Anti-Ad Blocking Strategy: Measuring its True Impact

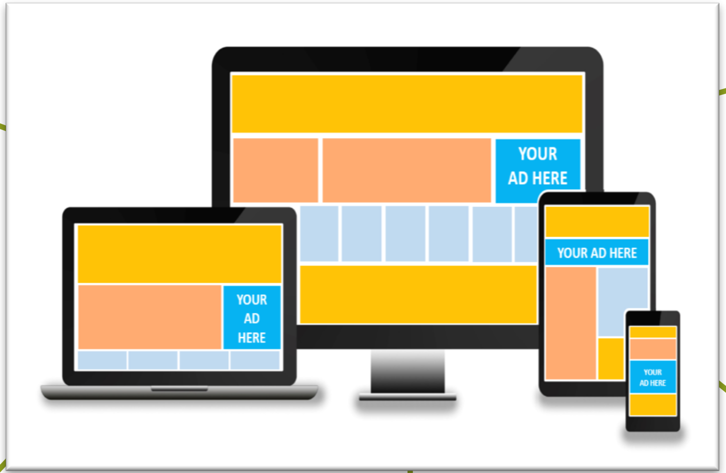
Atanu R. Sinha (Adobe), Meghanath Macha (CMU), Pranav Maneriker (Adobe), Sopan Khosla (Adobe), Avani Samdariya (Adobe), Navjot Singh (IIT Bombay)

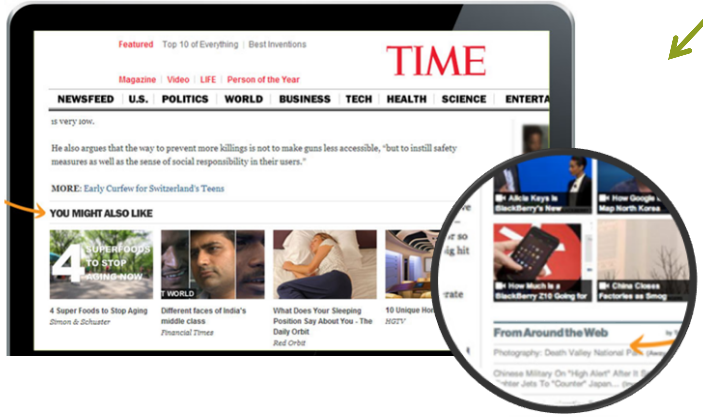
Presenter – Deepak Pai (Adobe)

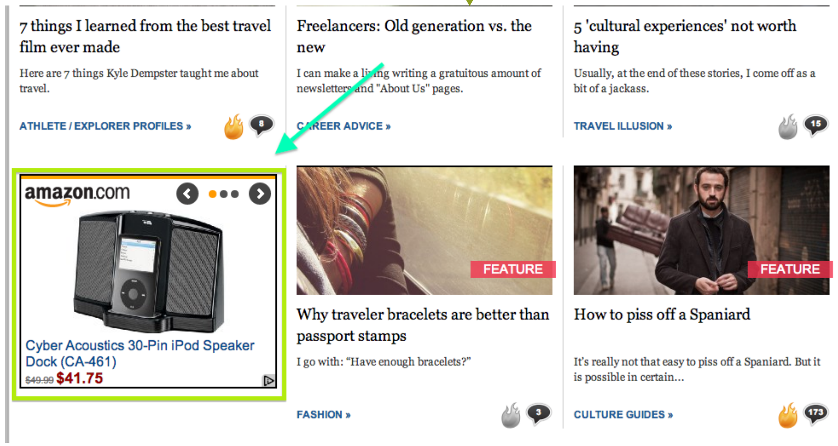
Outline

- What is Ad-blocking?
- What is Anti-ad blocking?
- What is the research problem?
- Method
- Solution
- Evaluation

Online Advertisements





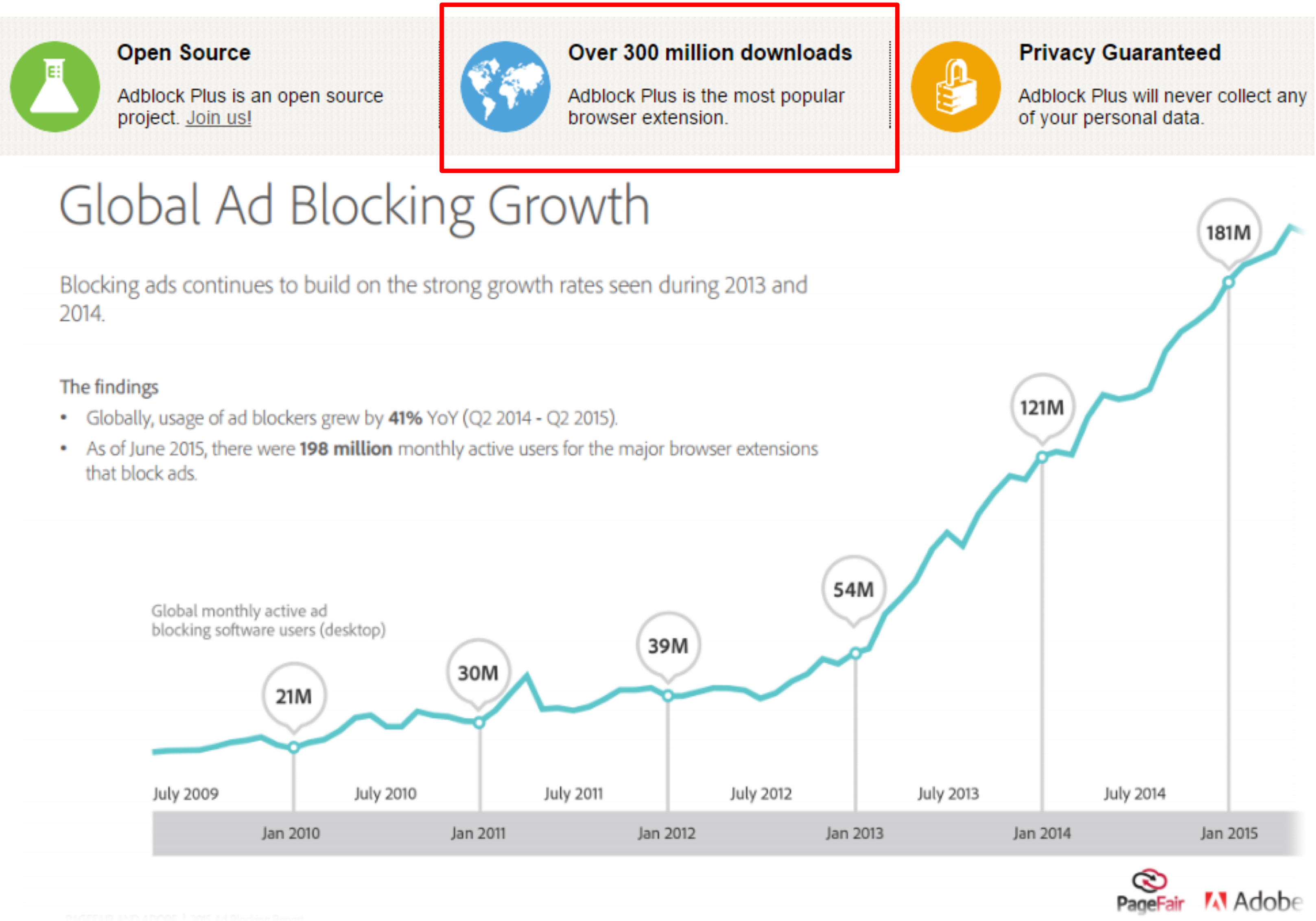


Adobe

Meet the Blocker!

