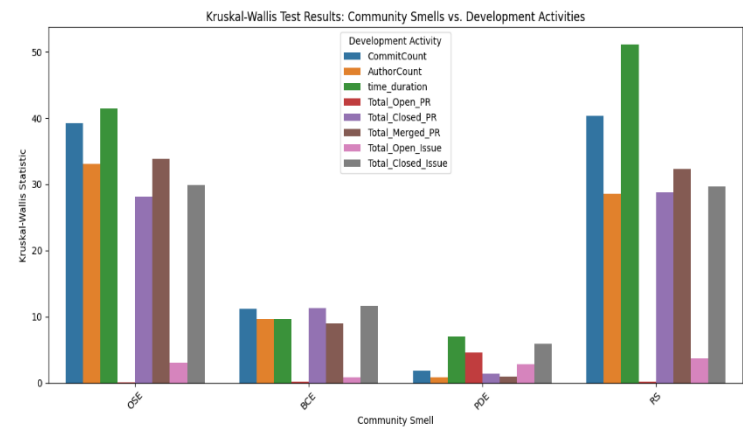
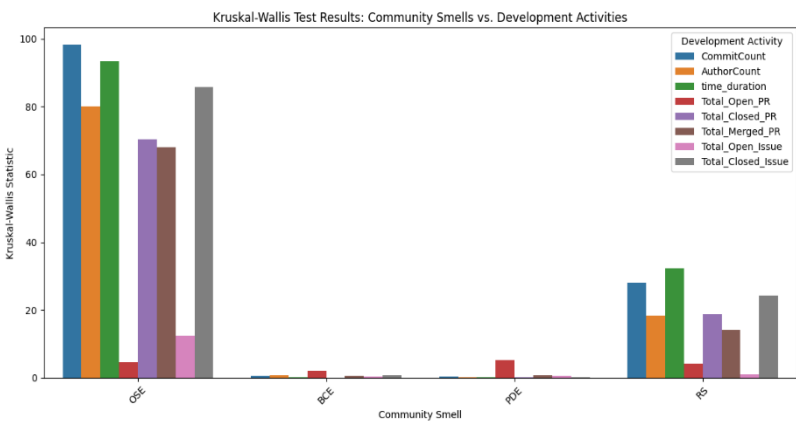


RQ2: To what extent are community smells related to development activities?

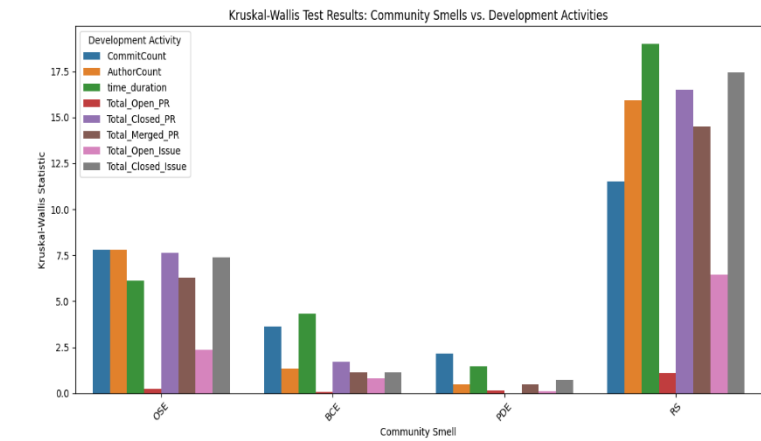
This research question investigates the relationship between community smells and various development activities. To address this, we conduct statistical analyses to examine how detected community smells correlate with key development activities in the software system. Specifically, we apply the Kruskal-Wallis test to assess the impact of community smells on the frequency of changes, analyzing key development metrics across different releases.



