Web Application Testing: Using Tree Kernels to Detect Near-duplicate States in Automated Model Inference

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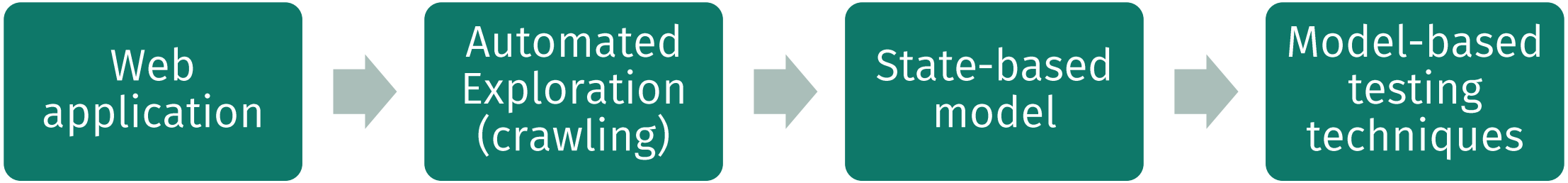
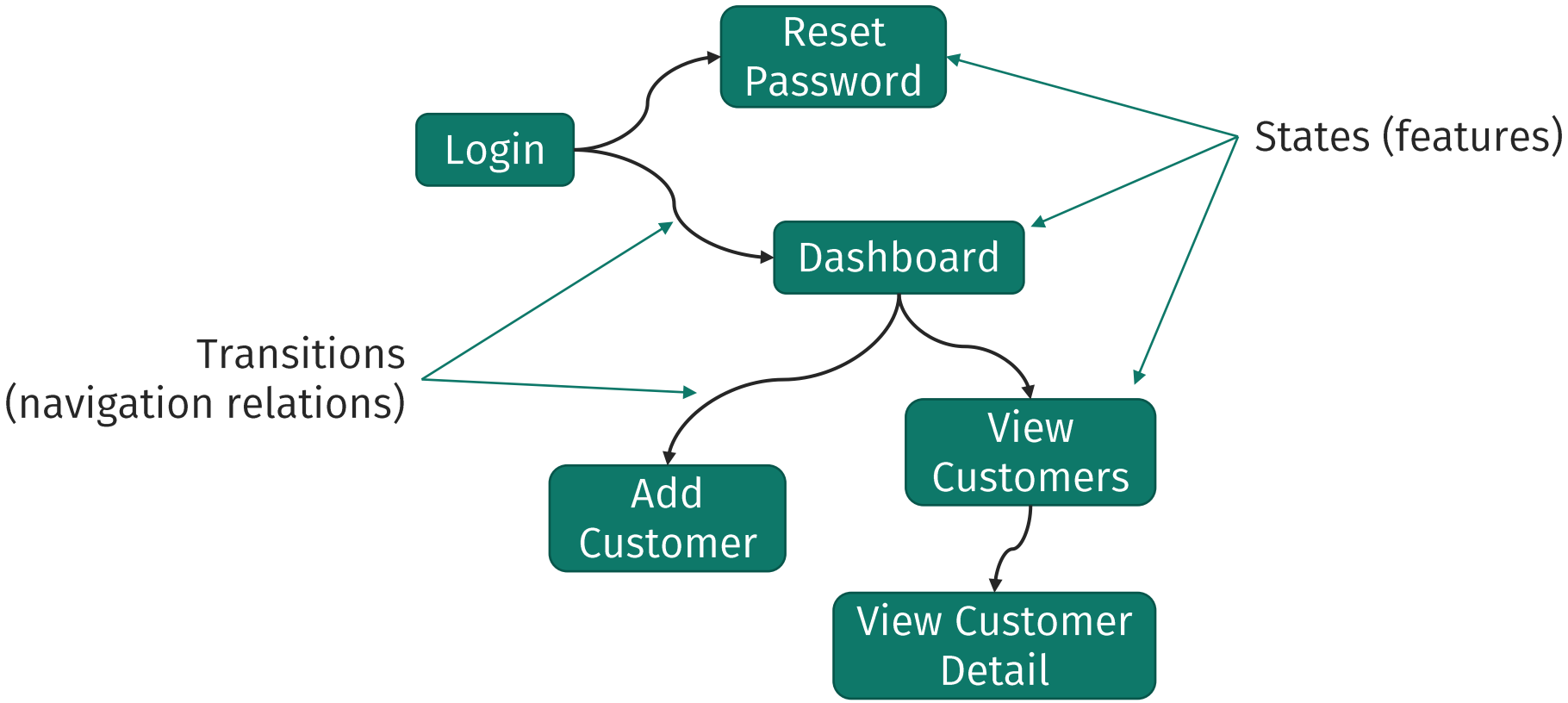
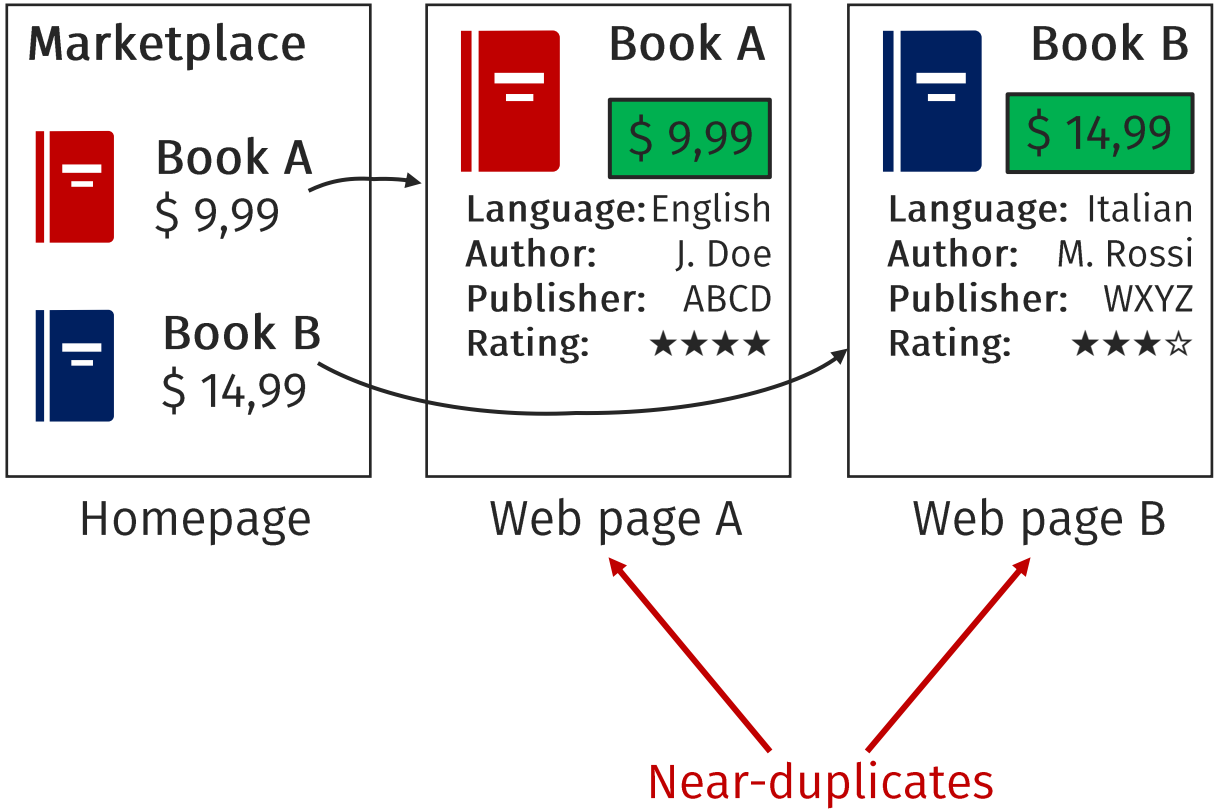
E2E testing of web applications



