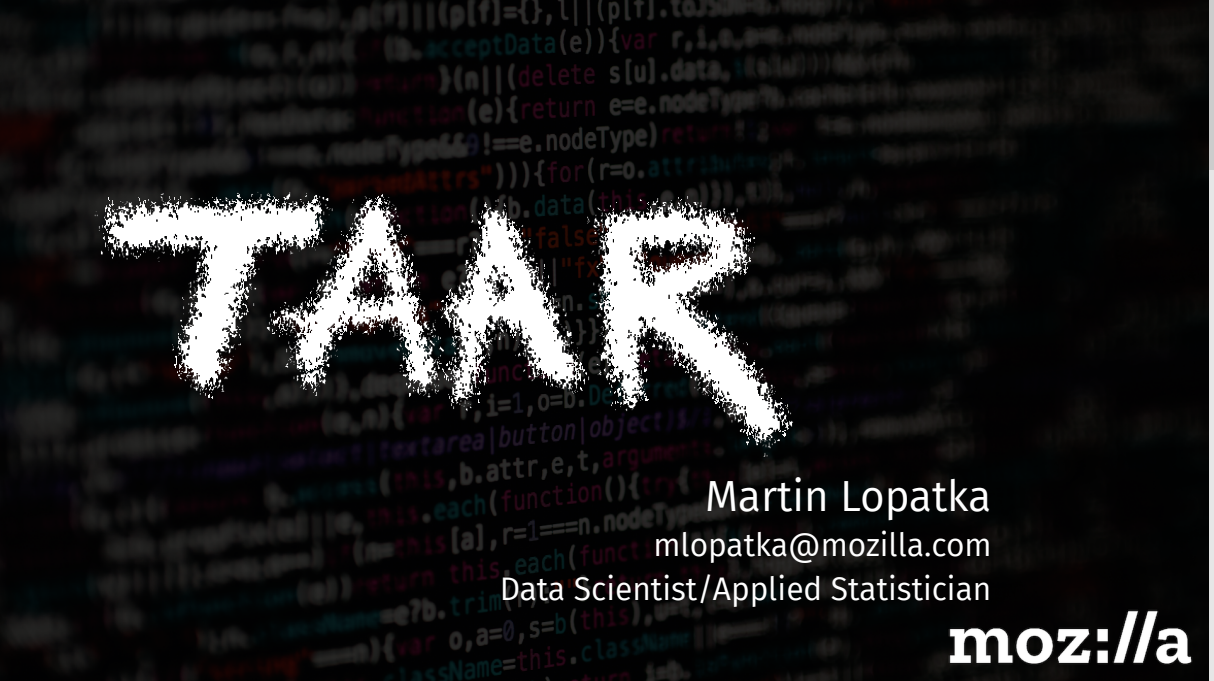
2019-06-10

- Personalised web browsing experience is hard
- Especially with a rigorous and respectful privacy policy
- Ultimately, many of the approaches in UMAP strive to find innovative ways to extract a meaningful signal from very noisy data.



TAAR
Martin Lopatka
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Data Scientist/Applied Statistician

- Martin Lopatka
- Time we have through… Mozilla's approach to recommending browser extensions
- T.A.A.R.
- Curiosity vs. builders -> move **spatial anchor**
- given the time, focus on a very brief overview, and two specific design choices
- Privacy by design and CLLR

Telemetry

Firefox Telemetry (optionally) measures and collects non-personal, performance and usage information.[1]

[1] https://wiki.mozilla.org/Telemetry

moz://a

└Telemetry

Firefox Telemetry (optionally) measures and collects non-personal, performance and usage information.

- application localization identifier: (ch-de, br-pt)
- operating system
- subsession length
- bookmark count
- open tab count
- unique TLDs
- add-ons installed

Telemetry-Aware Add-on Recommender

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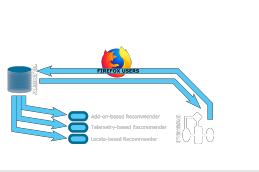


- Full system Spec
- Three modules each leveraging different subsets of client information based on availability.
- Individual recommendations combined via linear stacked ensemble
- These are domain specific and specific to our telemetry infra, so lets treat them like black boxes
- more interesting is the comparison of functions for determining individual weighting of the recommendations.