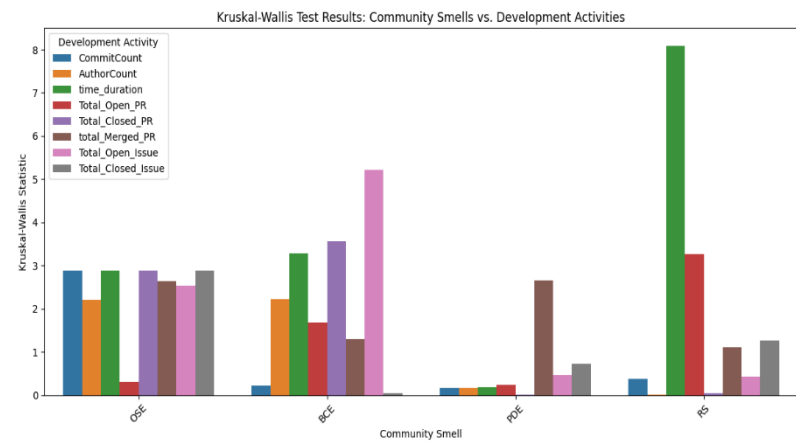
Netdata Project



Transformers



Shardingsphere



Pytorch

Netdata Project:

Community Smell	Metric	Kruskal-Wallis Statistic	p-value
OSE	CommitCount	39.2287562	3.77E-10
	AuthorCount	33.03459785	9.05E-09
	time_duration	41.4215405	1.23E-10
	Total_Open_PR	0.100747639	0.750934276
	Total_Closed_PR	28.13194285	1.13E-07
	Total_Merged_PR	33.87400324	5.88E-09
	Total_Open_Issue	3.027648384	0.081856577
	Total_Closed_Issue	29.92157311	4.50E-08
BCE	CommitCount	11.16386741	0.000834059
	AuthorCount	9.704587142	0.001838086
	time_duration	9.698610757	0.001844074
	Total_Open_PR	0.200731241	0.654131256
	Total_Closed_PR	11.2487371	0.000796772
	Total_Merged_PR	9.012347256	0.002681618
	Total_Open_Issue	0.872442715	0.350279948
	Total_Closed_Issue	11.65142602	0.000641533
PDE	CommitCount	1.804671685	0.179148735
	AuthorCount	0.853658478	0.355519428
	time_duration	7.018668131	0.008066421
	Total_Open_PR	4.625739927	0.031495674
	Total_Closed_PR	1.36566713	0.242557728
	Total_Merged_PR	0.968441001	0.325069297
	Total_Open_Issue	2.871958738	0.090135109
	Total_Closed_Issue	5.945163361	0.014757723
RS	CommitCount	40.28110948	2.20E-10
	AuthorCount	28.51849658	9.28E-08
	time_duration	51.15178864	8.55E-13
	Total_Open_PR	0.201298509	0.653674762
	Total_Closed_PR	28.80910178	7.99E-08
	Total_Merged_PR	32.30829362	1.32E-08
	Total_Open_Issue	3.718387732	0.053816312
	Total_Closed_Issue	29.69267404	5.06E-08

Transformers project:

Community Smell	Metric	Kruskal-Wallis Statistic	p-value
OSE	CommitCount	98.3424	3.52E-23
	AuthorCount	80.05574	3.64E-19
	time_duration	93.45295	4.16E-22
	Total_Open_PR	4.614686	0.031699
	Total_Closed_PR	70.3823	4.89E-17
	Total_Merged_PR	67.99771	1.64E-16
	Total_Open_Issue	12.37842	0.000434
	Total_Closed_Issue	85.78467	2.01E-20
BCE	CommitCount	0.561925	0.453486
	AuthorCount	0.742434	0.388882
	time_duration	0.138744	0.709533
	Total_Open_PR	2.024628	0.154767
	Total_Closed_PR	0.051374	0.82069
	Total_Merged_PR	0.6671	0.414064
	Total_Open_Issue	0.287559	0.591789
	Total_Closed_Issue	0.831469	0.361848
PDE	CommitCount	0.332678	0.564087
	AuthorCount	0.249595	0.61736
	time_duration	0.094076	0.759058
	Total_Open_PR	5.275996	0.021621
	Total_Closed_PR	0.217705	0.640794
	Total_Merged_PR	0.864983	0.352348
	Total_Open_Issue	0.594613	0.440641
	Total_Closed_Issue	0.157928	0.691072
RS	CommitCount	28.02152	1.20E-07
	AuthorCount	18.26068	1.93E-05
	time_duration	32.32585	1.30E-08
	Total_Open_PR	4.217217	0.040016
	Total_Closed_PR	18.67501	1.55E-05
	Total_Merged_PR	14.06485	0.000177
	Total_Open_Issue	0.962601	0.326532
	Total_Closed_Issue	24.17257	8.81E-07