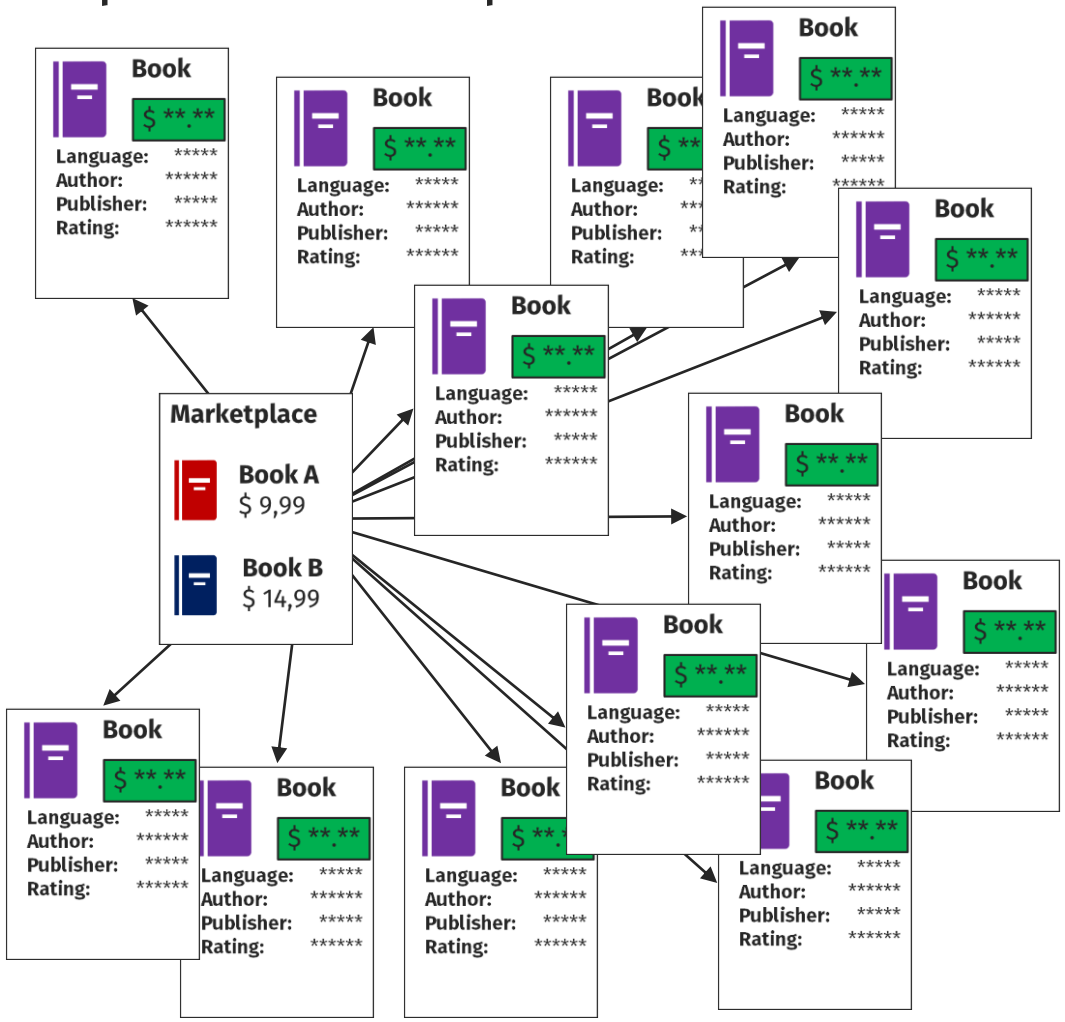
State-based web application models



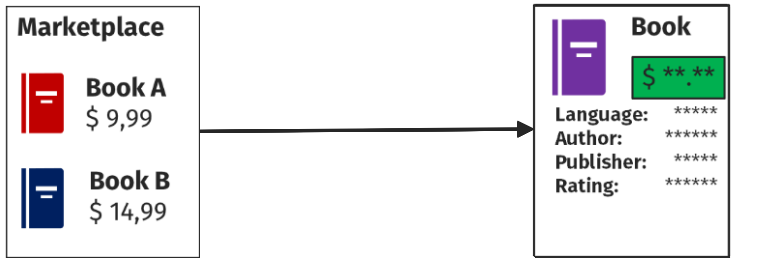
The near-duplicate problem



The near-duplicate problem



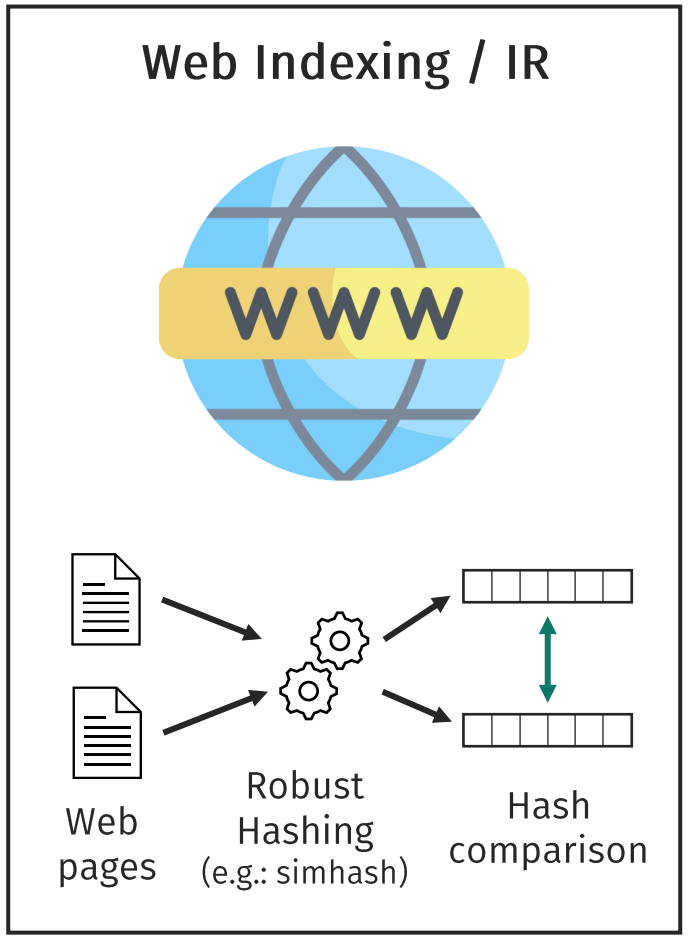
The challenge: detecting near-dupes