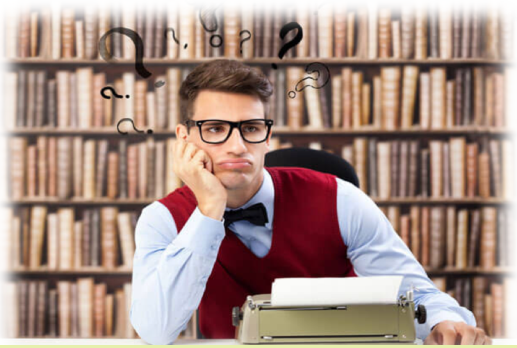
Ad-Blocking is on a Rise

- **198 million** active ad-block users globally as on June'15
- Ad blocking **grew by 41%** globally in 2014-15.
- US ad blocking **grew by 48%** to reach 45 million users
- UK ad blocking **grew by 82%** to reach 12 million users



Source: The cost of ad blocking, PageFair and Adobe 2015 ad blocking report

Effect of Ad-Blocking on:

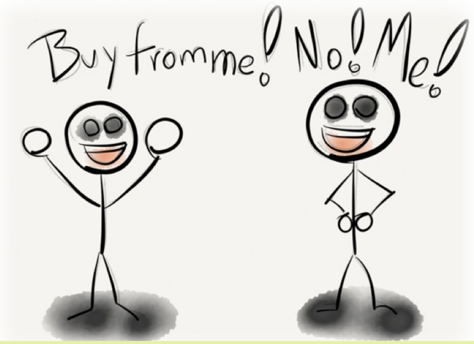


Publisher

Ad revenue loss, the main source of income for most of them

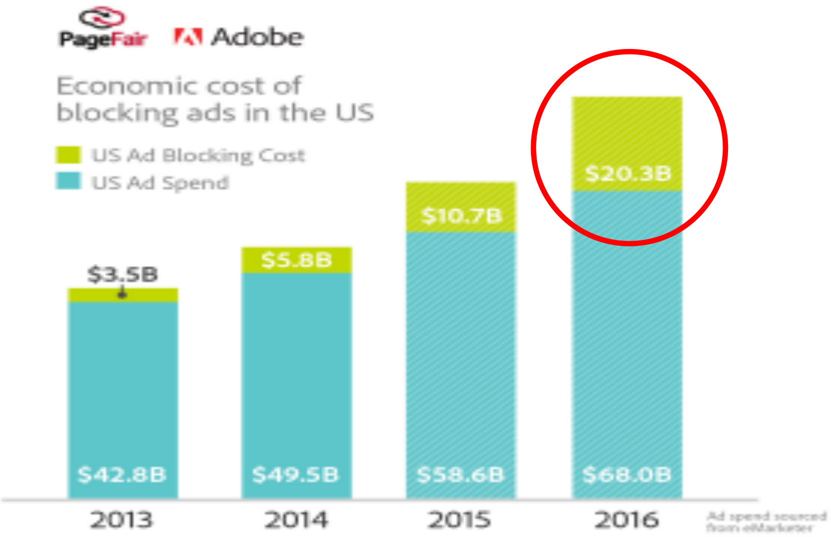
User

Threat to existence of favorite sites and free internet content

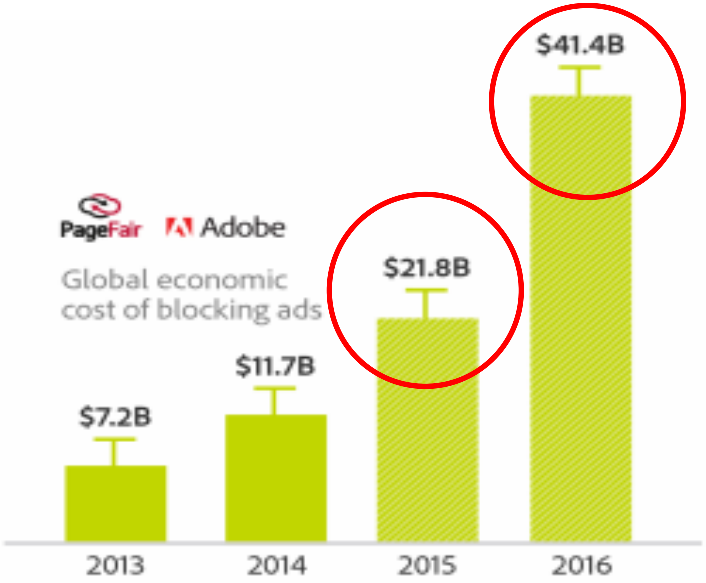


Advertiser

Potential views on ads get limited



- Resources like bandwidth are still costing money
- The estimated loss of global revenue in 2015 was $21.8B

