Supplementary - Learning On-the-Job to Re-rank Anomalies from Top-1 Feedback

6.1 CLUSTERED DATASETS Details: We provide the details of how the datasets in CLUSTERED DATASETS were generated from existing multi-class datasets in Table 7. We list down from which randomly sampled class different type of instances ('anomaly', 'rare nominal', 'frequent nominal') were sampled. The numbers in square bracket indicate the number of instances selected from each class. If the number is not present, it means the entire class was used.

Table 7: List of CLUSTERED DATASETS. We list the type of instances and from what class were they sampled.

Dataset	# Instances	Anom. %	Description
Vowels	2821	1.77	Anomaly (Class 4[25]) Rare Nominals (Class 8[25]) Frequent Nominals (Class 2,3,6)
Optdigits	592	4.22	Anomaly (Class 8[25]) Rare Nominals (Class 2[25]) Frequent Nominals (Class 1,3,5)
Letters	2433	2.05	Anomaly (Class 25[50]) Rare Nominals (Class 7[50]) Frequent Nominals (Class 20, 3, 15)
Sensor	16257	0.92	Anomaly (Class 8[150]) Rare Nominals (Class 5[150]) Frequent Nominals (Class 1, 7, 9)
Segment	1090	4.58	Anomaly (Class 1[50]) Rare Nominals (Class 2[50]) Frequent Nominals (Class 5, 6, 7)
Statlog	1665	3.00	Anomaly (Class 2[50]) Rare Nominals (Class 4[50]) Frequent Nominals (Class 1, 3, 5, 7)
Vehicle	495	6.06	Anomaly (Class 0[30]) Rare Nominals (Class 3[30]) Frequent Nominals (Class 1, 2)
Svmguide	544	9.19	Anomaly (Class +3[50]) Rare Nominals (Class -3[50]) Frequent Nominals (Class -2, -1, 1, 2)

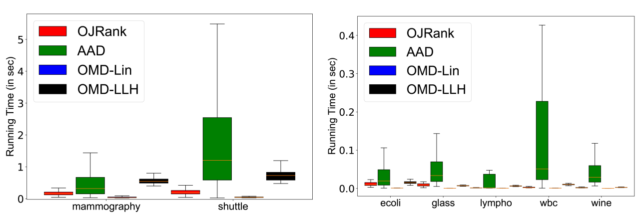
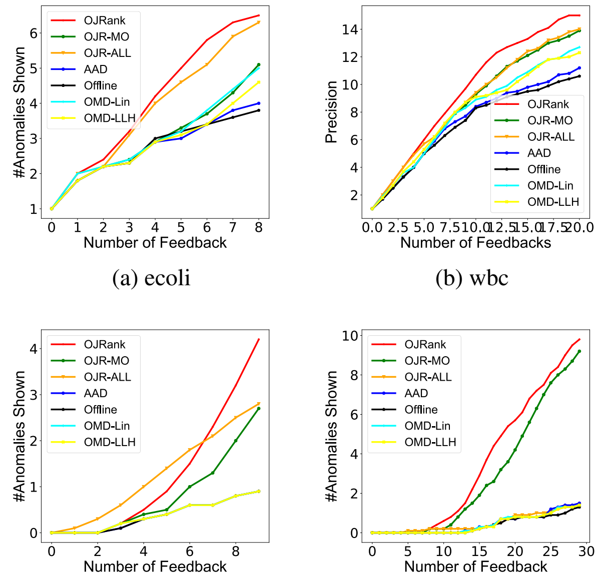


Figure 5: Avg. runtime per update on several BENCHMARK DATASETS.

6.2 Results - *precision@b*: We showed in Table 3 and Table 4 that OJRANK outperforms other baseline methods in term of *precision@b*. We now show how number of true anomalies discovered by the method change with the number of feedbacks provided by the expert on several BENCHMARK DATASETS (Figure 6) and several CLUSTERED DATASETS (Figure 7). We note that OJRANK is better than other baselines in leveraging the feedback and showing true anomalies to the expert.

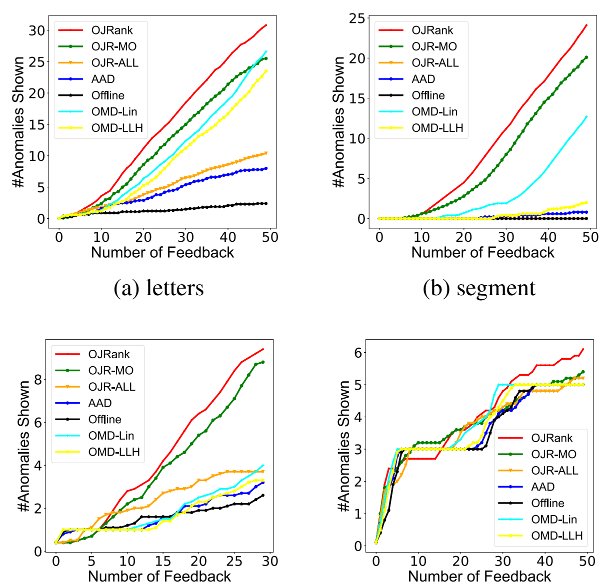
6.3 Response time to update: We supplement the results from Figure 3 by reporting the runtime over the remaining BENCHMARK DATASETS in Figure 5. The plots corroborate our earlier insights that OJRANK provides near instantaneous update and has low variance in runtime across datasets.



(a) ecoli (b) wbc

(c) wine (d) vertebral

Figure 6: Number of anomalies shown by each method over feedback rounds for several BENCHMARK DATASETS.



(a) letters (b) segment

(c) vehicle (d) svmguide

Figure 7: Number of anomalies shown by each method over feedback rounds for several CLUSTERED DATASETS.

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