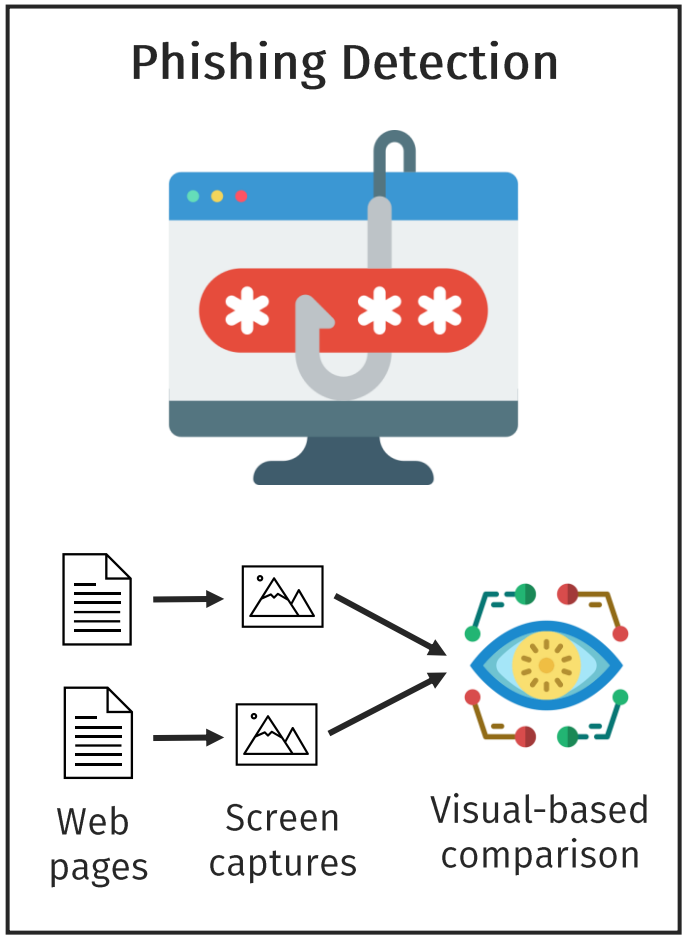


Catalog

Book detail page

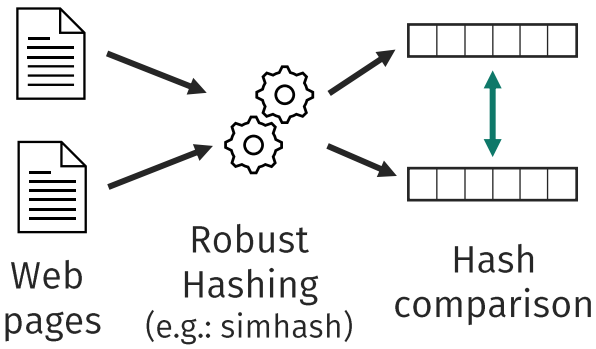
Related works and proposed solution



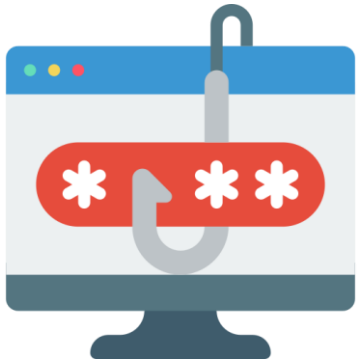


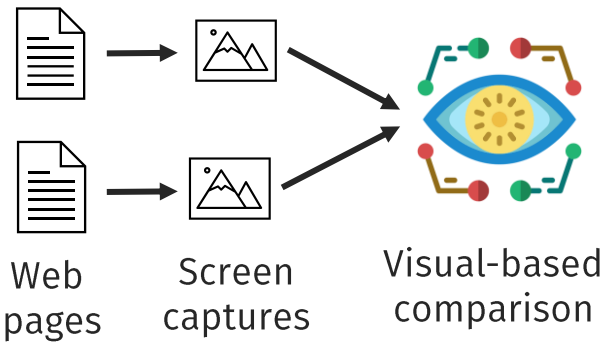
Related works and proposed solution

Web Indexing / IR