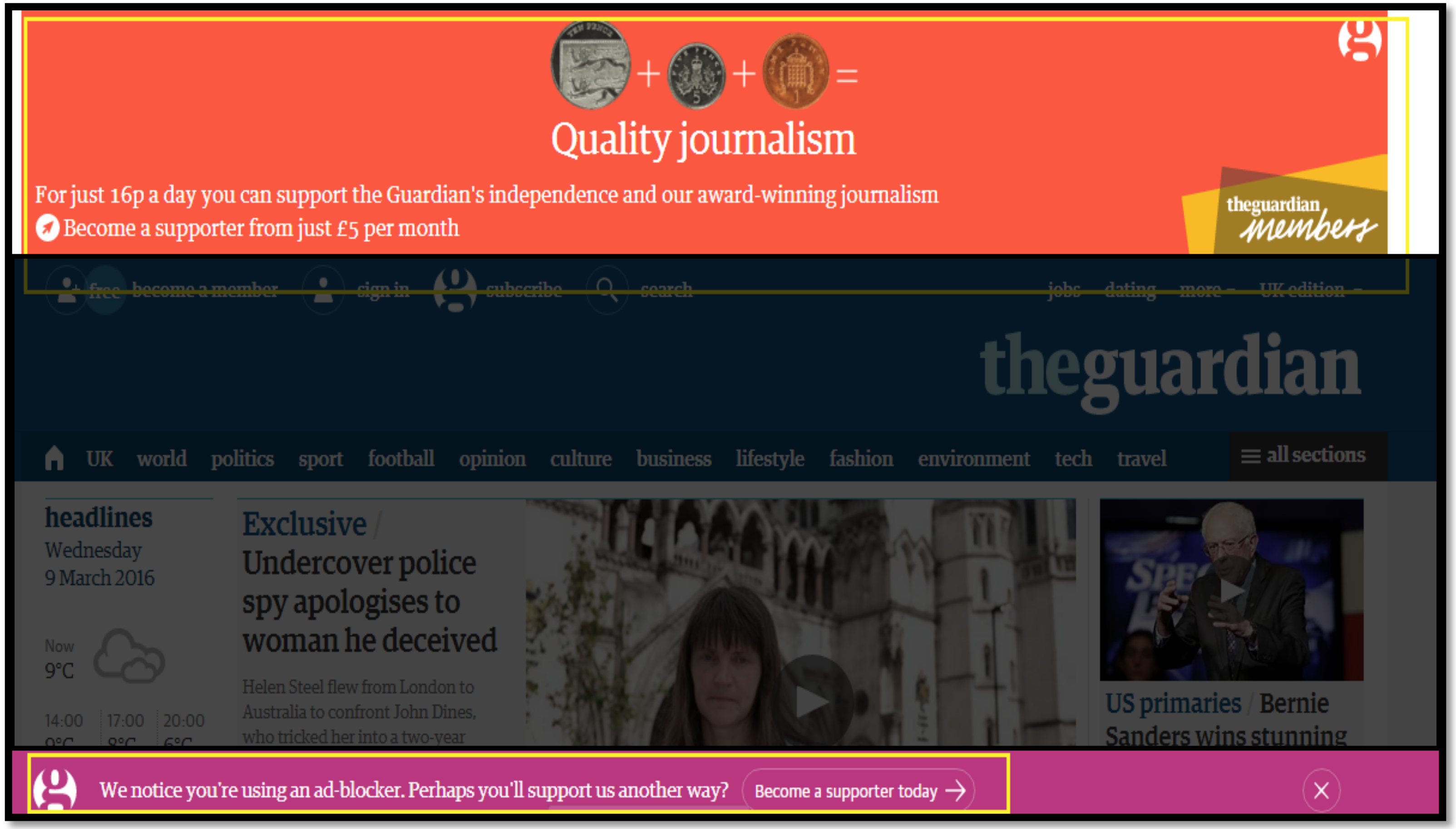


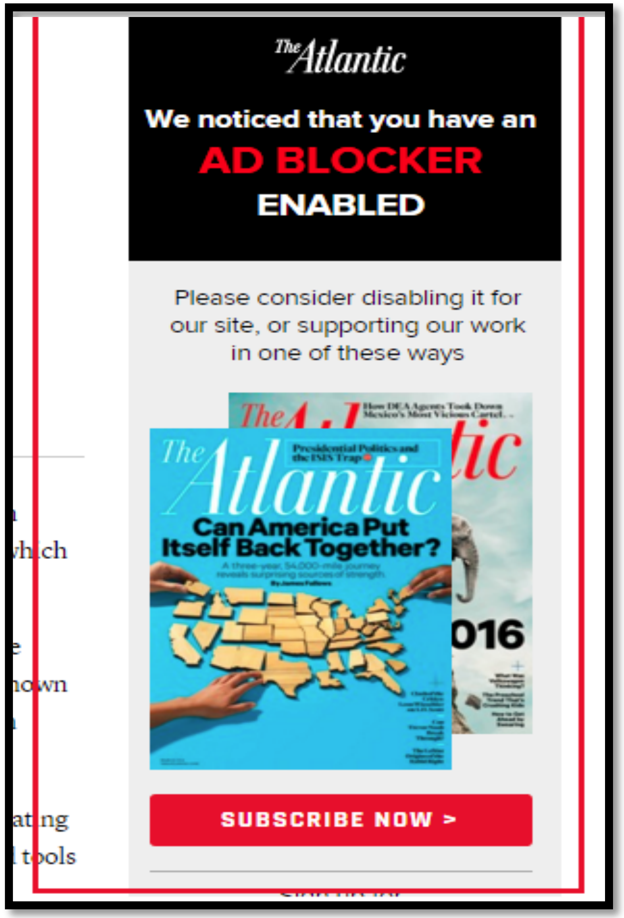
Source: The cost of ad blocking, PageFair and Adobe 2015 ad blocking report

What is the response?

Enter Anti-ad Blocking Actions


We noticed you're using an ad blocker. Support Slate's journalism and help us reduce our dependence on advertising — join Slate Plus!


Quality journalism
For just 16p a day you can support the Guardian's independence and our award-winning journalism
Become a supporter from just £5 per month
theguardian members
theguardian
UK world politics sport football opinion culture business lifestyle fashion environment tech travel
all sections
headlines
Wednesday 9 March 2016
Exclusive
Undercover police spy apologises to woman he deceived
US primaries Bernie Sanders wins stunning
We notice you're using an ad-blocker. Perhaps you'll support us another way?
Become a supporter today


The Atlantic
We noticed that you have an
AD BLOCKER
ENABLED
Please consider disabling it for our site, or supporting our work in one of these ways
Can America Put Itself Back Together?
SUBSCRIBE NOW >

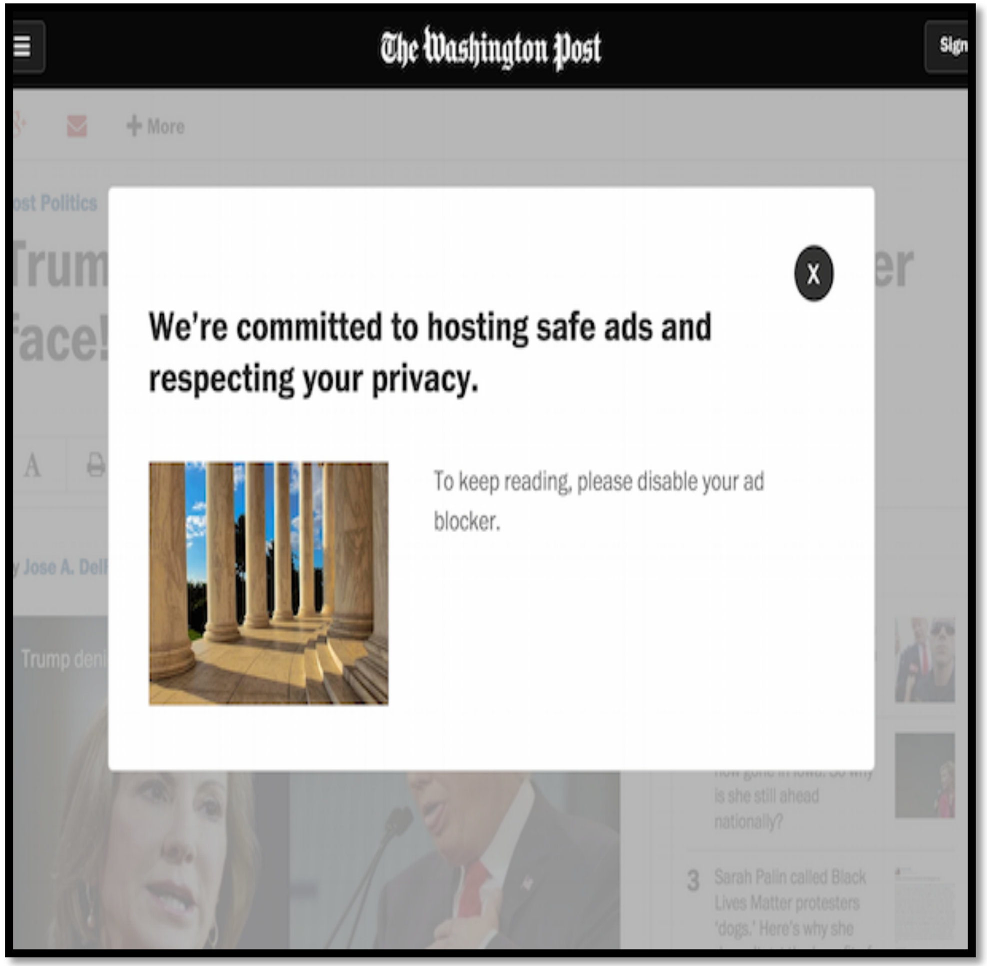
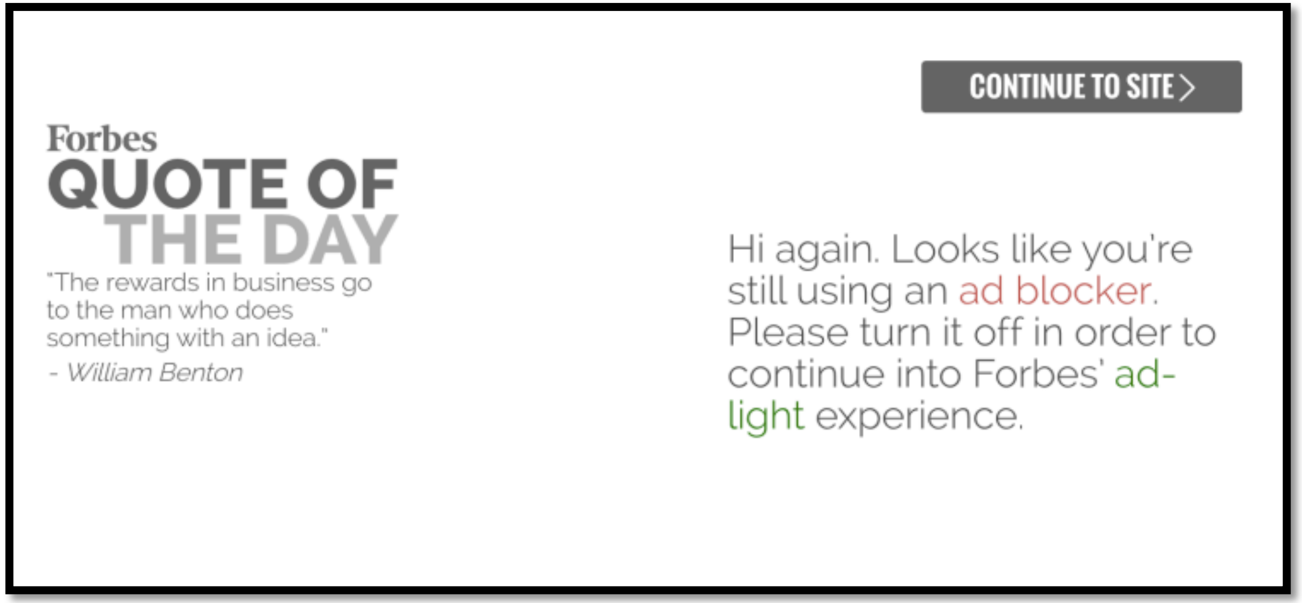

