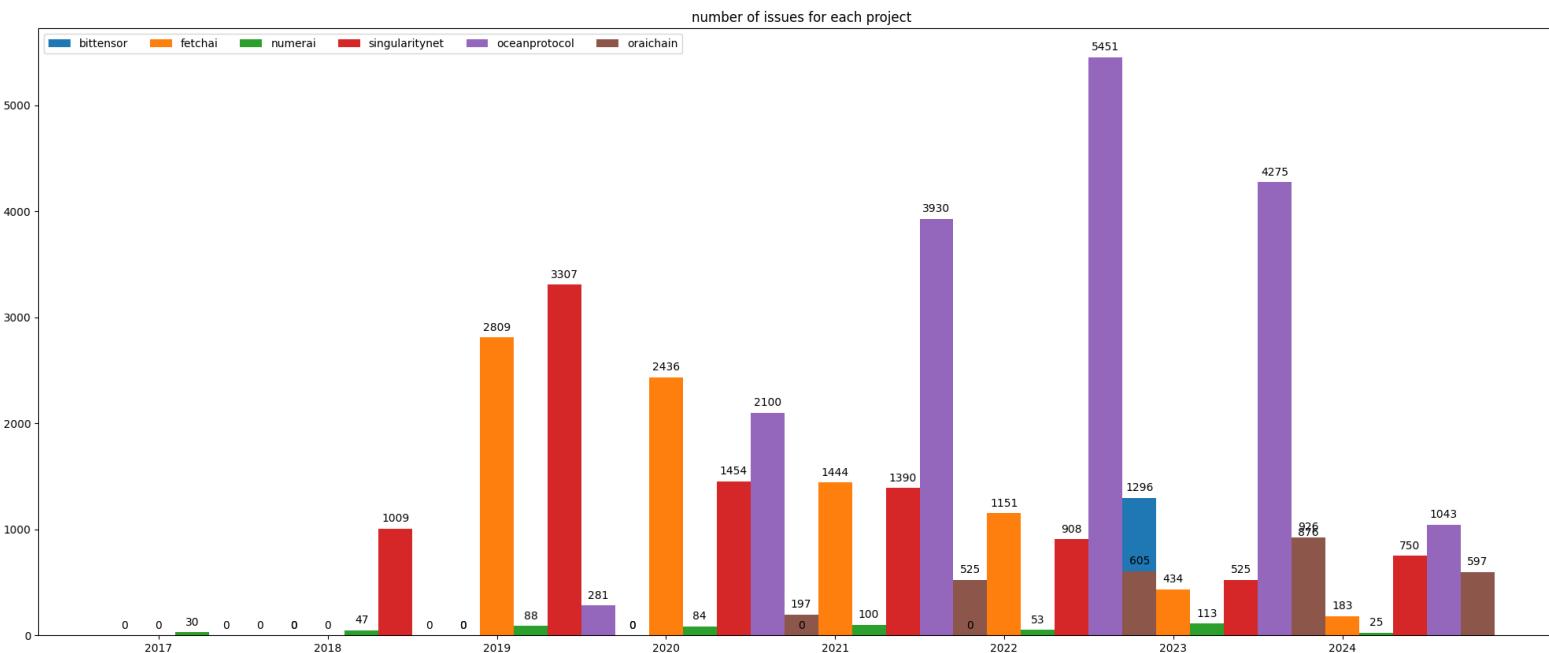
Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.



Except of numerai which has been the weakest token in all activity metrics , the other tokens had considerable amount of authors. Bittensor and fetchai has the most amount more than 2000 authors where singularity and oceans has more than 1500 authors. the amount of authors of all tokens declined to below 500 in 2024

Rank Projects by Activity (issues)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.

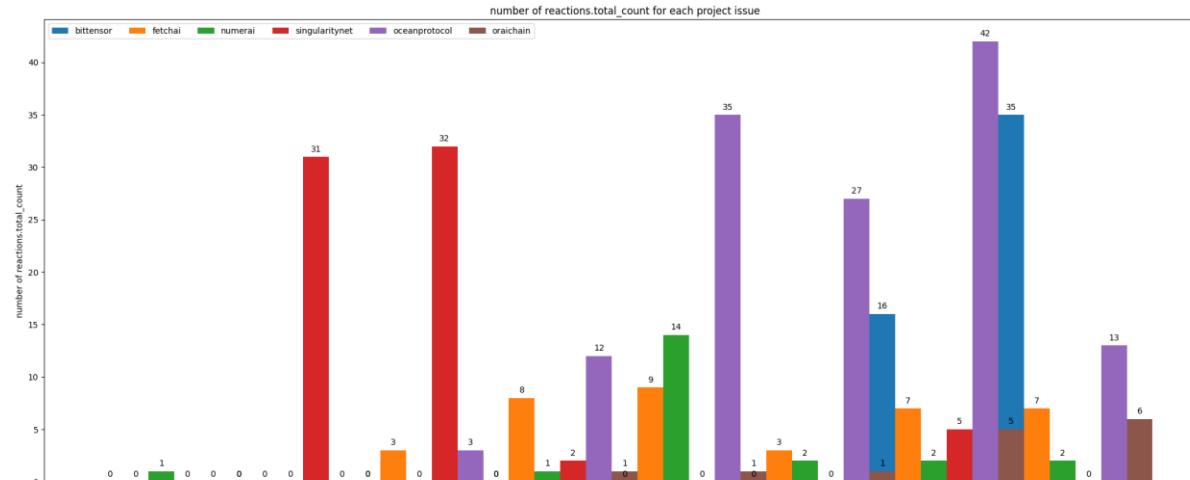
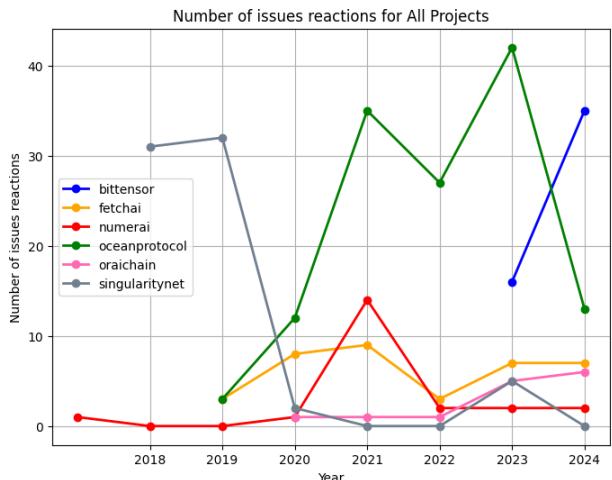
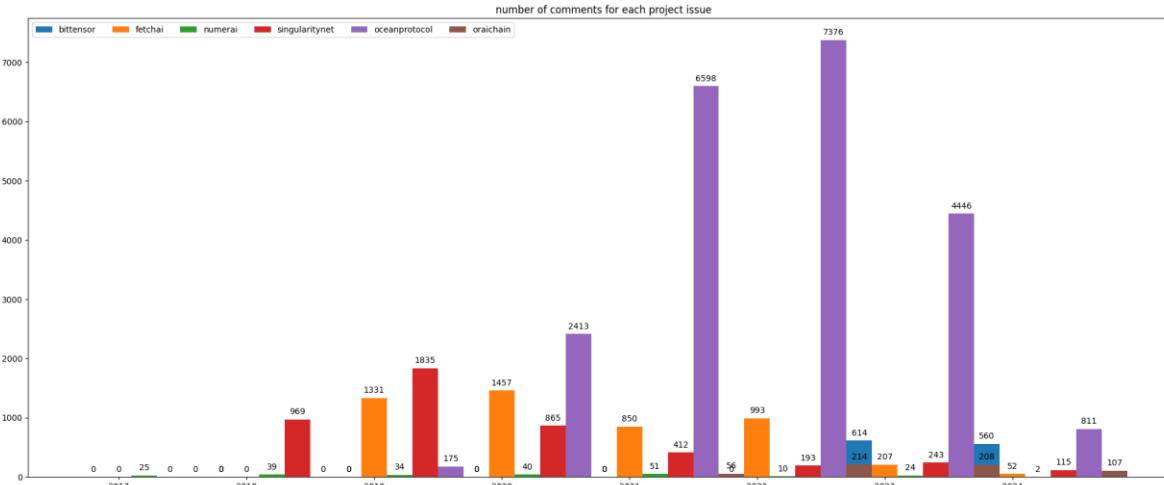
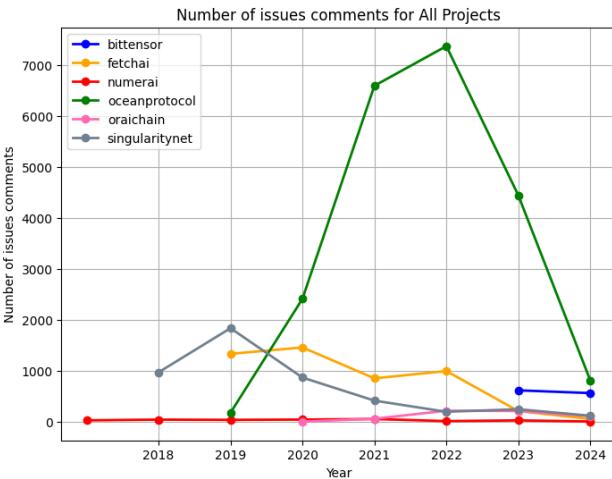


These two figures illustrates the number of issues for each project. Ocean with its active community has the most amount of issues with more than 5000 in 2022. its issues number inclines uniformly from 2019 to 2022 but after that started to fall. Singularity also had more than 3000 issues in 2019 but decreased after that.

And numerai ... :/

Rank Projects by Activity (issues)

Collect data on the number of commits and repositories created for each crypto project. Rank the projects based on these metrics and graph the evolution of this ranking over time.



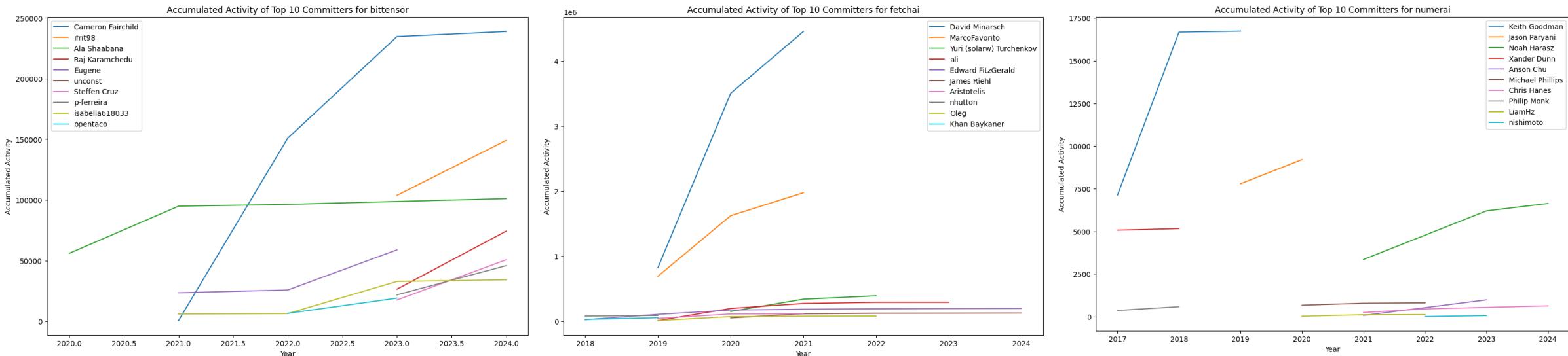
Based in these figures oceans stand in the first place in issues activities both reactions and comments.

However the scale is really different. comments are more than 7000 in 2022 whereas the reaction count is below 100 totally.

After ocean singularity and fetchai were the most active projects respect to comments.

Rank the Most Active Developers

Analyze developer activity within each project and identify the most active contributors. Graph the evolution of this ranking over time to track changes in developer involvement.