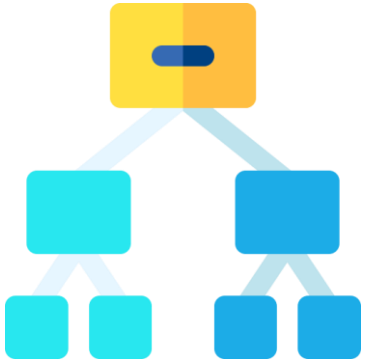


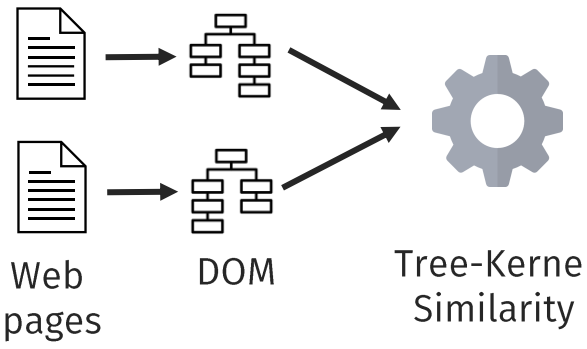
Phishing Detection



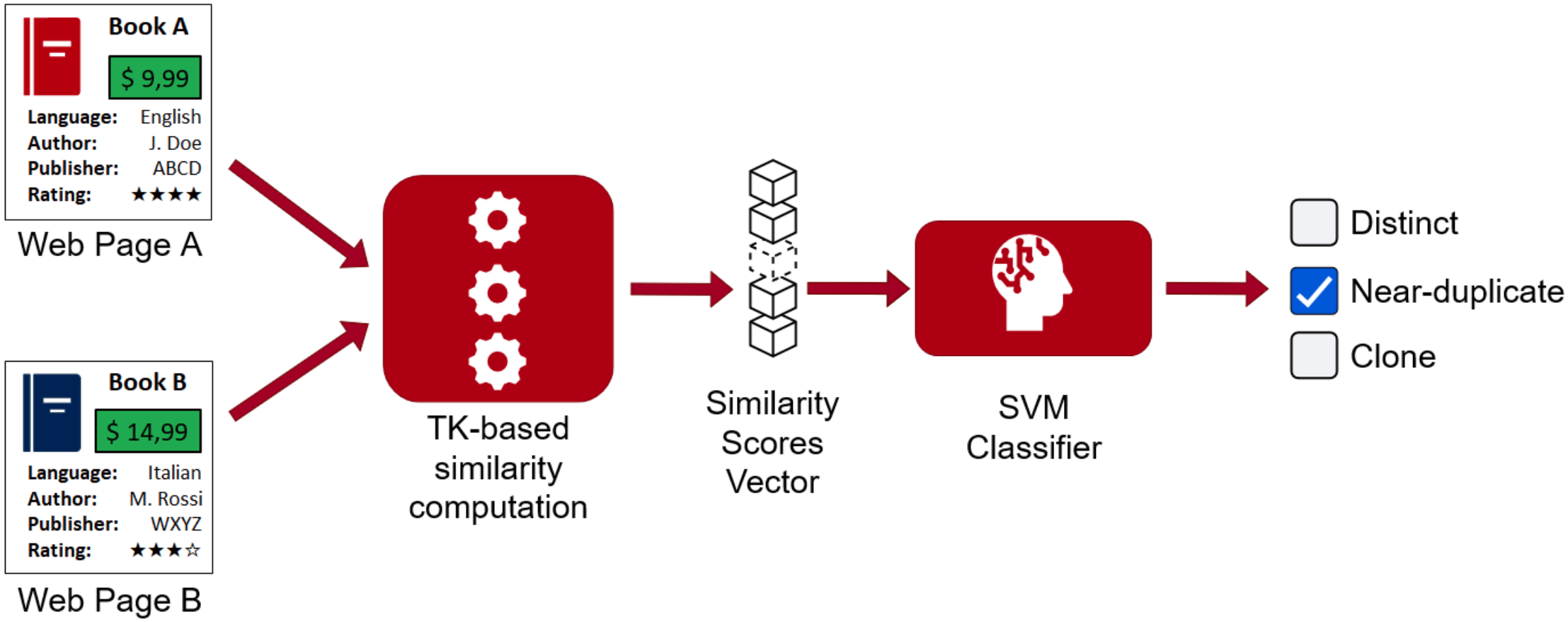


Our Approach





Tree Kernel-based near-dupes detection



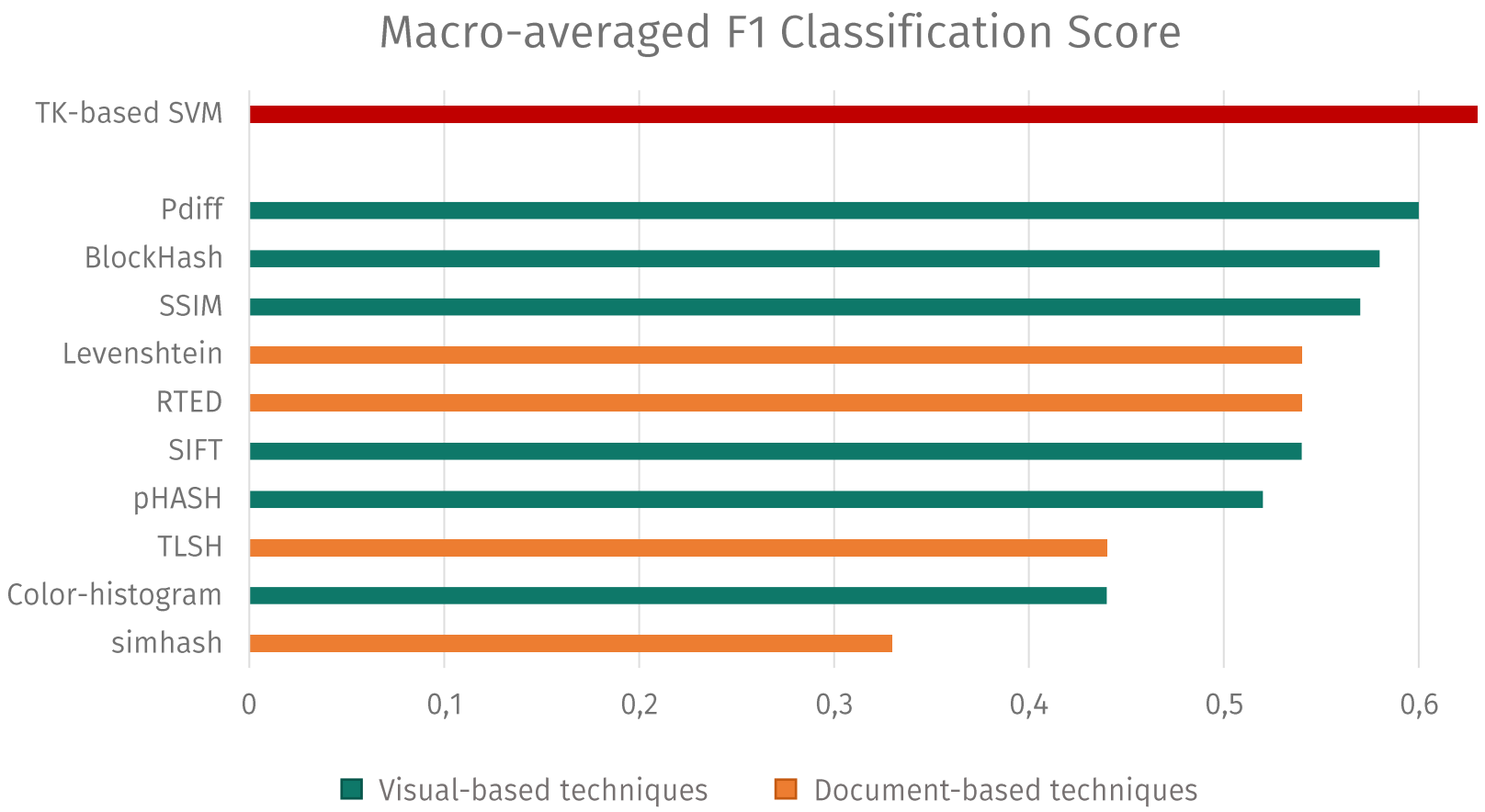
Experimental Framework