The Washington Post
Sign
More
We're committed to hosting safe ads and respecting your privacy.
X
To keep reading, please disable your ad blocker.
Sarah Palin called Black Lives Matter protesters 'dogs.' Here's why she
is she still ahead nationally?

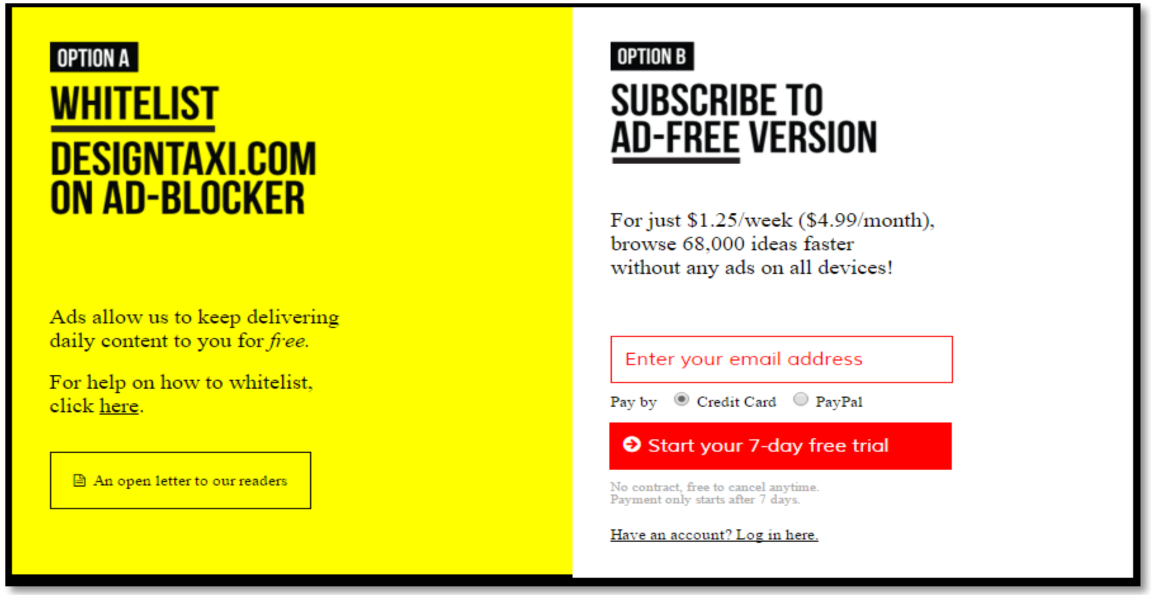

Bild
1. MONAT 0,99 €
WETTER
9°C
KONTAKT
BILD SHOP
COMMUNITY
LOGIN
BILDplus NEWS POLITIK GELD UNTERHALTUNG SPORT BUNDESLIGA LIFESTYLE RATGEBER REISE AUTO DIGITAL SPIELE REGIO VIDEO
BREAKING NEWS
LM FUNKEL NEUER TRAINER +++ GRIECHENLAND: 1000 FLÜCHTLINGE STRÖMEN AUS LAGER IDOMENI RICHTUNG M
Mit aktiviertem Adblocker können Sie BILD.de nicht mehr besuchen
Jetzt Adblocker deaktivieren
oder BILDsmart abonnieren


Blocked
Blocked


WIRED
Ad Blockers Are Making Money Off Ads (And Tracking, Too)
BUSINESS
CULTURE
DESIGN
GEAR
SCIENCE
SECURITY
Here's The Thing With Ad Blockers
We get it: Ads aren't what you're here for. But ads help us keep the lights on. So, add us to your ad blocker's whitelist or pay $1 per week for an ad-free version of WIRED. Either way, you are supporting our journalism. We'd really appreciate it.
Sign Up
Already a member? Log in


The New York Times
The New York Times
The best things in life aren't free.
You currently have an ad blocker installed. Advertising helps fund our journalism. To continue to enjoy The Times, please support us in one of the following ways.
SUBSCRIBE
WHITELIST US


CONTINUE TO SITE
Forbes
QUOTE OF THE DAY
"The rewards in business go to the man who does something with an idea."
- William Benton
Hi again. Looks like you're still using an ad blocker. Please turn it off in order to continue into Forbes' ad-light experience.


OPTION A
WHITELIST DESIGNTAXI.COM ON AD-BLOCKER
Ads allow us to keep delivering daily content to you for free.
For help on how to whitelist, click here.
An open letter to our readers
OPTION B
SUBSCRIBE TO AD-FREE VERSION
For just $1.25/week ($4.99/month), browse 68,000 ideas faster without any ads on all devices!
Enter your email address
Pay by Credit Card PayPal
Start your 7-day free trial
No contract, free to cancel anytime.
Payment only starts after 7 days.
Have an account? Log in here.