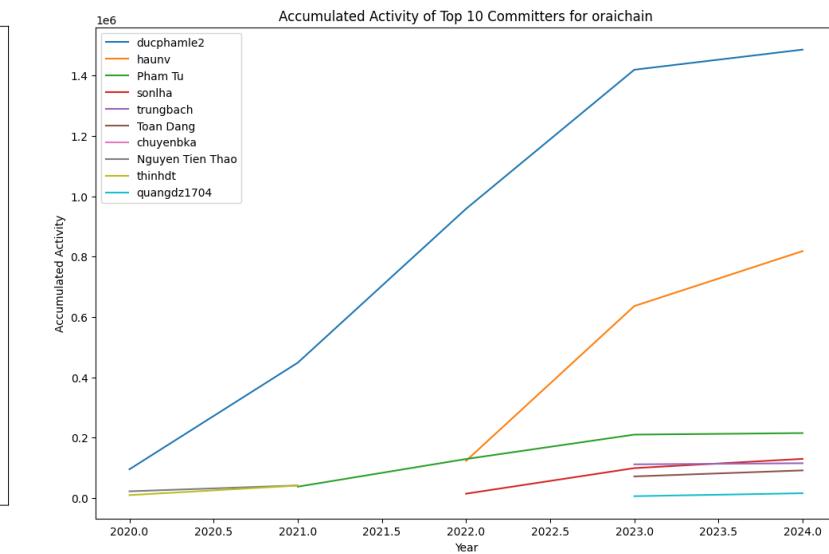
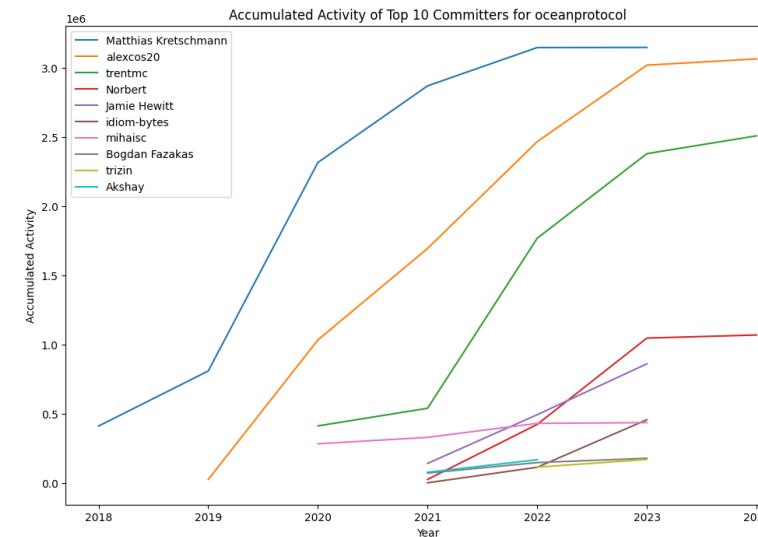
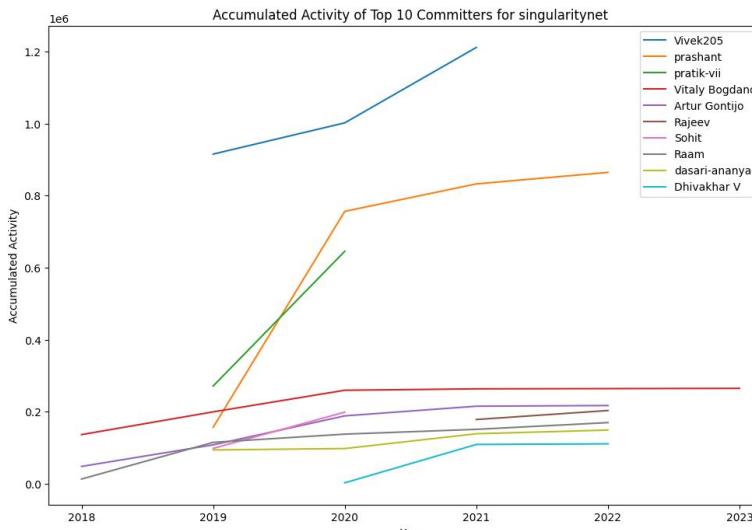
These figures shows the top 10 most active developers for each projects over the years. Their activity determined by the number of commits that each of them posted as the author. You can also see their id in the notebook.

Among these three figures fetchai developers amount of commits are in the scale of 10 to the power of 6 where David Minarsch is at the top with more than 4 millions commits in 2021 and marcofavorito with around 2 millions in the same year. However both stop their activities since then.

Generally most of these authors worked in a portion of the recorded time however Ala Shabana work consistently on bittensor from 2020 to 2024

Rank the Most Active Developers

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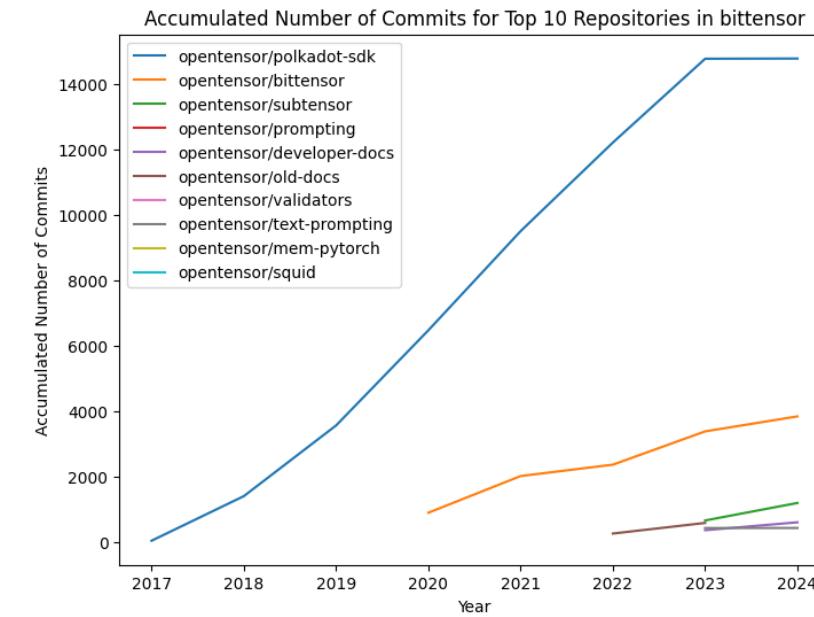
These figures shows the top 10 most active developers for each projects over the years. Their activity determined by the number of commits that each of them posted as the author. You can also see their id in the notebook.

The scale of activity on these three projects (singularity, ocean and oraichain) is in million commits . Matthias and alexcos are the most active developers in ocean community with around 3 millions commits in 2022 and after. Among the above figures ocean has the most active community by the number of commits but in total fetchai had the most active developer

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

bittensor			
	id	node_id_x	full_name
0	761412090	14769	opentensor/polkadot-sdk
14769	283347912	3851	opentensor/bittensor
18620	608683796	1210	opentensor/subtensor
19830	741209532	898	opentensor/prompting
20728	703178046	620	opentensor/developer-docs
21348	498821260	601	opentensor/old-docs
21949	601243114	554	opentensor/validators
22503	687654447	447	opentensor/text-prompting
22950	530342503	312	opentensor/mem-pytorch
23262	508370989	275	opentensor/squid
..



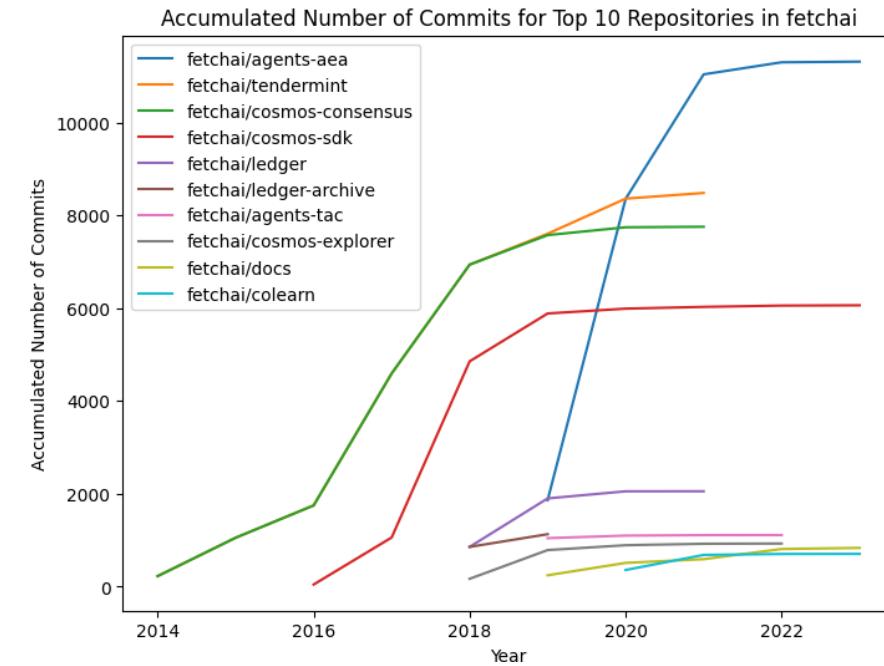
These figures shows the top 10 repositories by number of commits. In the left figure id is the id of repository , node_id indicates the number of commits of each repository

In the bittensor project, the polkadot-sdk repository is the most active, with 14,469 commits. It stands in first place, with a significant distance from the next repository. Bittensor and subtensor are 2nd and 3rd ranked

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

fetchai			
	id	node_id_x	full_name
0	203558879	11310	fetchai/agents-aea
11310	381083181	8481	fetchai/tendermint
19791	239742630	7753	fetchai/cosmos-consensus
27544	248020306	6061	fetchai/cosmos-sdk
33605	117567381	2055	fetchai/ledger
35660	145117118	1130	fetchai/ledger-archive
36790	176983957	1111	fetchai/agents-tac
37901	248222385	929	fetchai/cosmos-explorer
38830	189378561	835	fetchai/docs
39665	288762198	706	fetchai/colearn

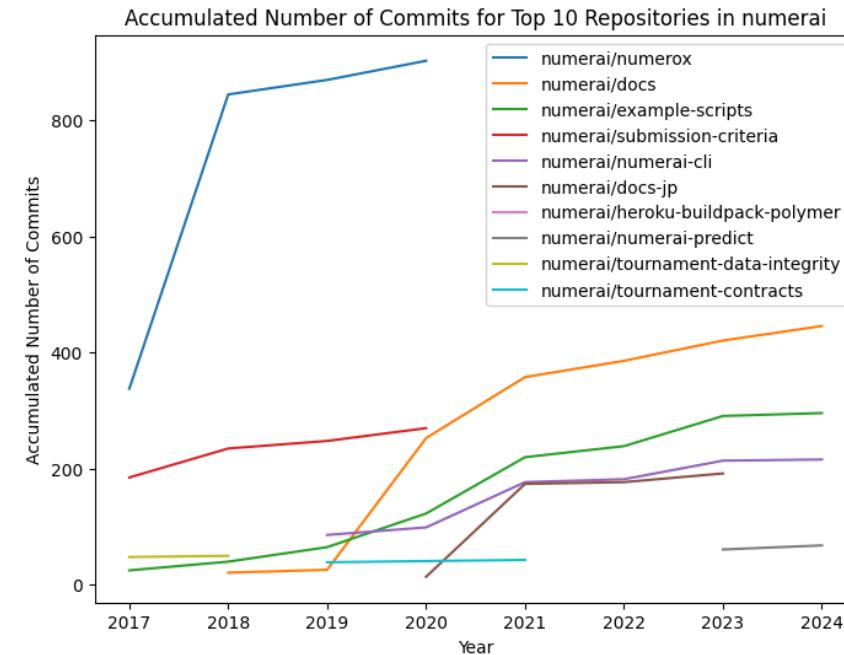


In the fetchai project, the agents-aea repository is the most active, with 11310 commits in 2020 and after. It stands in first place. Tendermint and cosmos-consensus are 2nd and 3rd ranked with 8481 and 7753 commits.

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

numerai		
	id	node_id_x
0	107438215	903
903	150622229	446
1349	78245673	296
		numerai/example-scripts
1645	102884922	270
		numerai/submission-criteria
1915	187930883	216
		numerai/numerai-cli
2131	311464380	192
		numerai/docs-jp
2323	87472110	68
		numerai/heroku-buildpack-polymer
2391	628102458	68
		numerai/numerai-predict
2459	107187129	50
		numerai/tournament-data-integrity
2509	198510193	43
		numerai/tournament-contracts

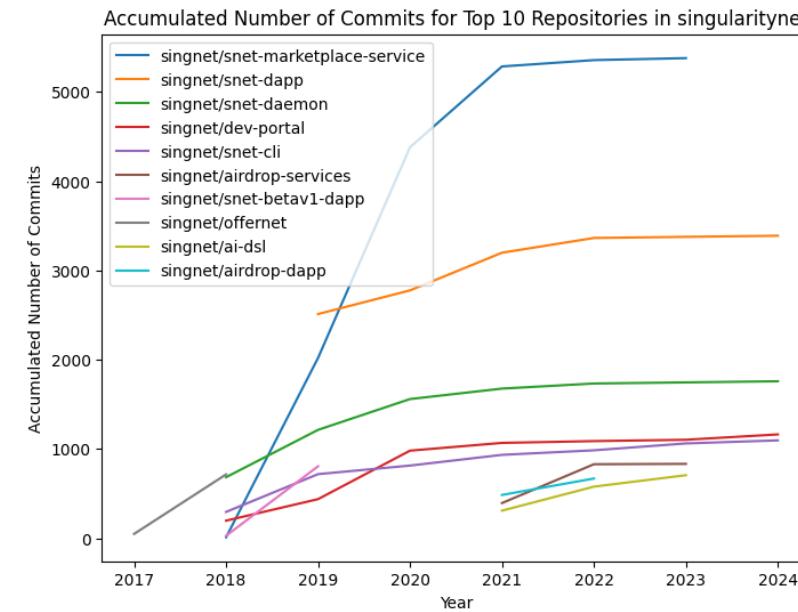


In the Numerai project, the numerox repository was the most active, with 903 commits in 2020. However, its activities stopped after 2020, and no more commits were pushed to this repository. It's worth mentioning that the scale of the number of commits in this project is less than 1,000, which is far less than the other projects.

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

singularitynet			
	id	node_id_x	full_name
0	162280649	5377	singnet/snet-marketplace-service
5377	172691795	3388	singnet/snet-dapp
8765	137923856	1758	singnet/snet-daemon
10523	155491258	1163	singnet/dev-portal
11686	131075650	1096	singnet/snet-cli
12782	408320052	833	singnet/airdrop-services
13615	162400731	806	singnet/snet-betav1-dapp
14421	126846406	715	singnet/offernet
15136	338078172	706	singnet/ai-dsl
15842	408694159	669	singnet/airdrop-dapp

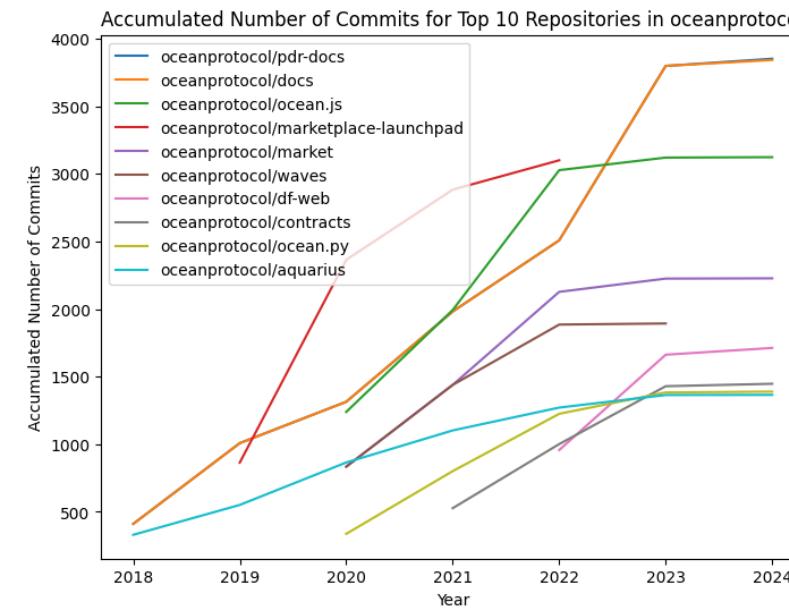


In the Numerai project, the numerox repository was the most active, with 903 commits in 2020. However, its activities stopped after 2020, and no more commits were pushed to this repository. It's worth mentioning that the scale of the number of commits in this project is less than 1,000, which is far less than the other projects.