We're replicating the procedure presented at ICSE20 [1]

- Near-duplicate detection framed as a **classification task**
- Leverage the same massive dataset (~100k web page pairs)
- Measure performance using **F1 classification score**

[1] Yandrapally et al. "*Near-duplicate detection in web app model inference.*" *Proceedings of the ACM/IEEE 42nd International Conference on Software Engineering*. 2020.

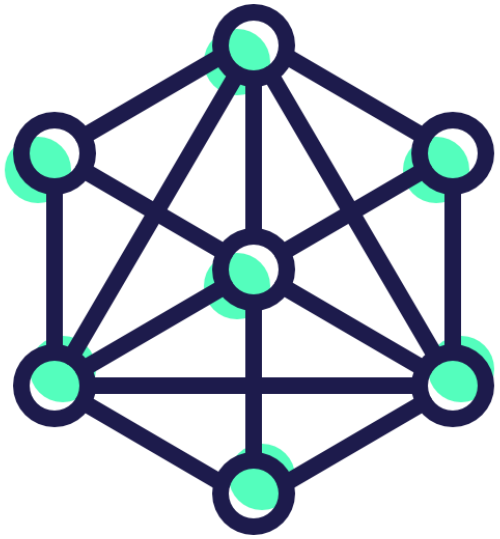
Emerging Results



3% improvement w.r.t. Pdiff (best, **visual-based** technique, but ~**5 times slower**)