The Reactions…


FINANCIAL TIMES

Subscribe | Sign In

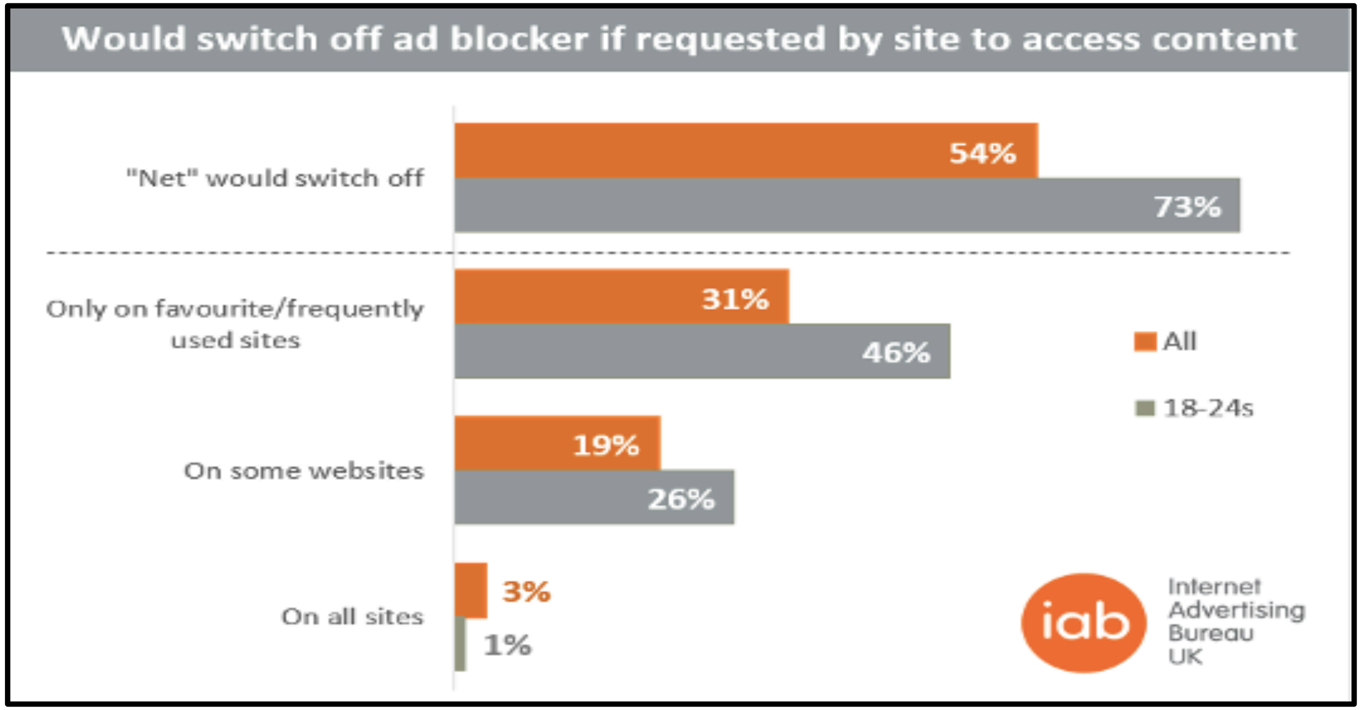
Axel Springer + Follow

Axel Springer says it is winning fight against adblockers

Bild readers stop blocking adverts when asked to buy subscription

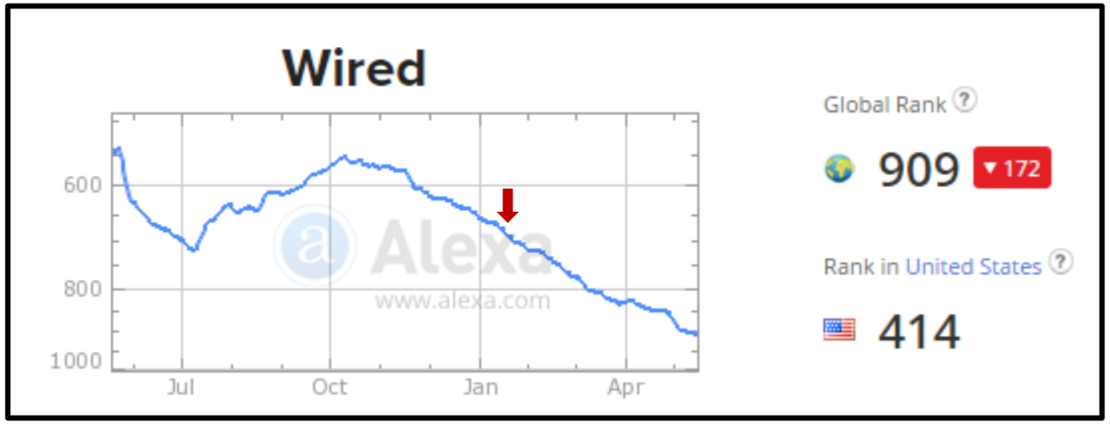
0 Save

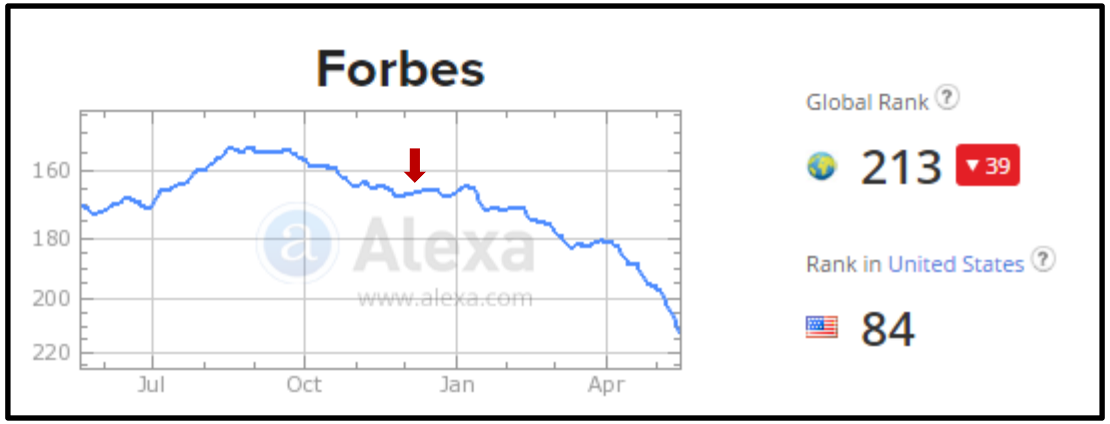
NOVEMBER 4, 2015 by: Jeevan Vasagar in Berlin

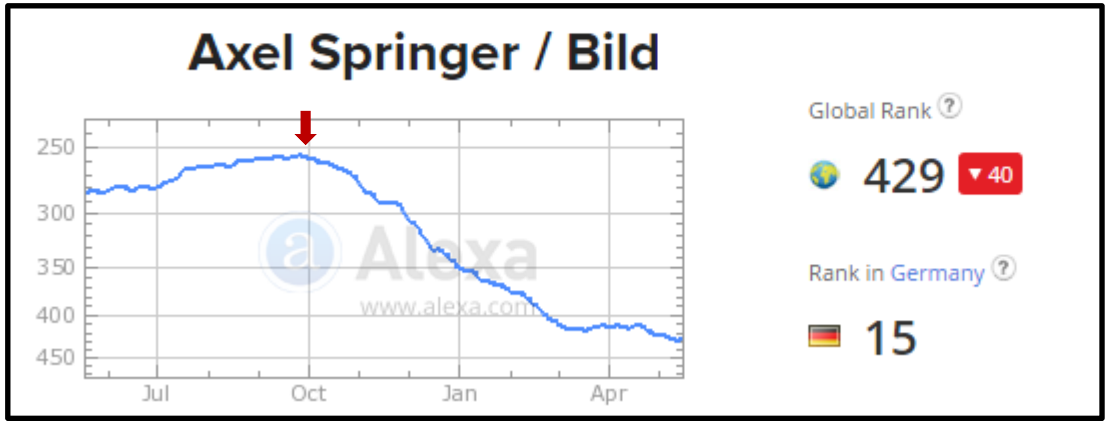


Source : ***Would you switch off your ad blocker?(IAB)***

A Hit on traffic.. Drop in Alexa Rankings







⬇ - Denial of access to ad blockers

- Ranking based on reach and page view calculated daily.

*Source : **Sites that block ad-blockers seem to be suffering (The Stack)***

Research Question

Context: Anti-ad blocking actions are implemented site-wide

All adblockers in treatment group
(Every adblock user inflicted by action)

Questions:

a) How to measure effectiveness of Anti-ad blocking actions?

b) How effectiveness varies by different ad blocking tendencies?

True Effectiveness

Measurement is challenging

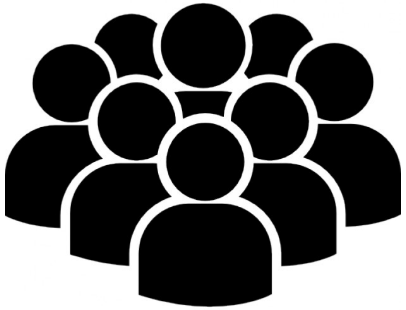
- Any site-wide action suffers from lack of natural control group (not subjected to action)
- Before – After measure, widely used, subject to sampling bias due to group differences
- Choice of time period for comparison contributes to sampling bias
- Difference in differences (DiD) could potentially be used
  - But, which group(s) to use as control ??
  - Data from other comparable websites are not forthcoming !