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

oceanprotocol			full_name
	id	node_id_x	
0	774280927	3851	oceanprotocol/pdr-docs
3851	156526410	3842	oceanprotocol/docs
7693	264921815	3123	oceanprotocol/ocean.js
10816	449718214	3100	oceanprotocol/marketplace-launchpad
13916	259586079	2227	oceanprotocol/market
16143	557774491	1893	oceanprotocol/waves
18036	488111637	1712	oceanprotocol/df-web
19748	248724103	1447	oceanprotocol/contracts
21195	266274883	1389	oceanprotocol/ocean.py
22584	137914287	1365	oceanprotocol/aquarius
.	.	.	.

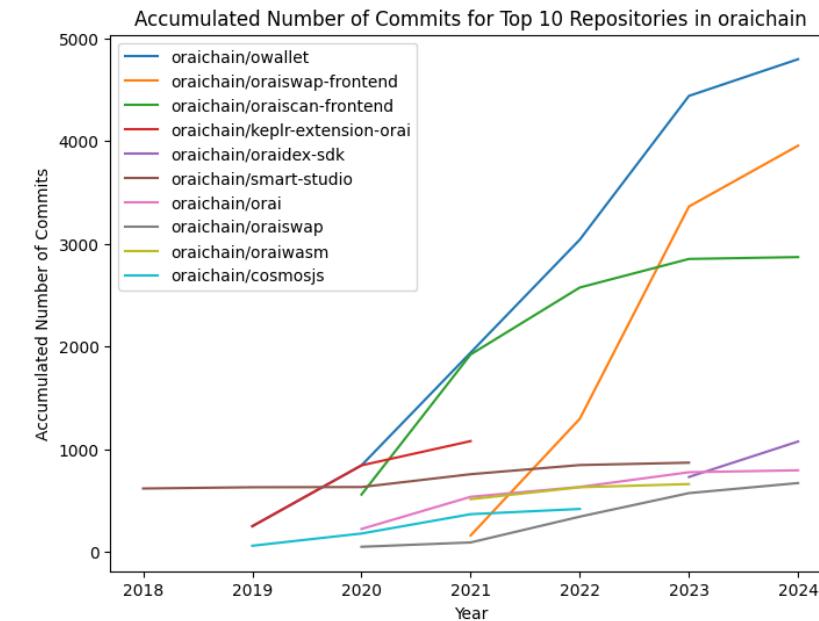


In the Ocean project, the top four ranked repositories by number of commits are pdr-docs, docs, ocean.js, and marketplace-launched. All of these repositories have a close number of commits, with each exceeding 3,000 commits.

Rank Repositories by Activity

For each project, rank repositories by the number of commits. This will help identify which parts of the project are seeing the most development activity.

oraichain			
	id	node_id_x	
		full_name	
0	546614312	4795	oraichain/owallet
4795	449552985	3954	oraichain/oraiswap-frontend
8749	316470417	2870	oraichain/oraiscan-frontend
11619	364135668	1080	oraichain/keplr-extension-orai
12699	638755456	1076	oraichain/oraidex-sdk
13775	346656676	870	oraichain/smart-studio
14645	288762317	796	oraichain/orai
15441	445991281	672	oraichain/oraiswap
16113	340681816	662	oraichain/oraiwasm
16775	342202007	420	oraichain/cosmosjs



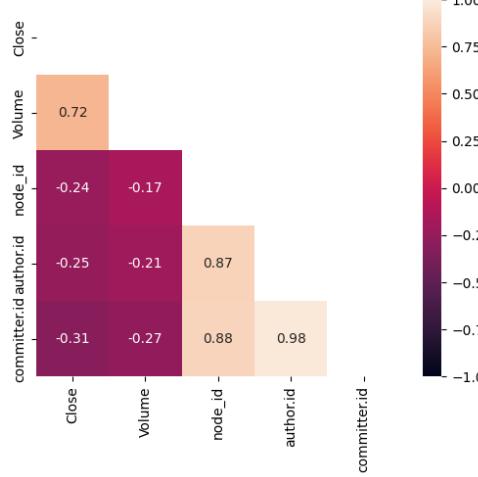
In the oraicahin project, the top 3 ranked repositories by number of commits are owallet, oraiswap-frontend, oraiscan-frontend with 4795 , 3954 and 287 commits respectively in 2024.

Correlations (commit- price) / weekly (short term)

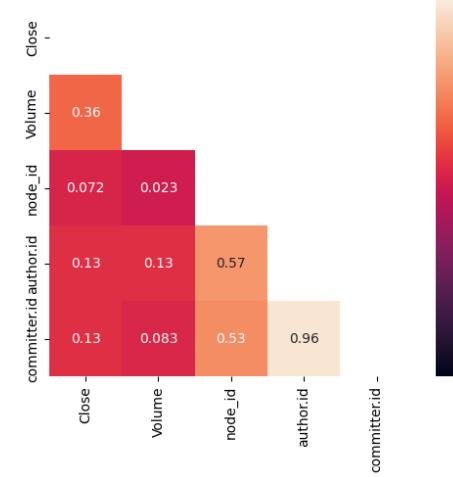
Use statistical methods to determine the correlation between developer activity and project token price.

Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.

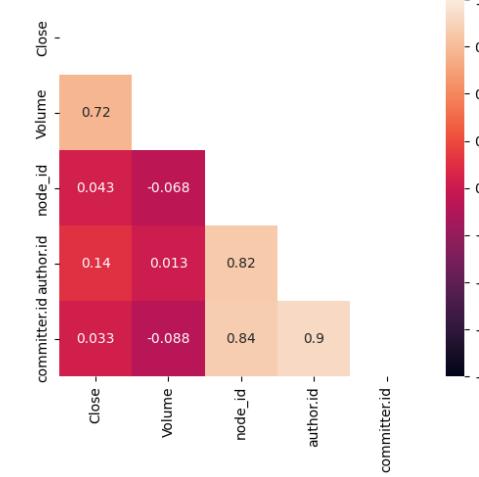
weekly commit-price corr of singularitynet



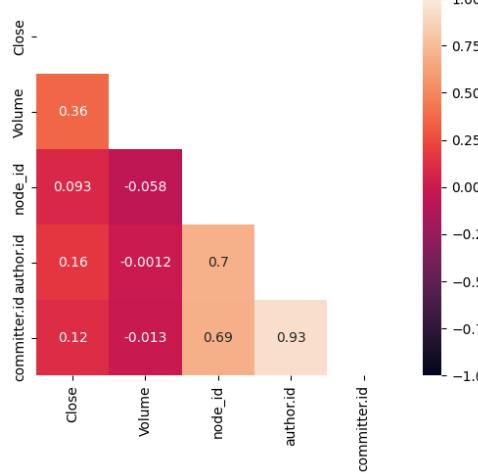
weekly commit-price corr of oraichain



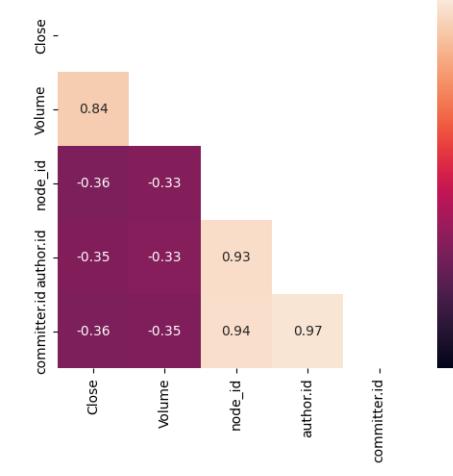
weekly commit-price corr of oceanprotocol



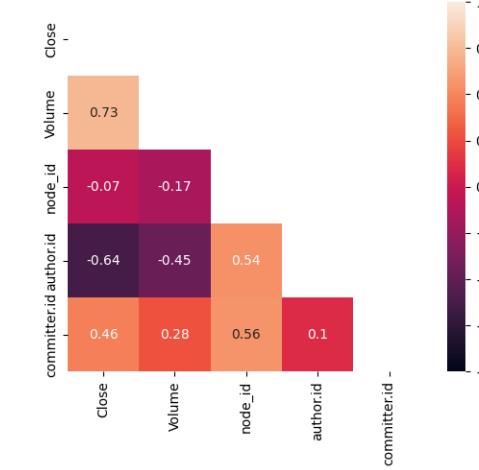
weekly commit-price corr of numerai



weekly commit-price corr of fetchai



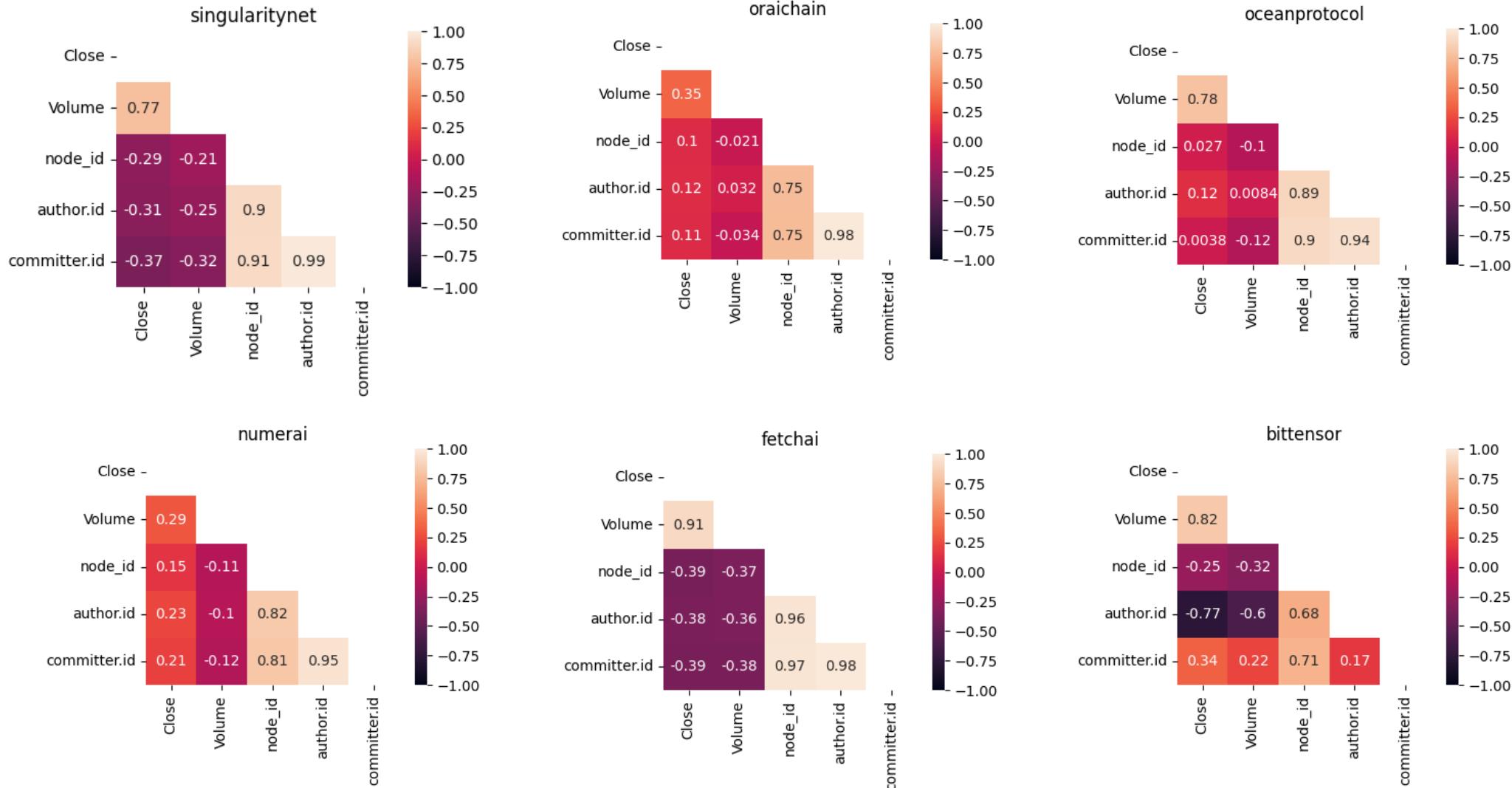
weekly commit-price corr of bittensor



Correlations (commit- price) / monthly (mid term)

Use statistical methods to determine the correlation between developer activity and project token price.