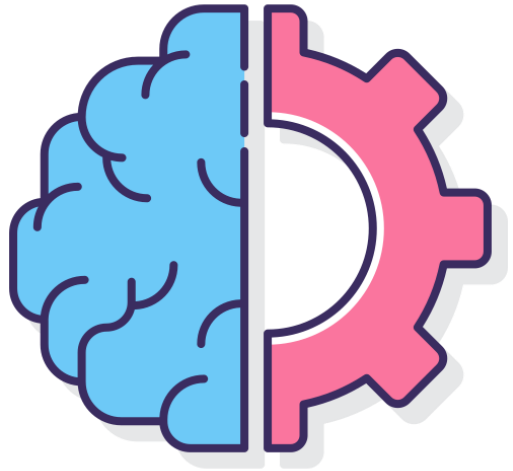
10% to **30% improvement** w.r.t. similar document-based techniques

Future research



Apply to Model Inference!

Custom Tree-Kernels



Deep Learning / Embeddings

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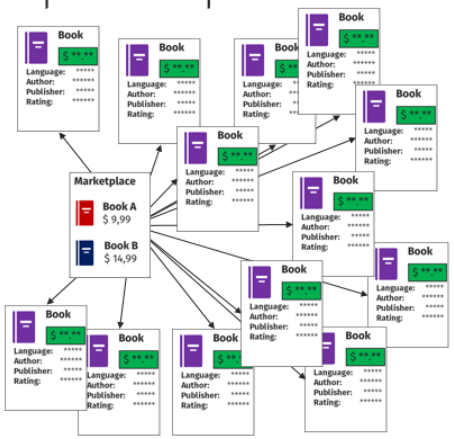
The near-duplicate problem



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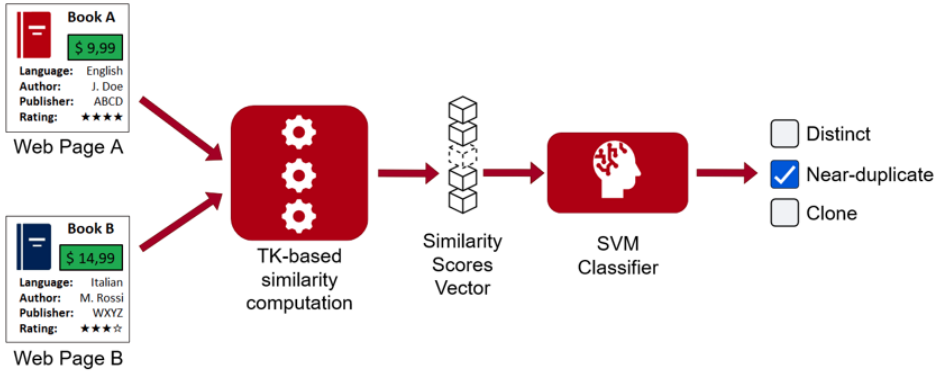
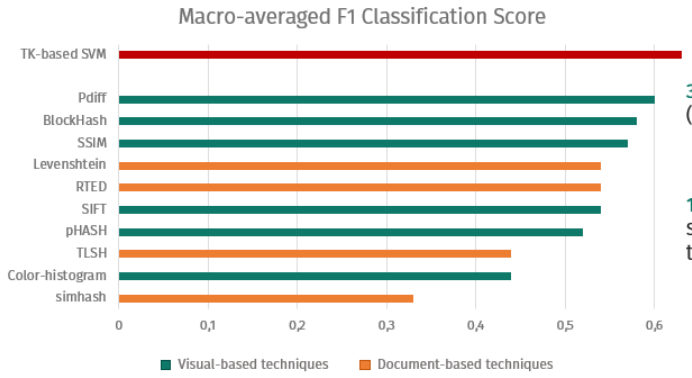


Emerging Results



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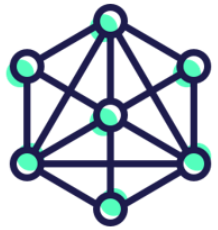

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