Shardingsphere project:

Community Smell	Metric	Kruskal-Wallis Statistic	p-value
OSE	CommitCount	7.8	0.005225
	AuthorCount	7.801922	0.005219
	time_duration	6.106854	0.013466
	Total_Open_PR	0.239011	0.624921
	Total_Closed_PR	7.61441	0.00579
	Total_Merged_PR	6.282051	0.012197
	Total_Open_Issue	2.343694	0.125791
	Total_Closed_Issue	7.405128	0.006504
BCE	CommitCount	3.62549	0.056901
	AuthorCount	1.325817	0.249551
	time_duration	4.333507	0.037369
	Total_Open_PR	0.091387	0.762422
	Total_Closed_PR	1.70932	0.191074
	Total_Merged_PR	1.129412	0.287901
	Total_Open_Issue	0.806566	0.369138
	Total_Closed_Issue	1.129412	0.287901
PDE	CommitCount	2.140741	0.143433
	AuthorCount	0.474191	0.491065
	time_duration	1.452567	0.228116
	Total_Open_PR	0.153439	0.69527
	Total_Closed_PR	0.00742	0.931355
	Total_Merged_PR	0.474074	0.491119
	Total_Open_Issue	0.109061	0.741216
	Total_Closed_Issue	0.740741	0.389424
RS	CommitCount	11.52842	0.000685
	AuthorCount	15.93866	6.54E-05
	time_duration	19.00936	1.30E-05
	Total_Open_PR	1.090226	0.296421
	Total_Closed_PR	16.51743	4.82E-05
	Total_Merged_PR	14.50316	0.00014
	Total_Open_Issue	6.452909	0.011077
	Total_Closed_Issue	17.43368	2.98E-05

Pytorch project:

Community Smell	Metric	Kruskal-Wallis Statistic	p-value
OSE	CommitCount	2.880147	0.089678
	AuthorCount	2.205788	0.137494
	time_duration	2.880735	0.089645
	Total_Open_PR	0.316072	0.573978
	Total_Closed_PR	2.88	0.089686
	total_Merged_PR	2.646891	0.103753
	Total_Open_Issue	2.53293	0.111493
	Total_Closed_Issue	2.880147	0.089678
BCE	CommitCount	0.222165	0.637395
	AuthorCount	2.216176	0.136571
	time_duration	3.280221	0.070119
	Total_Open_PR	1.68599	0.19413
	Total_Closed_PR	3.554462	0.059386
	total_Merged_PR	1.303085	0.253651
	Total_Open_Issue	5.212072	0.022431
	Total_Closed_Issue	0.044464	0.832993
PDE	CommitCount	0.169544	0.680518
	AuthorCount	0.169595	0.680472
	time_duration	0.182372	0.669343
	Total_Open_PR	0.235217	0.627682
	Total_Closed_PR	0.008372	0.927096
	total_Merged_PR	2.664461	0.102613
	Total_Open_Issue	0.471243	0.492416
	Total_Closed_Issue	0.72934	0.393097
RS	CommitCount	0.373364	0.541177
	AuthorCount	0.012145	0.912248
	time_duration	8.09464	0.00444
	Total_Open_PR	3.258682	0.071046
	Total_Closed_PR	0.040134	0.841219
	total_Merged_PR	1.106978	0.29274
	Total_Open_Issue	0.437347	0.508406
	Total_Closed_Issue	1.25866	0.261905