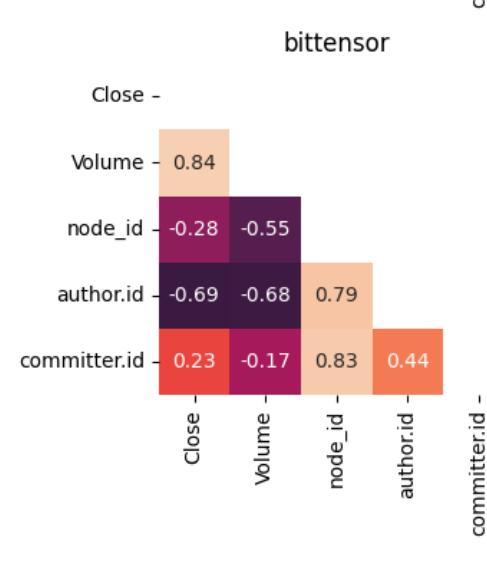
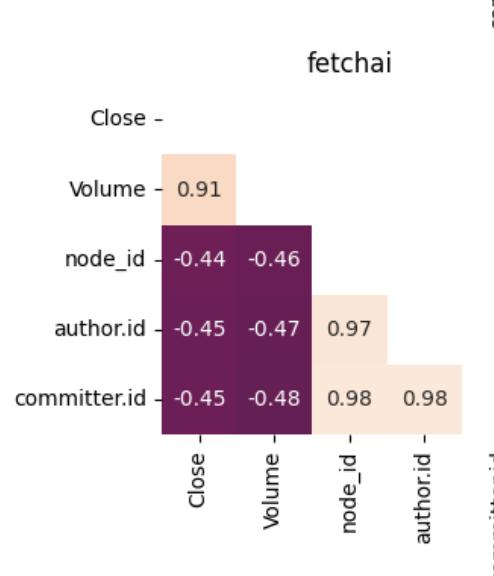
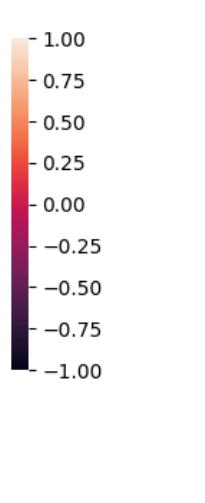
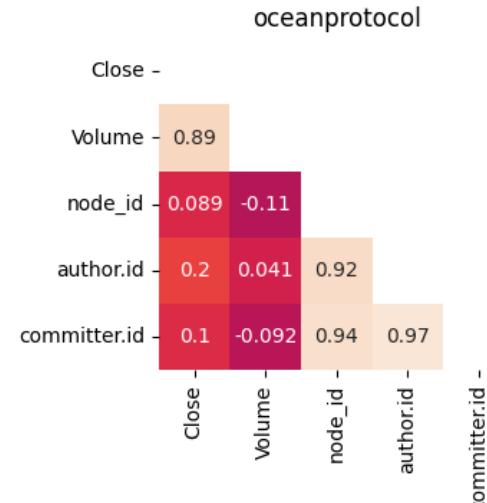
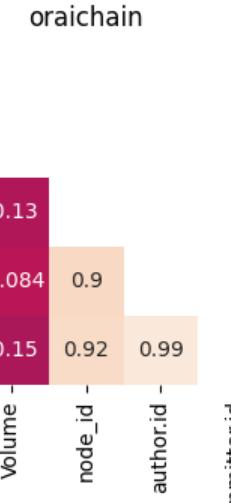
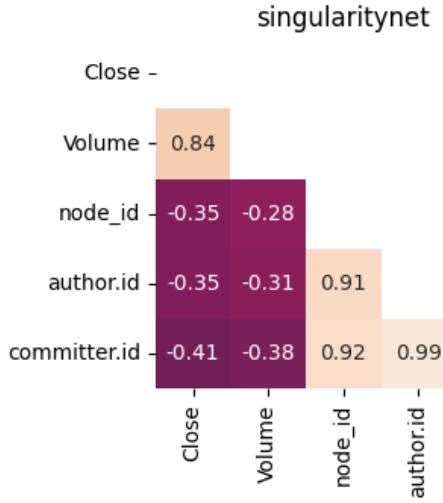
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (commit- price) / Quarterly (long term)

Use statistical methods to determine the correlation between developer activity and project token price.

Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (commit- price) key finding

Use statistical methods to determine the correlation between developer activity and project token price.

Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.

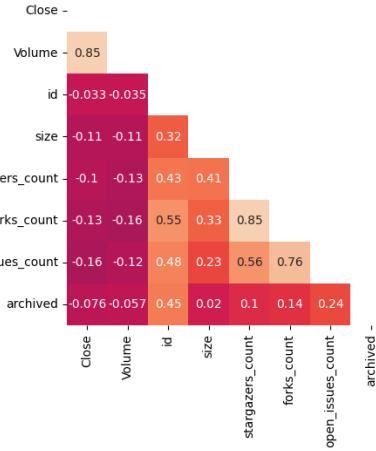
- Oraichain: Shows a relatively diverse pattern of correlations compared to other cryptocurrencies, with mixed weak positive and negative correlations across different metrics.
- Fetch.ai and Ocean Protocol: Display the strongest negative correlations between close and volume, suggesting that price increases significantly discourage trading volume.
- High positive correlations: There are generally very strong positive correlations among the commit activities (node_id, author.id, committer.id) across most cryptocurrencies. This suggests that these metrics tend to increase or decrease together, indicating synchronized activity levels among nodes, authors, and committers.
- Close and node_id, author.id, committer.id: The correlations are generally weak across all cryptocurrencies. This suggests that the price of these cryptocurrencies is not strongly influenced by the measured GitHub commit activities.

Correlations (repo-price) / weekly (short term)

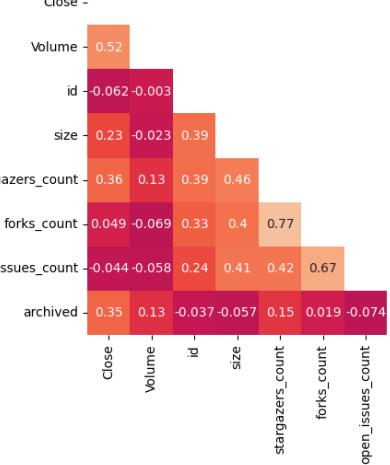
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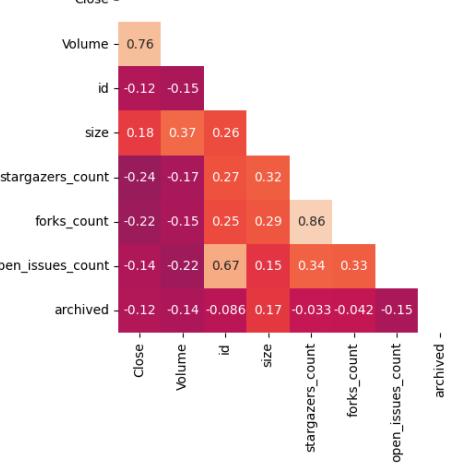
weekly repos-price corr of singularitynet



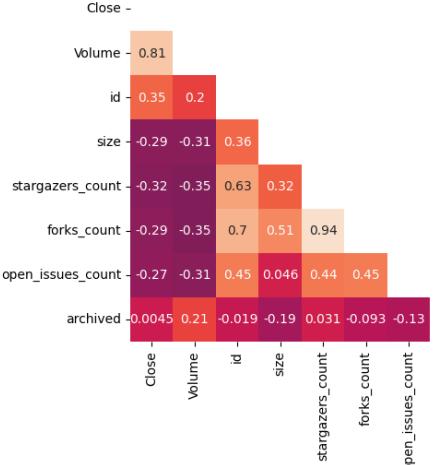
weekly repos-price corr of oraichain



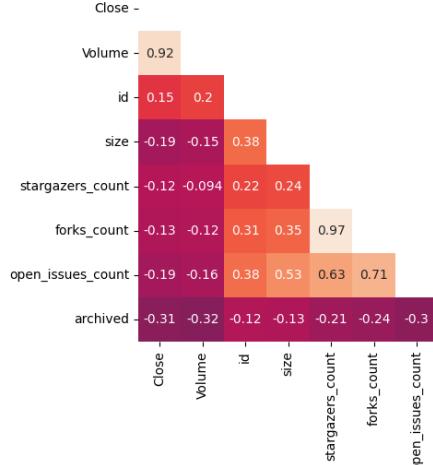
weekly repos-price corr of oceanprotocol



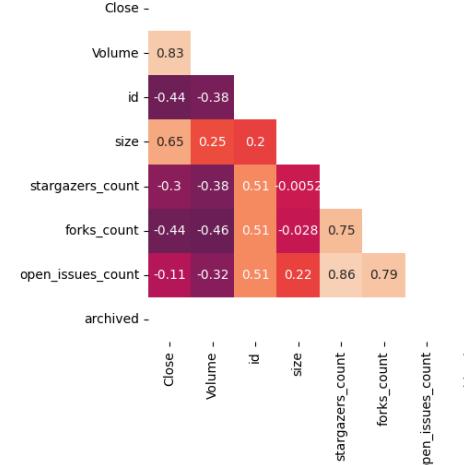
weekly repos-price corr of numerai



weekly repos-price corr of fetchai



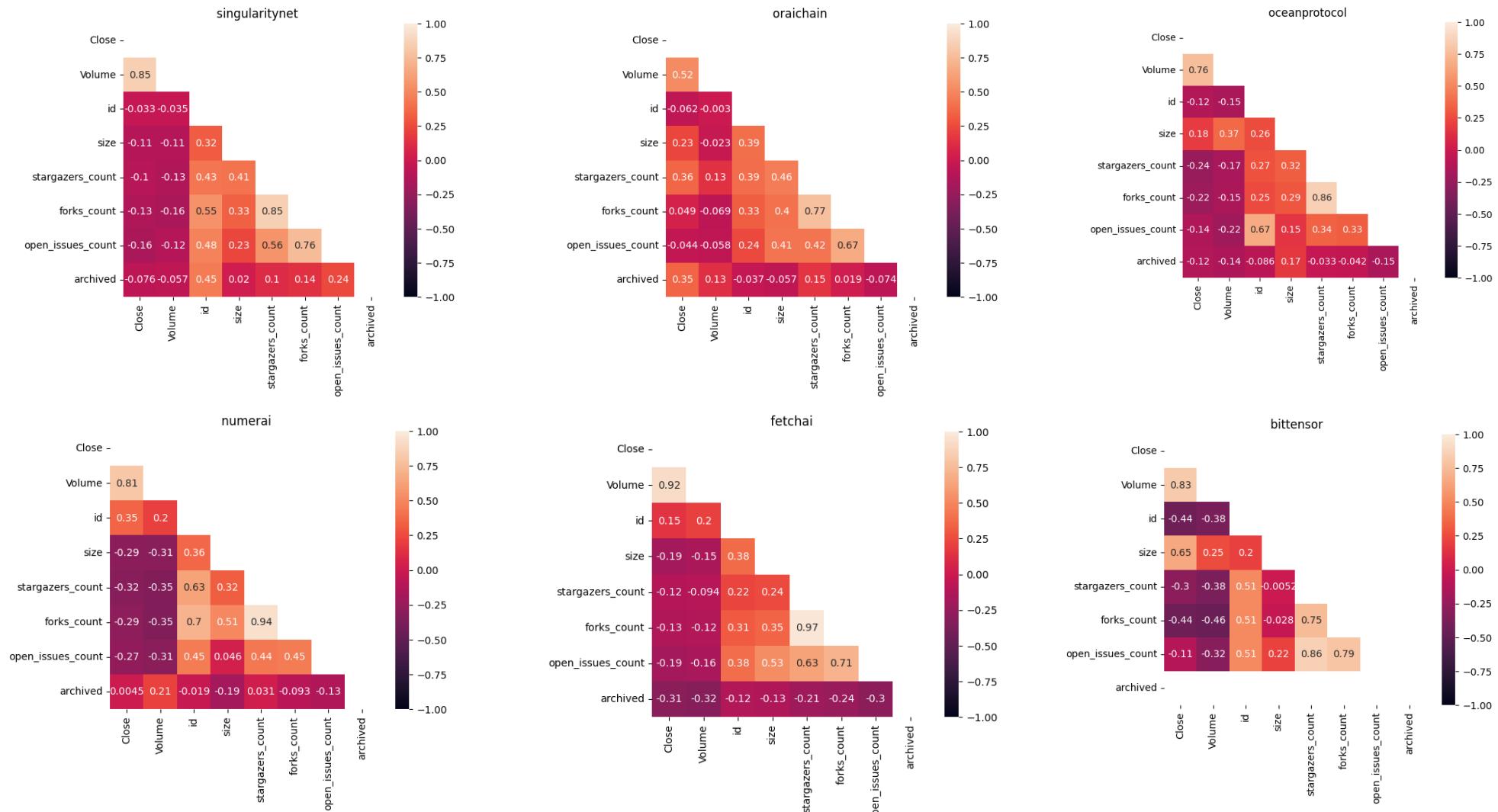
weekly repos-price corr of bittensor



Correlations (repo-price) / monthly (mid term)

Use statistical methods to determine the correlation between developer activity and project token price.