Our Approach

- Ex post, that is, uses only past, observational data
  - without running new, costly experiments.
- Allows endogenous selection of the control group from the available data, going back in time.
  - Ad blockers from a previous time
  - (*Multiple experiments to find the appropriate control group)*
- Allows endogenous selection of clusters of visitors within the DiD framework
  - recognizing heterogeneity in ad blocking tendencies
- Shows to quantify the effect of anti-ad blocking action the Negative Binomial regression model performs better than Poisson regression.

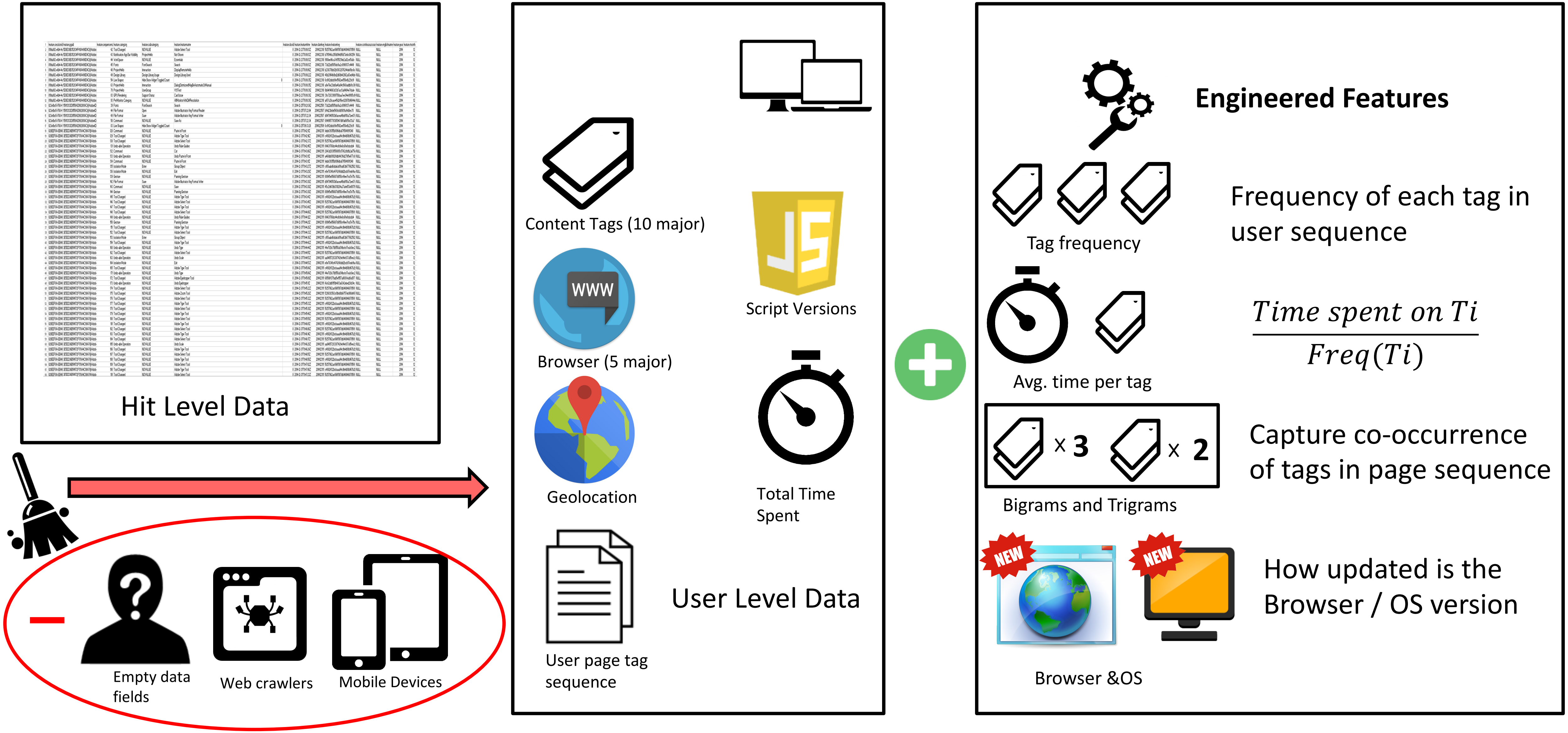
Data

- Unnamed online-only publisher
- Data span three days after anti-ad blocking action
- Prior to action two months of data are available
- Hit level data of clicks
- Aggregate data of outcome metrics like pageviews, time spent,



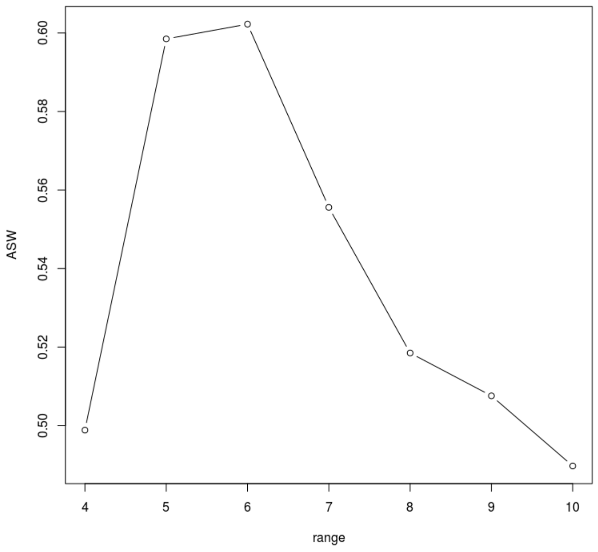
22,000 users

Featuring: Features

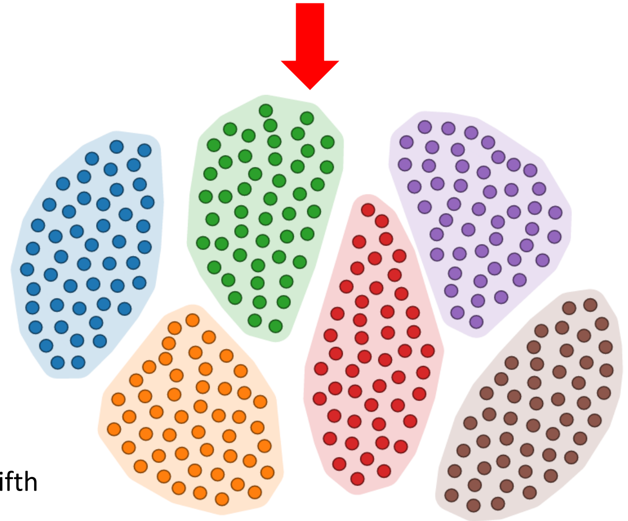


Unsupervised Scheme : Clustering

- K – means Clustering[1]
  - Euclidean distance
  - Scaled data columns
  - Gave stable clusters
  - Interesting insights in user segmented clusters



Silhouette Score



6 clusters

[1] MacQueen, James. "Some methods for classification and analysis of multivariate observations." Proceedings of the fifth Berkeley symposium on mathematical statistics and probability. Vol. 1. No. 14. 1967.

