Stacked Filters Author's Feedback

Anonymous Author(s)

1 LEARNED FILTERS IN INTEGER EXPERIMENTS

To further complete our synthetic data experiments, we evaluated the Learned Filter on our synthetic dataset. The Learned Filter performs poorly in this instance because it is unable to learn a pattern in the randomly generated keys. This means that its performance becomes similar to a standard Bloom Filter. However, it is slightly larger because it stores a full ML model as well.

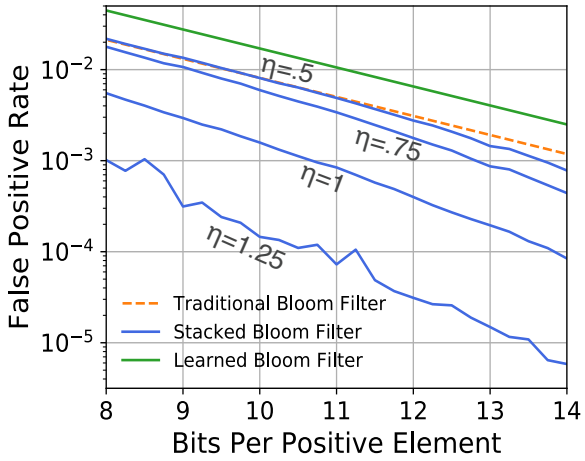

Figure 1: With synthetic data, the Learned Filter performs similarly to a standard Bloom Filter with additional computational and storage overhead from the model.

2 ADDITIONAL EXPERIMENT: FIREHOSE DATASET

In order to demonstrate the variety of uses for Stacked Filters, we have run an additional set of experiments against a standard benchmark in packet filtering caled Firehose [1]. This benchmark simulates an environment where some subset of packets each keyed by a unique id is labeled suspicious and need to be filtered. We let 10% of the packets be marked suspicious as the positive set, which left the other 90% of packets as a negative set. We then used the generator provided by Firehose to produce packets which we filtered based on the the packet ID. We further restricted the known negative set of the Stacked Filter to 20% of the negative set in the same manner as we did for the URL blacklisting set. From this, we measured the latency and false positive rate of Stacked, Learned, and Traditional filters in the same manner as we did for URL blacklisting.

As can be seen by figure 2, Stacked Filters perform very favorably in this context, providing multiple magnitudes lower FPRs than either traditional or Learned Filters. This is largely because of the high level of skew which the Stacked Filters are able to take advantage of. Understandably, Learned Filters perform poorly in this use case because the Packet IDs carry no intrinsic meaning and therefore lack a pattern for the Learned Filters to classify based on.

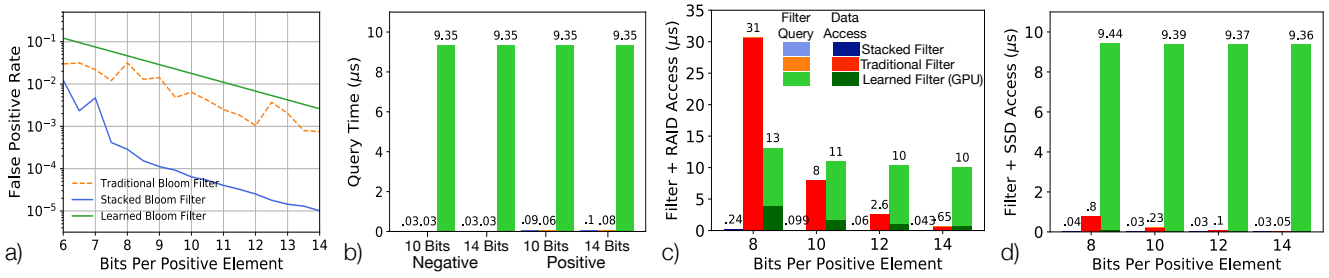

Figure 2: In the use case described by the Firehose benchmark, Stacked Filters performed very strongly as compared to both traditional and Learned Filters.

REFERENCES

[1] K. Anderson and S. Plimpton. Firehose streaming benchmarks. Technical report, Sandia National Laboratory, 2015.