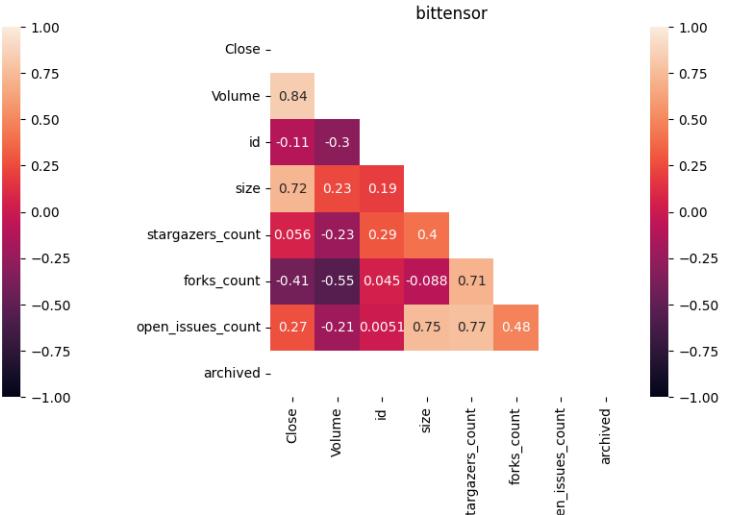
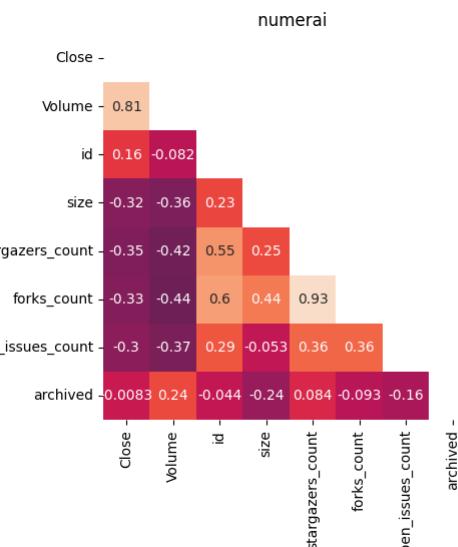
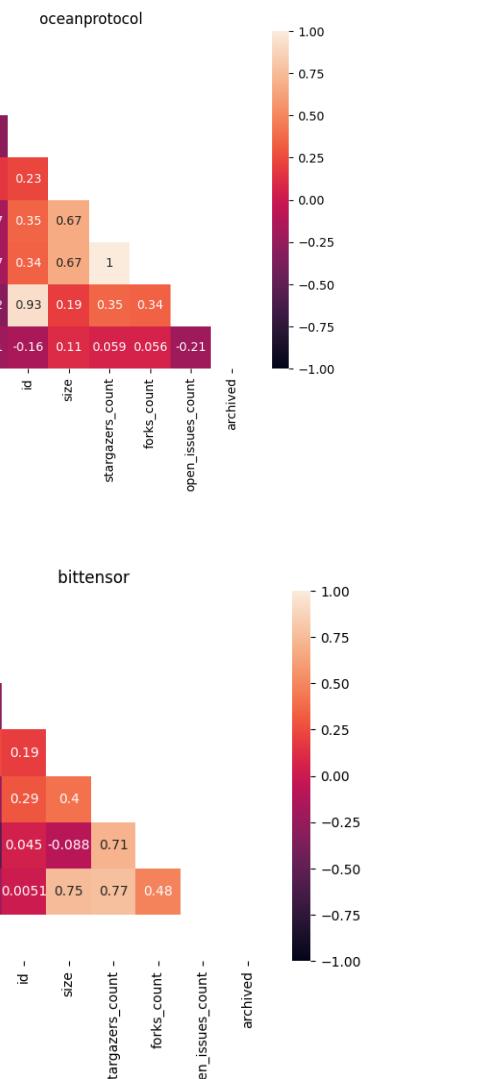
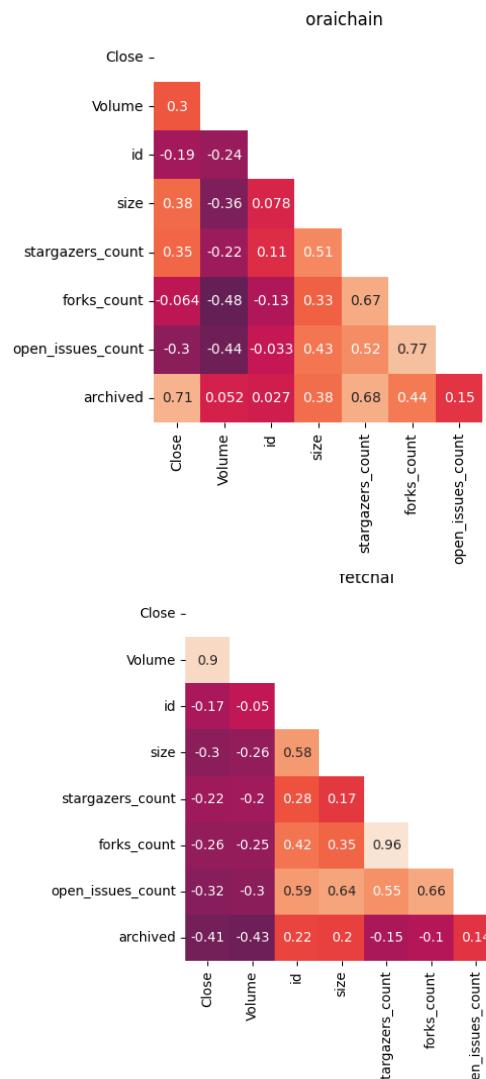
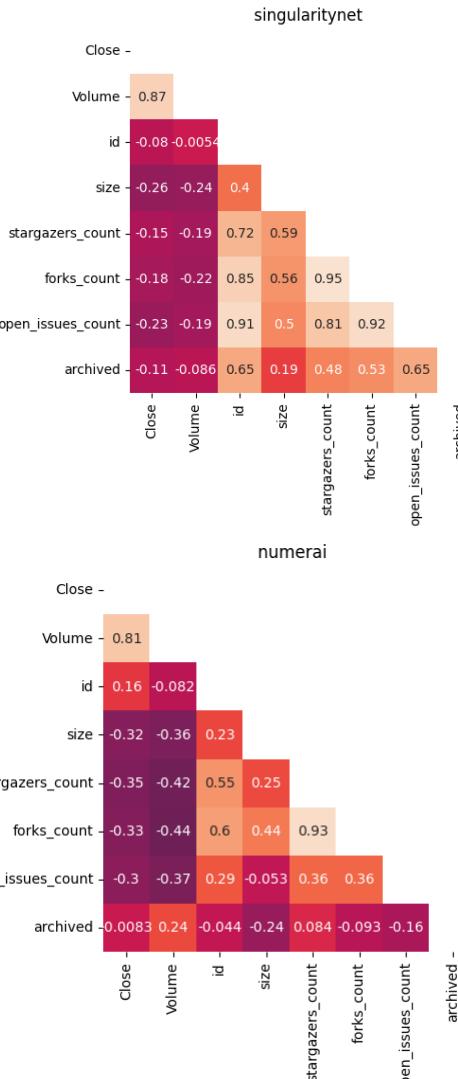
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (repo-price) / Quarterly (long term)

Use statistical methods to determine the correlation between developer activity and project token price.

Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (repo-price) key findings

Use statistical methods to determine the correlation between developer activity and project token price.

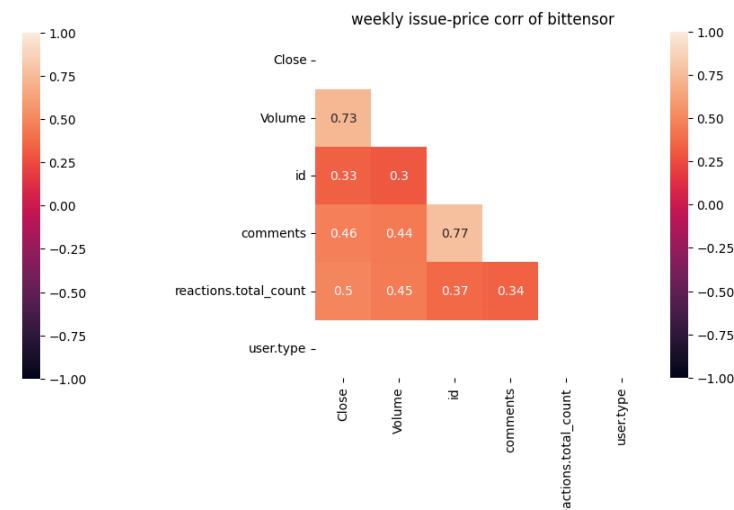
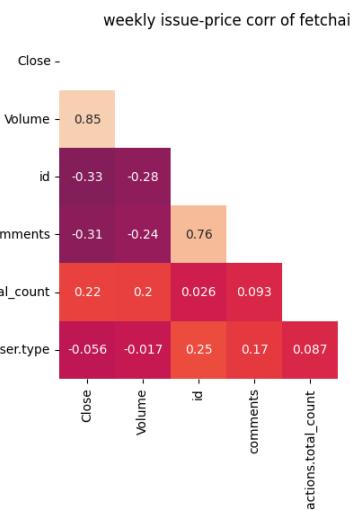
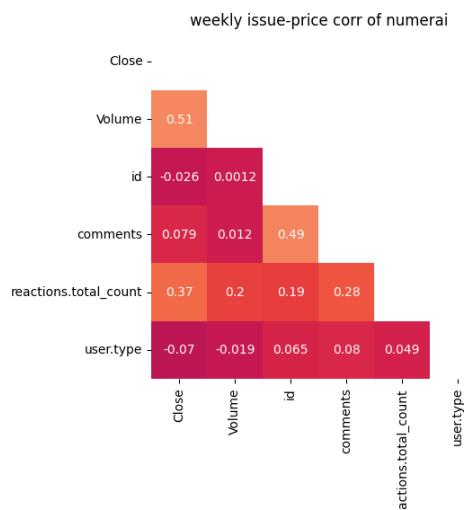
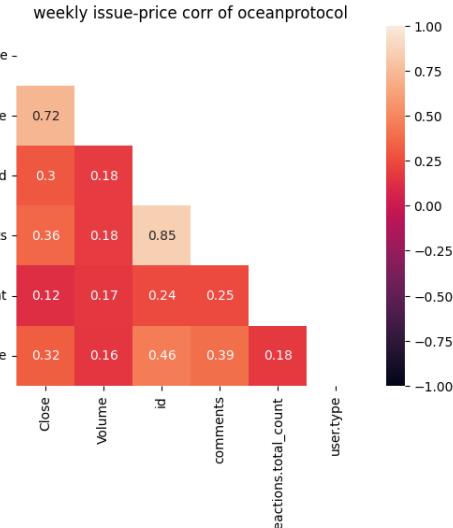
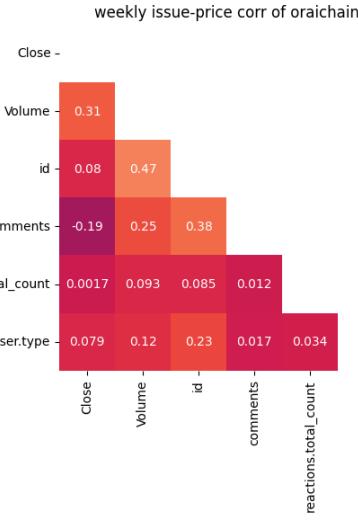
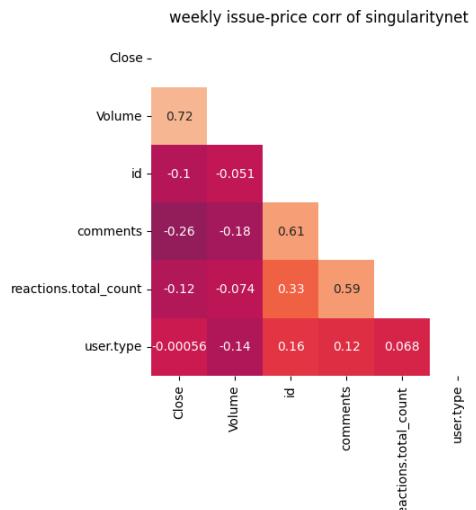
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.

- The correlation between repository size and cryptocurrency price tends to be weak to moderately negative for most of the cryptocurrencies analyzed. For instance, SingularityNET shows a -0.28 correlation between repository size and price.
- There is generally a positive correlation between the number of stars and forks in a GitHub repository and the cryptocurrency's price. This suggests that more popular and contributed-to repositories might be associated with higher crypto prices. For example, Numeraire shows a correlation of 0.69 between stars count and price.
- Open issues count presents a mixed correlation with crypto prices; in some cases, there is a moderate positive correlation, while in others, it is slightly negative or near zero. This indicates there is no consistent relationship between the number of open issues and cryptocurrency prices.
- The 'archived' variable seems to have a weak correlation with crypto prices, suggesting that whether a repository is archived or not does not significantly impact cryptocurrency prices.
- Trading volume has a variable correlation with the price, with some cryptocurrencies showing a moderate positive correlation, while others show little to no correlation.

Correlations (issue-price) / weekly (short term)

Use statistical methods to determine the correlation between developer activity and project token price.

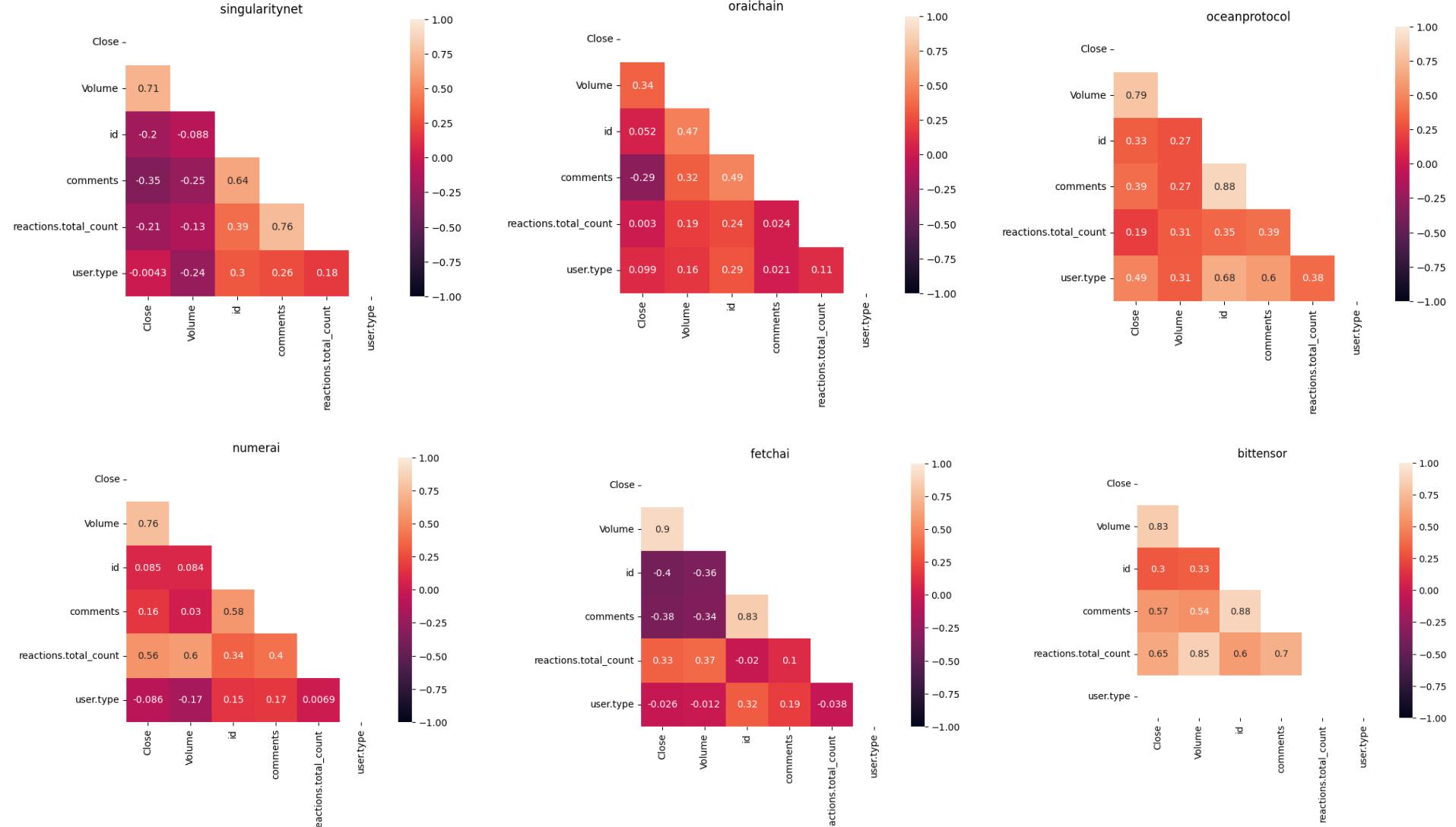
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (issue-price) / monthly (mid term)

Use statistical methods to determine the correlation between developer activity and project token price.