Algorithm – at cluster level

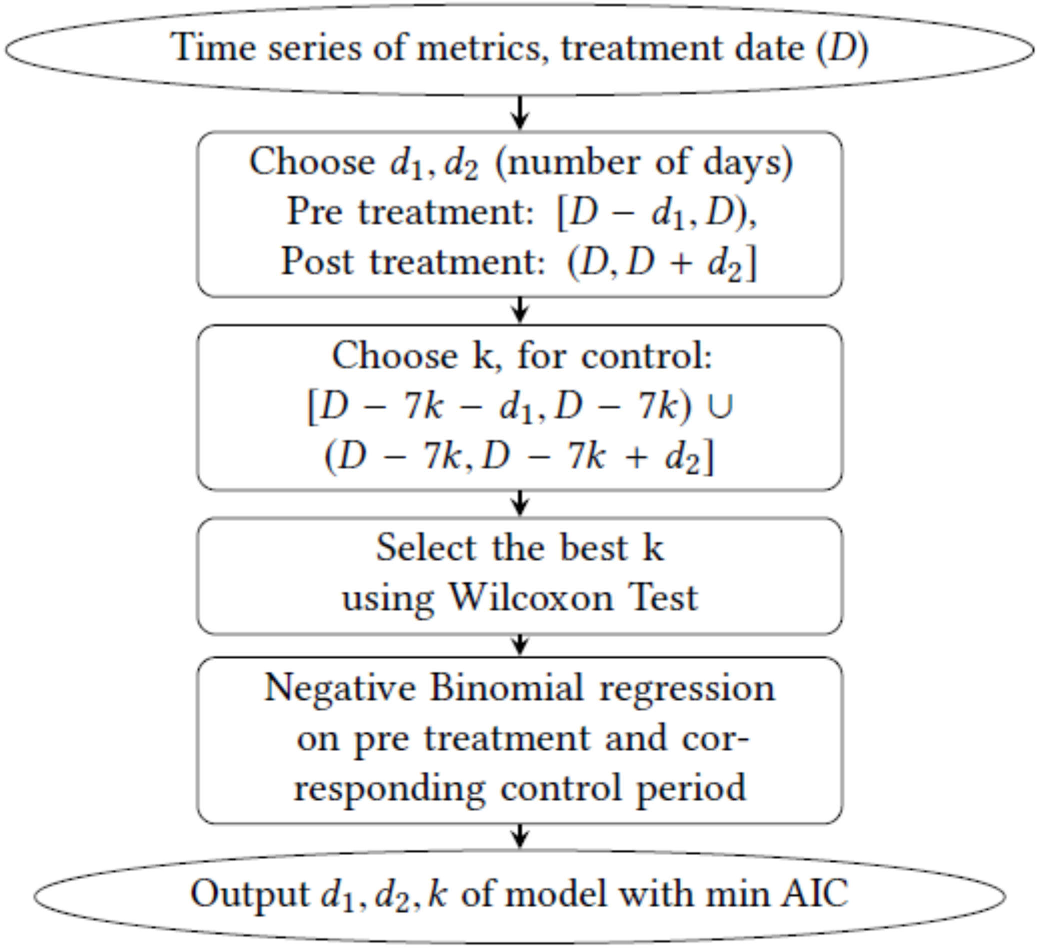


Figure 1: Summary of Effectiveness algorithm

Control group selection – at cluster level

Visitors broken down by these ***Control Variables***

- Browser
- Operating system
- Sections
- Language
- First touch marketing channel
- Page depth

→

5 options for control group

↓

Hypothesis testing using Wilcoxon signed rank test on all **control variables**

↓

Control group which matches on maximum number of control variables picked

Evaluation

- No ground truth available to us
  - Implementation site-wide
- Even if A/B testing is done, the implementation of either A or B is site-wide
    - Produces differences with testing results
- We perform indirect evaluation

Model free evidence

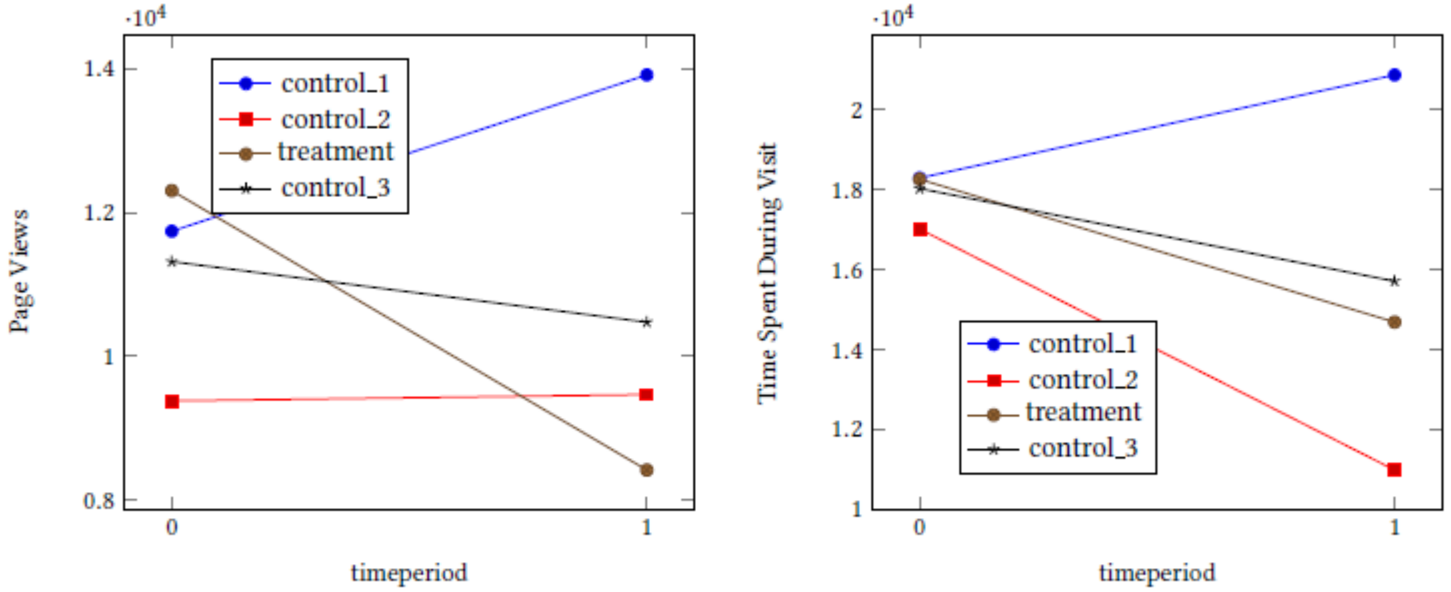


Figure 3: Real Life Data - Aggregate Statistics for Adblockers

Control_1 is our method.
Control_2 is where the control group is same duration as the treatment group, selected from recent preceding time.
Control_3 is where multiple equivalent durations are selected going back in time and then averaged.

Model based evidence

Table 3: Real Life Data - Cluster level model for Visitors

Visitors	Cluster1	Cluster2	Cluster3	Cluster4	Cluster5	Cluster6
Intercept	5.09**	4.80**	5.21**	3.10**	2.62**	3.61**
timeperiod	0.46**	0.49**	0.44**	0.07	0.50**	0.27**
grouptype	0.25**	0.17**	0.19**	-0.20**	-0.16**	0.02
dummy_1	-1.22**	-1.18**	-1.21**	-0.81**	-1.17**	-1.04**
dummy_2	-0.05	0.05	-0.05	0.24**	0.05	0.21**
weekend	-0.43**	-0.45**	-0.40**	-0.44**	-0.31**	-0.56**
t:g	-0.59**	-0.66**	-0.56**	0.11	-0.54**	-0.40**

Significance codes: $* < 0.05$, $** < 0.01$

Table 4: Cluster Details

	Visitors (%) of total	Visits (%) of total	End of Article Reached (%)	Viewed 5 Pages (%)
Cluster1	32.44	32.41	8.45	0.35
Cluster2	22.51	22.24	90.22	0.04
Cluster3	34.69	34.63	11.47	0
Cluster4	2.18	2.15	92.72	29.17
Cluster5	1.94	1.90	56.52	0.56
Cluster6	6.24	6.66	26.57	1.56