Differential Privacy

- Differentially private release mechanism for frequencies reports an approximate answer to an ***item:count*** distribution.
- Noise must be chosen to preserve the usefulness of the provided answer while protecting the privacy of the more rare counts

Introduction to DP: https://robertovitillo.com/2016/07/29/differential-privacy-for-dummies/

└Differential Privacy

- Formalizes the idea that released data set can not be used to infer whether any one person is present
- Typically generated on the basis of a known distribution and some known noise distribution.
- We adapt this technique to generate add-on installation frequency tables for each locale according to the following procedure
- Guards against Overfitting

Log Likelihood Ratio Cost (cLLR)

```
'zh-CN': [('guid_01', 0.75),...,('guid_02', 0.05)],
'fr-FR': [('guid_03', 0.24),...,('guid_04', 0.01)],
...,
'en-US': [('guid_04', 0.18),...,(guid_05', 0.02)]
```

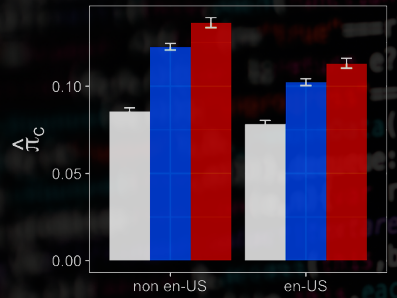
include boxplots vs other metrics.

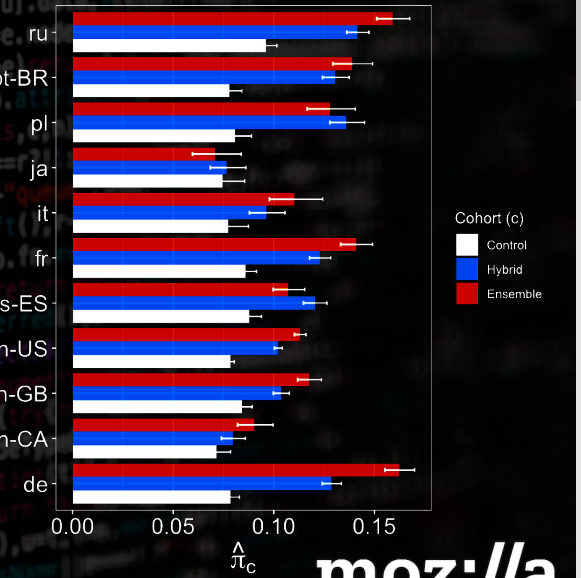
└Log Likelihood Ratio Cost (cLLR)

'zh-CN': [('guid_01', 0.75),...,('guid_02', 0.05)],
'fr-FR': [('guid_03', 0.24),...,('guid_04', 0.01)],
...,
'en-US': [('guid_04', 0.18),...,(guid_05', 0.02)]
include boxplots vs other metrics.

- better usage of full signal if component modules a probabilistic (flavoured)
- Symmetry also accounts for incorrect recommendations (instead of just relative rank fo correct recommendations and the relevance score)
- Versus Discounted Cumulative Gain (DCG), and versus Mean Average Precision (MAP) for including in the recommendation list at all

Performance





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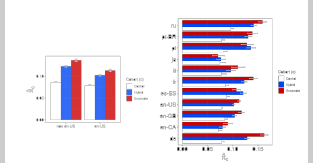

- variable availability of our data, not only in terms of quantity but in terms of fields
- offer users granular choice in Telemetry
- Performs well and scales with data availability
- And 100% open source
- TAAR Served over 450K recommendations to 348 900 unique clients

Acknowledgements

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David Zeber
Alessio Placitelli
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Fredrik Wollsén
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Stuart Colville
Shell Escalante
Scott Devaney

AMO team
InfoSec
QA team
Florian Hartmann
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- Thank you all for choosing to come engage with me here
- I'll be happy... questions
- but first... acknowledgements