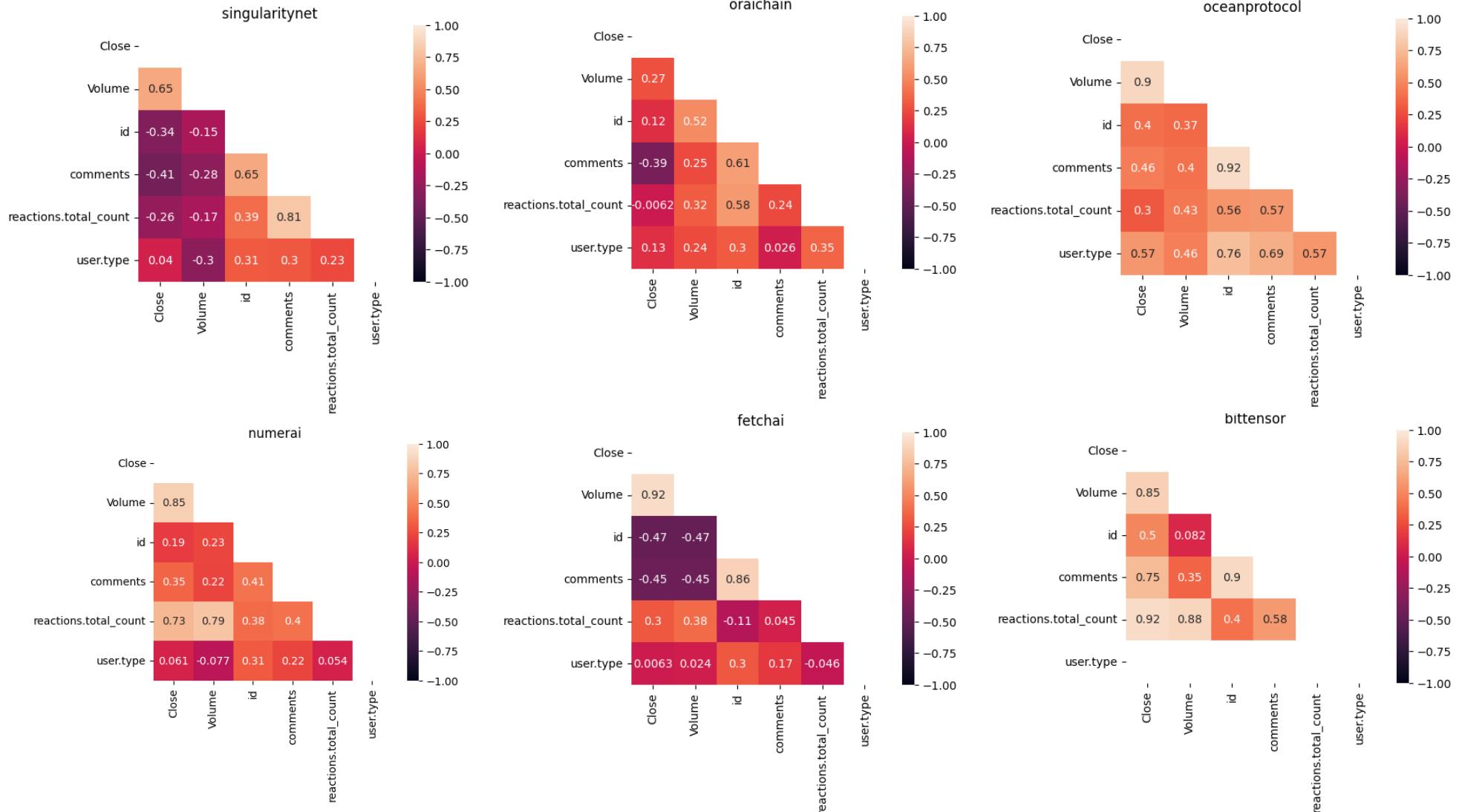
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (issue-price) / Quarterly (long term)

Use statistical methods to determine the correlation between developer activity and project token price.

Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.



Correlations (issue price) key findings

Use statistical methods to determine the correlation between developer activity and project token price.

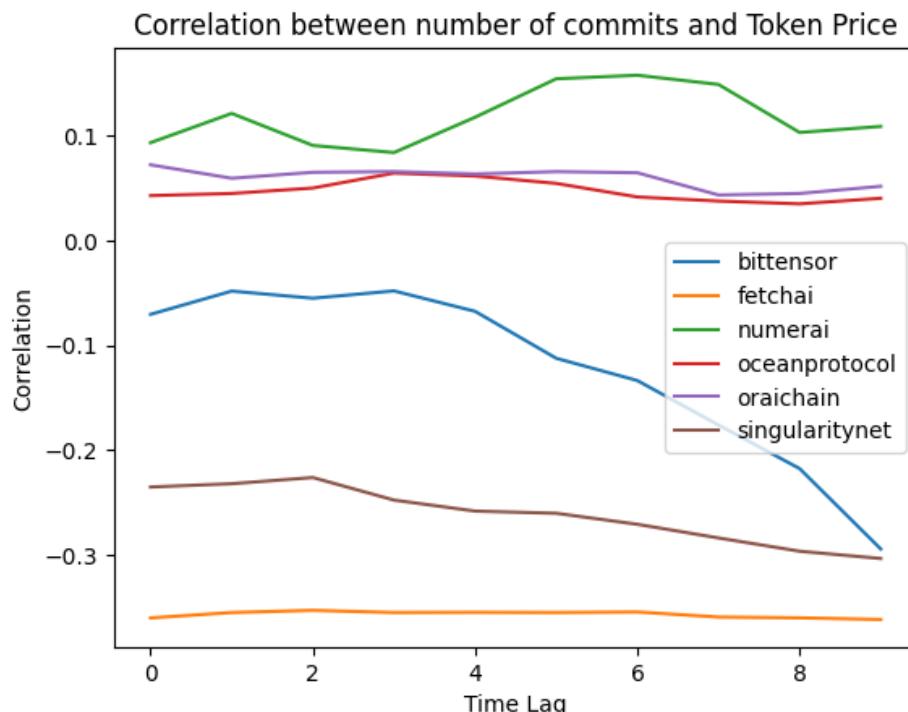
Analyze the correlation in different timeframes (short-term, medium-term, long-term) to understand if phases of high or low activity impact token price.

- The 'comments' variable shows a varied correlation with the cryptocurrency prices. For instance, Oracchain and Oceanprotocol exhibit a moderate positive correlation, while SingularityNET shows a weak negative correlation.
- A positive correlation is observed between the 'reactions total count' and the cryptocurrency prices for most cryptocurrencies, such as a strong correlation for SingularityNET (0.81) and Fetchai (0.58). This suggests that higher engagement, as indicated by reactions on GitHub issues, might be associated with higher cryptocurrency prices.
- The 'user type' variable shows a generally weak correlation with cryptocurrency prices, indicating that the type of users interacting with GitHub issues does not have a strong relationship with the price movements of these cryptocurrencies.
- Trading volume generally has a weak to moderate negative correlation with the closing price, which could imply that higher trading volumes are not necessarily associated with higher prices within these datasets.
- There are inconsistencies in the strength and direction of the correlations across different cryptocurrencies, which suggests that the relationship between GitHub issues activity and cryptocurrency prices can vary significantly between different cryptocurrencies.

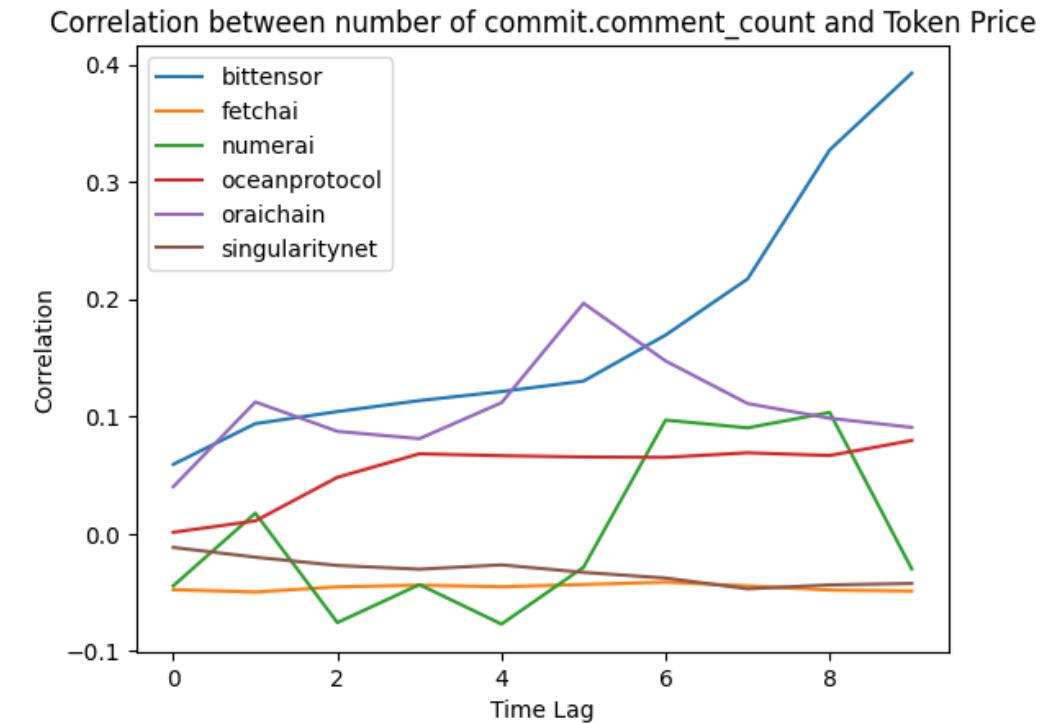
Determine Time Lags for Maximum Correlations

Analyze different time lags between developer activity and token price to find the ones that maximize correlation. This will help identify any lagged effects between developer activity and token price movements

```
Maximum correlation of number of commits and bittensor_price: -0.04811739333661531
Corresponding lag: 3
Maximum correlation of number of commits and fetchai_price: -0.3530525661192553
Corresponding lag: 2
Maximum correlation of number of commits and numerai_price: 0.15776276728523803
Corresponding lag: 6
Maximum correlation of number of commits and oceanprotocol_price: 0.0643298516571309
Corresponding lag: 3
Maximum correlation of number of commits and orachain_price: 0.07226455392281737
Corresponding lag: 0
Maximum correlation of number of commits and singularitynet_price: -0.22628363131611967
Corresponding lag: 2
```



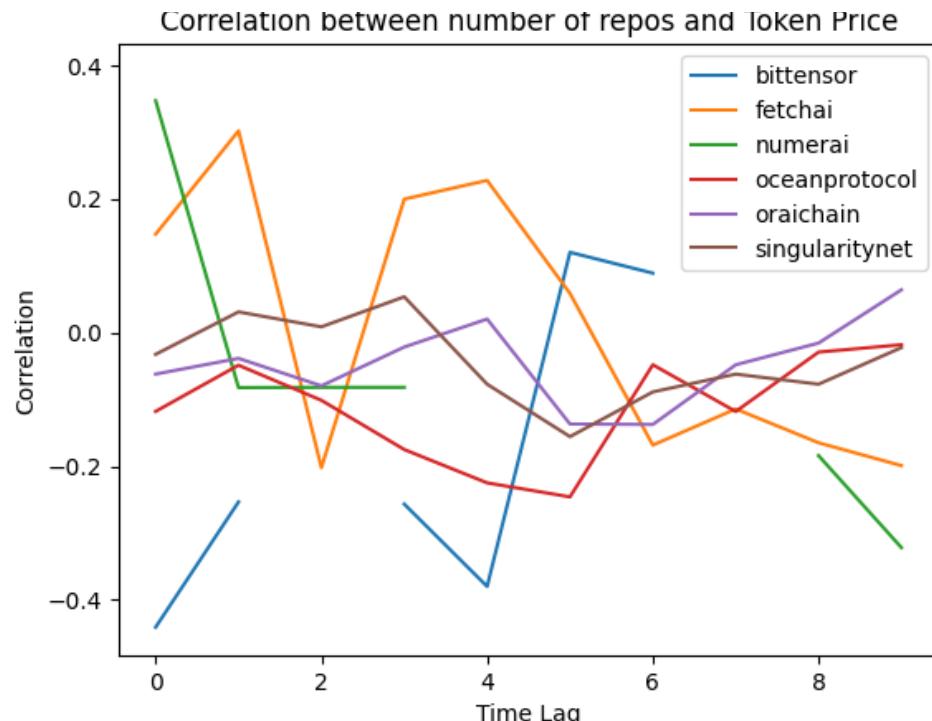
```
Maximum correlation of commit.comment_count and bittensor_price: 0.3926842720991453
Corresponding lag: 9
Maximum correlation of commit.comment_count and fetchai_price: -0.04126552153720453
Corresponding lag: 6
Maximum correlation of commit.comment_count and numerai_price: 0.10345701997536923
Corresponding lag: 8
Maximum correlation of commit.comment_count and oceanprotocol_price: 0.07955709950273923
Corresponding lag: 9
Maximum correlation of commit.comment_count and orachain_price: 0.1965525656336408
Corresponding lag: 5
Maximum correlation of commit.comment_count and singularitynet_price: -0.011646843033309501
Corresponding lag: 0
```