Limitations and Future Work

Do Direct Evaluation with suitable Data

Extend analysis to other websites

Compare actions across publishers

Scrape tags from content

Adobe

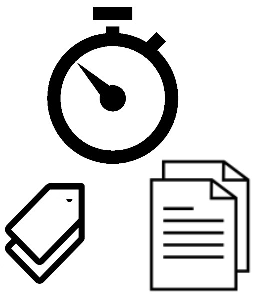
EXTRAS - EXTRAS - EXTRAS

Feature Buckets

Loyalty

- End of article reached
- Monthly user
- Visit number
- Total Hits

Interest



- Frequency of tags
- Avg. time per tag

Technology

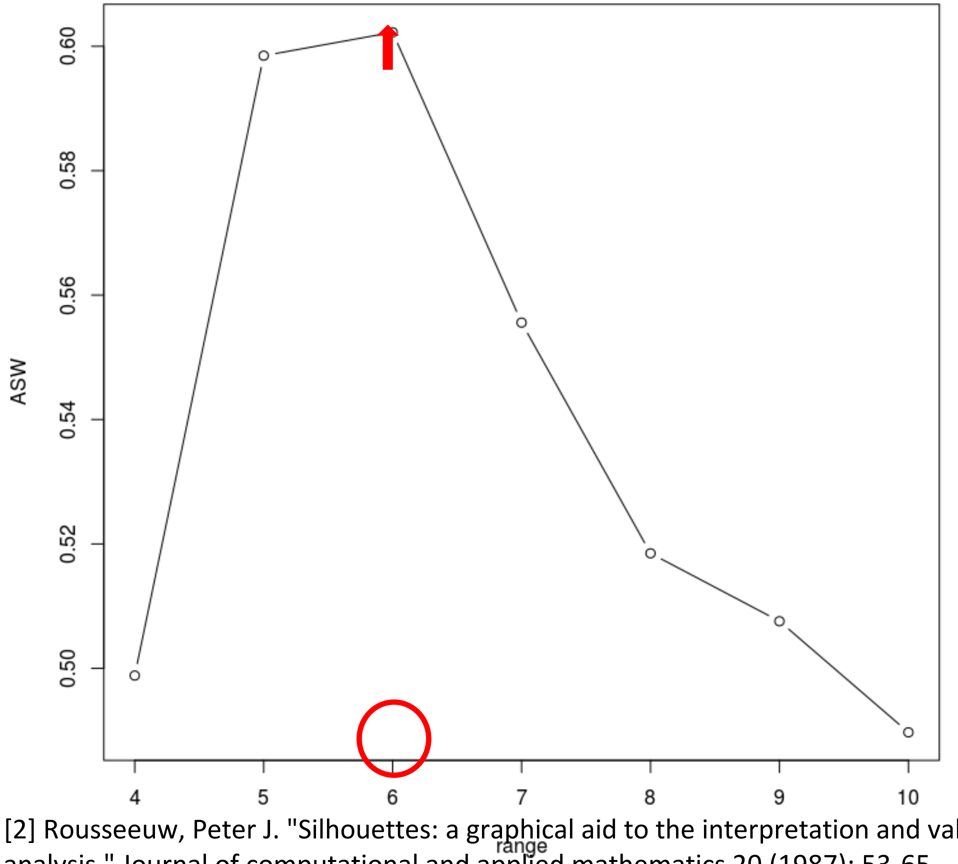
- Browser Version
- OS version
- New/ Old
- Cookies enabled
- JavaScript Version

Geo-Segmentation

- Country
- Region
- City

Clustering Quality – Loyalty Set

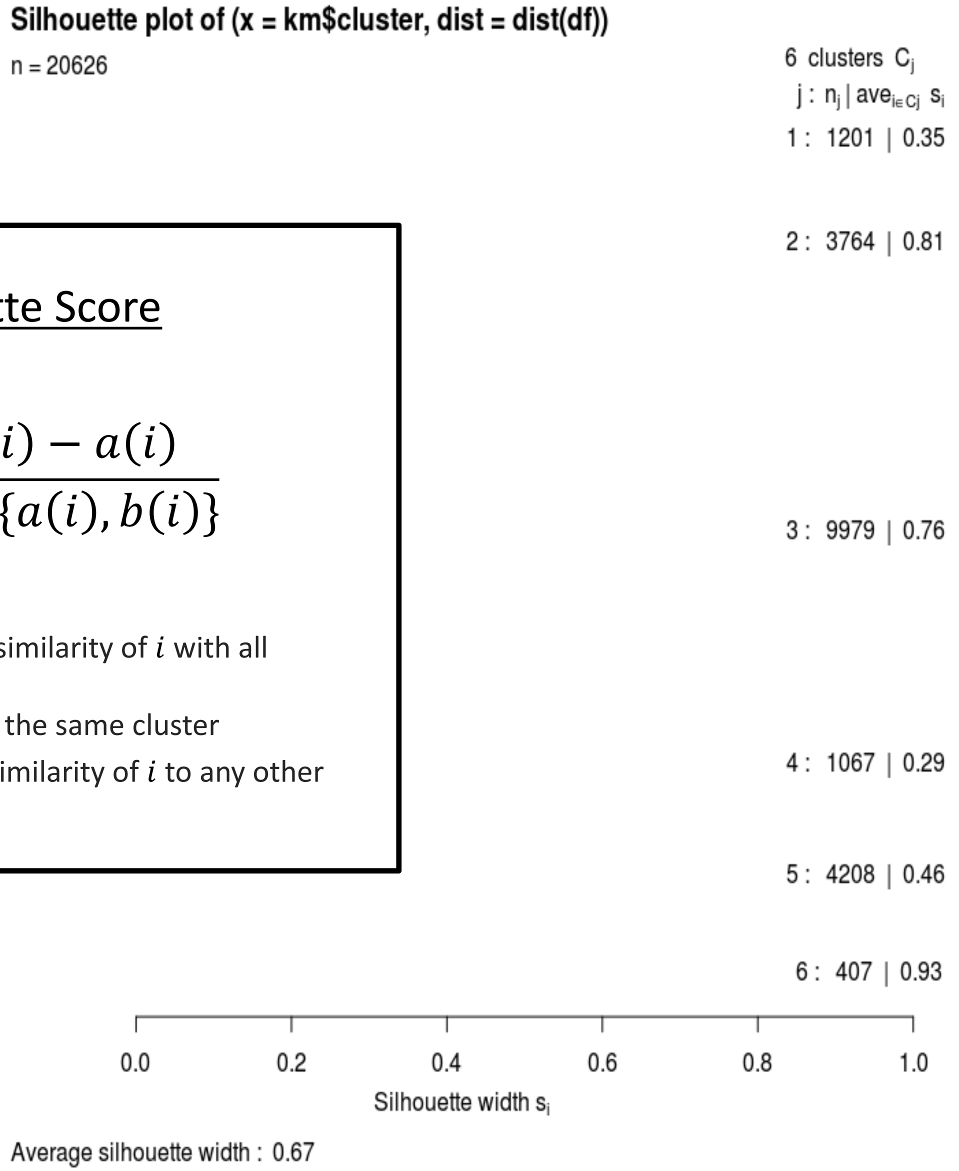
- Number of clusters : Average Silhouette[2] Width



Silhouette Score

$$s(i) = \frac{b(i) - a(i)}{\max\{a(i), b(i)\}}$$

i : a datum
$a(i)$: average dissimilarity of i with all other
data within the same cluster
$b(i)$: lowest dissimilarity of i to any other cluster



[2] Rousseeuw, Peter J. "Silhouettes: a graphical aid to the interpretation and validation of cluster analysis." Journal of computational and applied mathematics 20 (1987): 53-65.