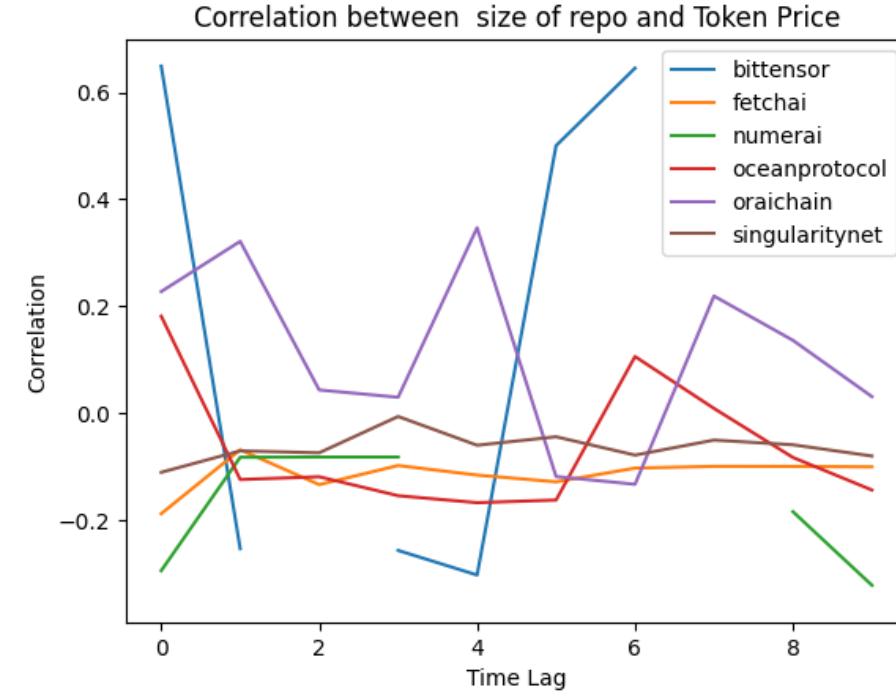
Determine Time Lags for Maximum Correlations

Analyze different time lags between developer activity and token price to find the ones that maximize correlation. This will help identify any lagged effects between developer activity and token price movements

```
Maximum correlation of number of repos and bittensor_price: 0.11996105461866145
Corresponding lag: 5
Maximum correlation of number of repos and fetchai_price: 0.3015779141750333
Corresponding lag: 1
Maximum correlation of number of repos and numerai_price: 0.38978885290694476
Corresponding lag: 5
Maximum correlation of number of repos and oceanprotocol_price: -0.01824792648909131
Corresponding lag: 9
Maximum correlation of number of repos and oraichain_price: 0.06391777475290218
Corresponding lag: 9
Maximum correlation of number of repos and singularitynet_price: 0.053450032667568016
Corresponding lag: 3
```



```
Maximum correlation of size of repo and bittensor_price: 0.6491343863290477
Corresponding lag: 0
Maximum correlation of size of repo and fetchai_price: -0.06824835970144366
Corresponding lag: 1
Maximum correlation of size of repo and numerai_price: 0.38978885290694465
Corresponding lag: 5
Maximum correlation of size of repo and oceanprotocol_price: 0.18148352885597913
Corresponding lag: 0
Maximum correlation of size of repo and oraichain_price: 0.3468561979212918
Corresponding lag: 4
Maximum correlation of size of repo and singularitynet_price: -0.006032621447479753
Corresponding lag: 3
```

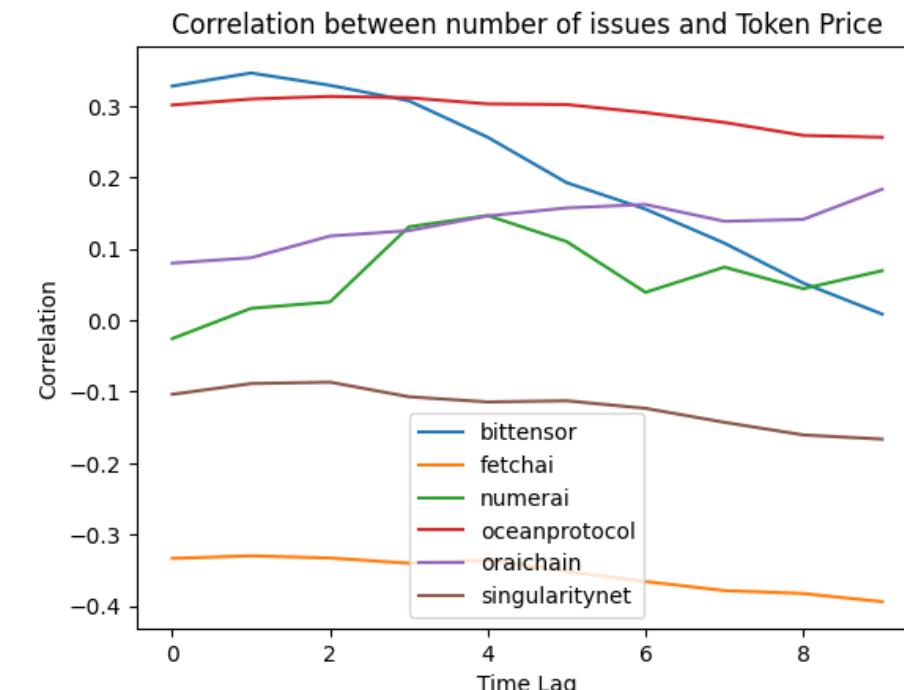
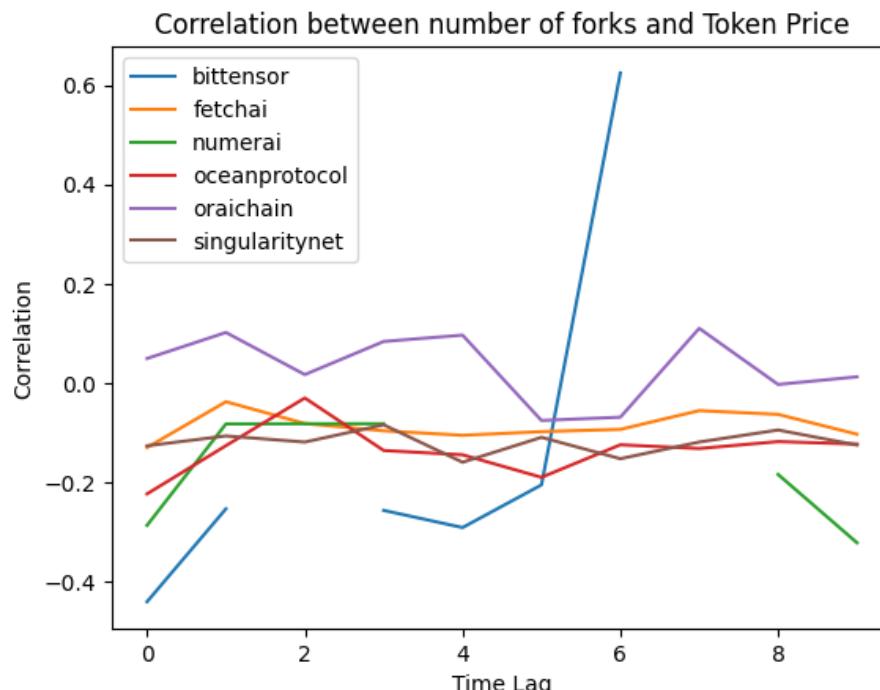


Determine Time Lags for Maximum Correlations

Analyze different time lags between developer activity and token price to find the ones that maximize correlation. This will help identify any lagged effects between developer activity and token price movements

```
Maximum correlation of number of forks and bittensor_price: 0.6245945913254526
Corresponding lag: 6
Maximum correlation of number of forks and fetchai_price: -0.03760318330996093
Corresponding lag: 1
Maximum correlation of number of forks and numerai_price: 0.3897888529069448
Corresponding lag: 5
Maximum correlation of number of forks and oceanprotocol_price: -0.030083232476704677
Corresponding lag: 2
Maximum correlation of number of forks and oraichain_price: 0.11022698462461414
Corresponding lag: 7
Maximum correlation of number of forks and singularitynet_price: -0.08414957722668619
Corresponding lag: 3
```

```
Maximum correlation of number of issues and bittensor_price: 0.34668064041054
Corresponding lag: 1
Maximum correlation of number of issues and fetchai_price: -0.3300554772415265
Corresponding lag: 1
Maximum correlation of number of issues and numerai_price: 0.1468927868795481
Corresponding lag: 4
Maximum correlation of number of issues and oceanprotocol_price: 0.3138641567397095
Corresponding lag: 2
Maximum correlation of number of issues and oraichain_price: 0.18379785566043705
Corresponding lag: 9
Maximum correlation of number of issues and singularitynet_price: -0.08660336169063408
Corresponding lag: 2
```



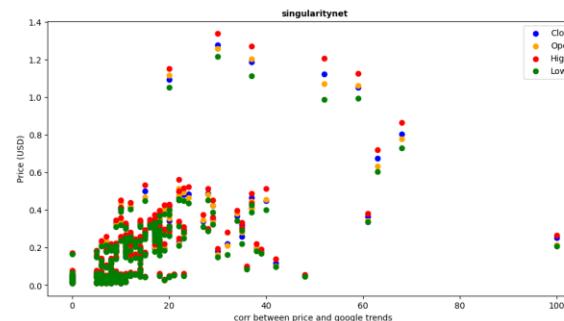
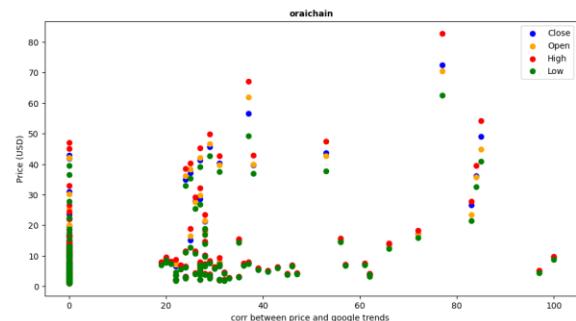
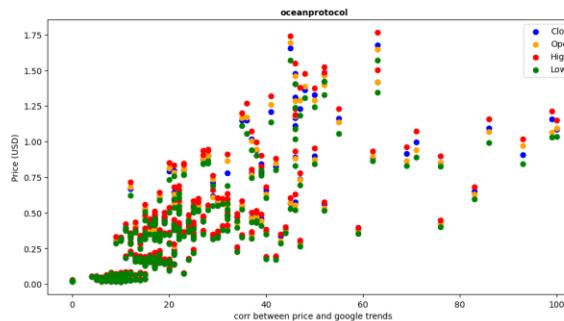
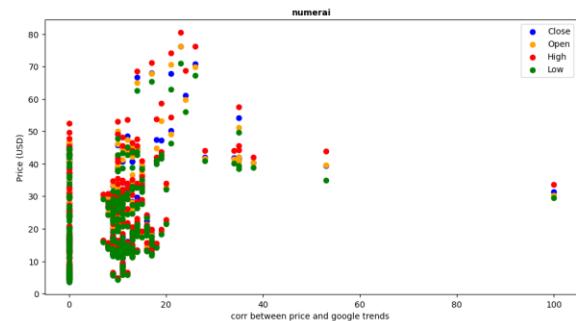
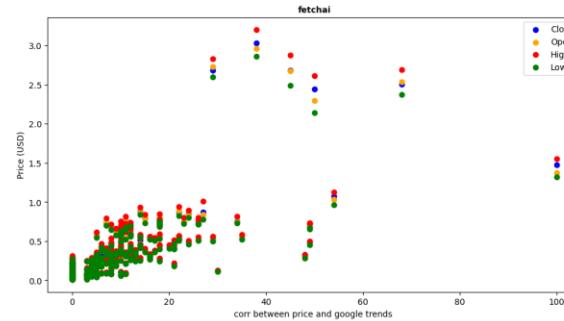
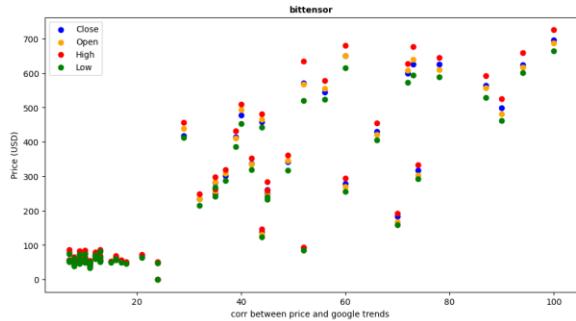
Determine Time Lags for Maximum Correlations (summary)

Analyze different time lags between developer activity and token price to find the ones that maximize correlation. This will help identify any lagged effects between developer activity and token price movements

- Each time lag indicates a week so 2 means two weeks
- The correlation for number of commits and number of issues with token price with different time lags doesn't change significantly and different time lags doesn't impact on the correlation
- For the commit_comment_count with the increase of time lag the correlation with its price increases but it doesn't satisfy for other tokens
- Size of repo: different time lags highly affects on the correlation between repo size and price. However different timelags behave differently for each projects and one can not state a common behavior for all of them . Bittensor is highly sensitive to the time lags and it rises to 0.6 from -0.2
- Number of repo: the same as size , number of repo correlation with price also affected with different timelags but again varies for different cryptos. Bittensor is highly sensitive to the time lags and it rises about 0.3 when time lags is 5
- Number of forks : time lags highly affects on bittensor where with timelag 6 its correlation rise to .6 from -0.2 but the other tokens move smoothly with no dramatic change with different time lags

Additional Data to Improve Analysis

Find and incorporate data on social media activity related to the project, or data on partnerships and collaborations to add another layer of insights to your analysis.

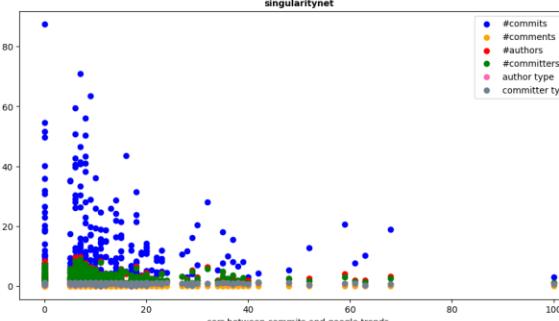
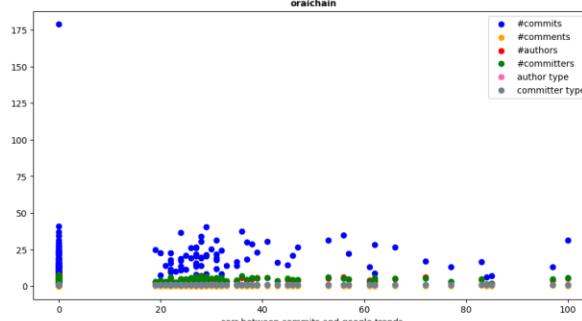
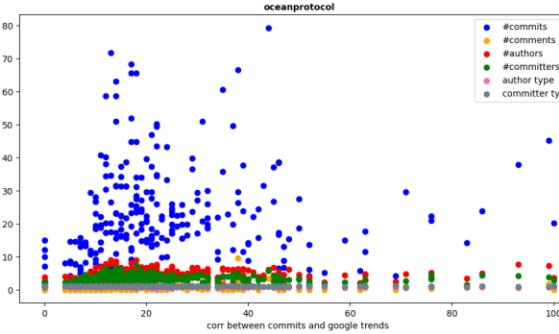
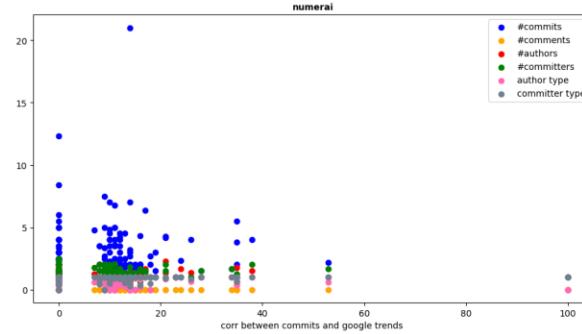
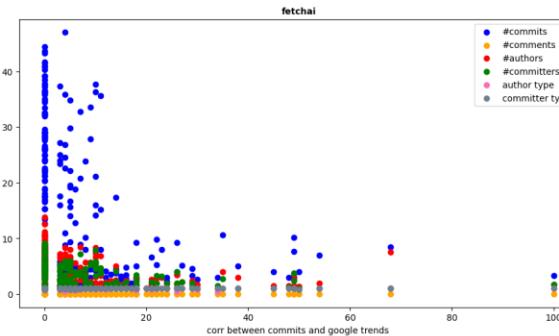
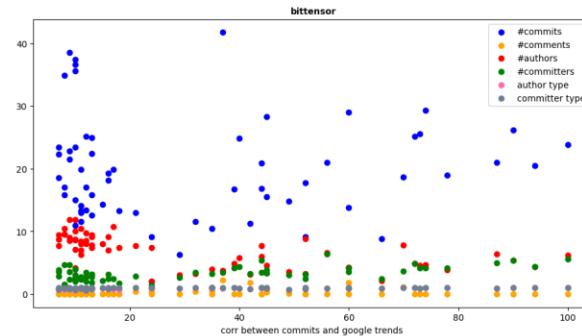


correlation between price and google trends

- It uses google trends as additional data to examine its correlation with price and github datasets
- Google trends are clearly correlated with price in ocean, fetchai and singularity and bittensor
- For the 2 other tokens however there is weak correlation between these factors

Additional Data to Improve Analysis

Find and incorporate data on social media activity related to the project, or data on partnerships and collaborations to add another layer of insights to your analysis.

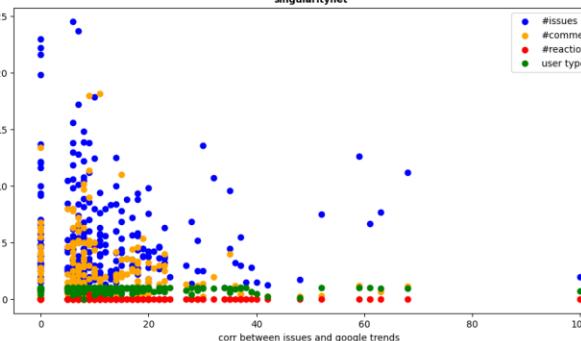
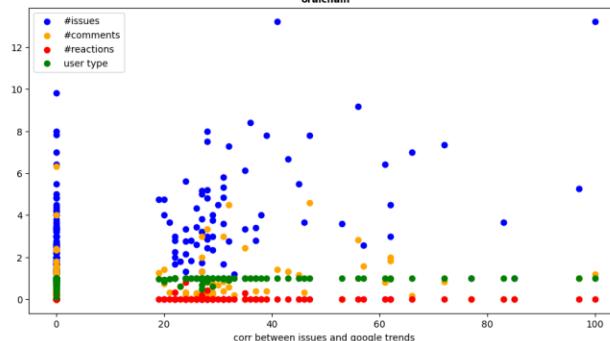
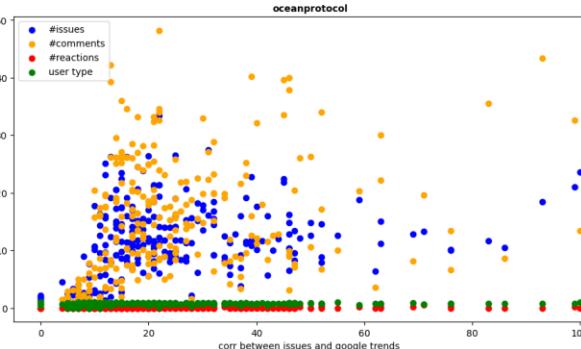
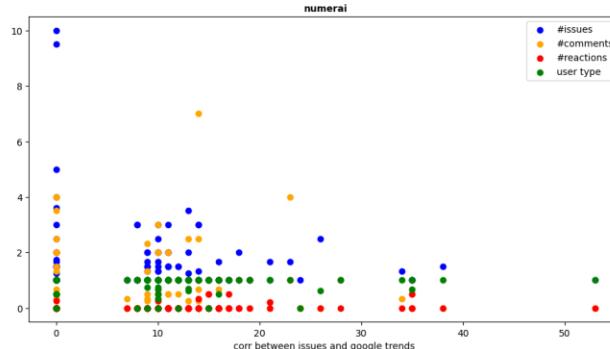
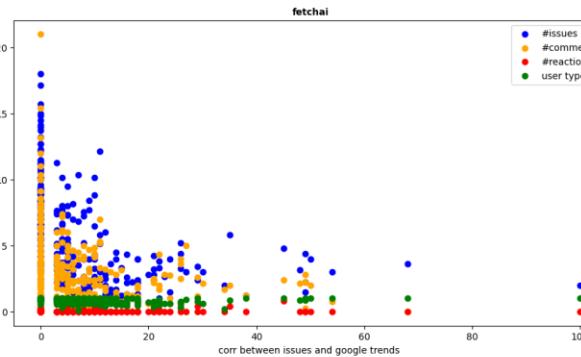
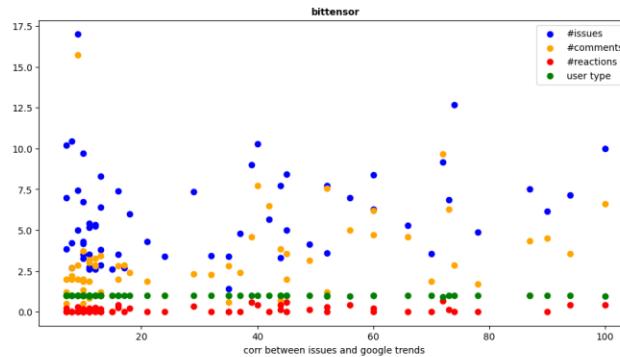


correlation between google trends and github commits

- Bittensor and ocean preices are correlated with github commits but the other ones are not clear

Additional Data to Improve Analysis

Find and incorporate data on social media activity related to the project, or data on partnerships and collaborations to add another layer of insights to your analysis.

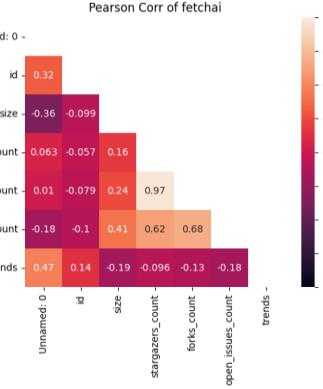
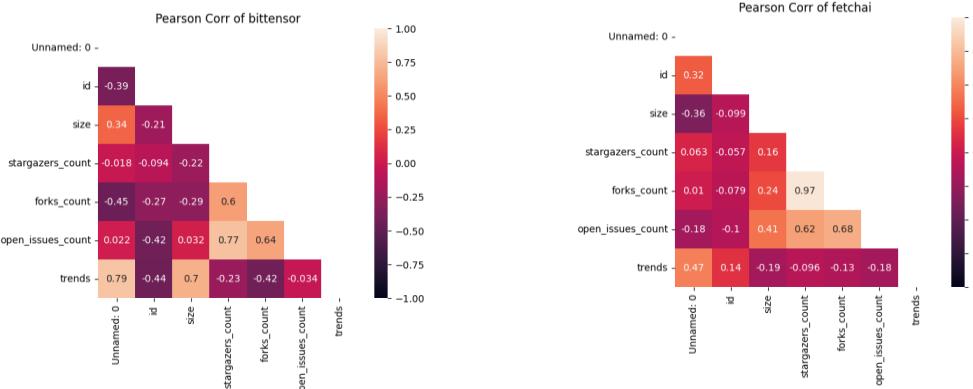


correlation between google trends and github issues

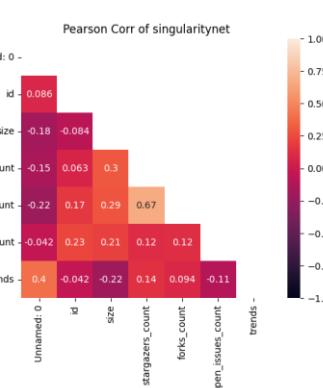
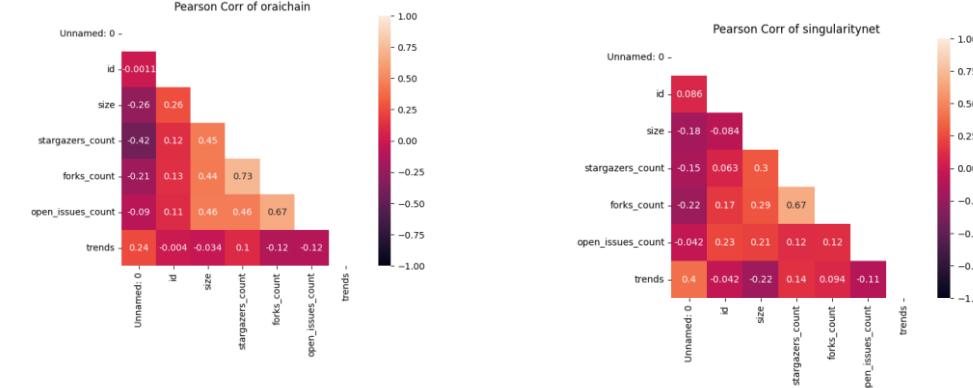
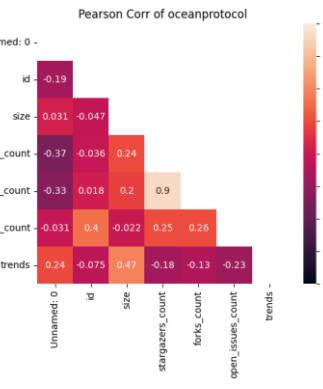
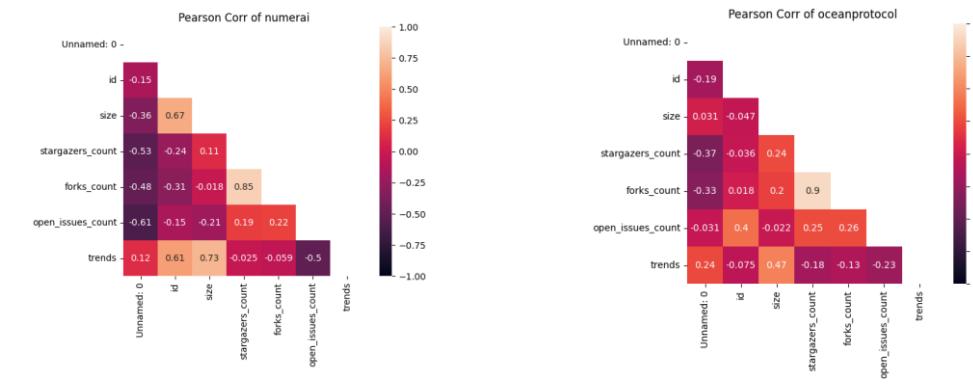
- Oceana and oraichain preices are correlated with github issues but the other tokens are rarely correlated

Additional Data to Improve Analysis

Find and incorporate data on social media activity related to the project, or data on partnerships and collaborations to add another layer of insights to your analysis.



correlation between google trends and github repos



Conclusions