Participatory Web Archiving

Opening the Black Box of Save Page Now

JESSICA OGDEN
University of Southampton
jessica.ogden@soton.ac.uk
@jessogden

ED SUMMERS
University of Maryland
edsu@umd.edu
@edsu

SHAWN WALKER
Arizona State University
shawn.w@asu.edu
@walkeoh

THE WEB THAT WAS - RESAW 2019 | AMSTERDAM | JUNE 22, 2019

Outline

- Introduce SPN Project
  - Centring participation - *participatory web archiving*
  - What is SPN
  - Related Work - IA/Wayback Machine, WA research tech, WA use
- Pilot RQs
- Methodology - collaborative ethos, data collection, analysis tools
- Foregrounding Limitations
- Results
  - What gets saved/when ➔ diversity
  - Liveness/archival distribution ➔ ephemerality
  - Role of automation ➔ novelty (as one characteristic of contribution)
- Discussion
- Future Work

We met at Archives Unleashed

How SPN responds to external events such as disasters and social movements?

How is SPN web archival labour

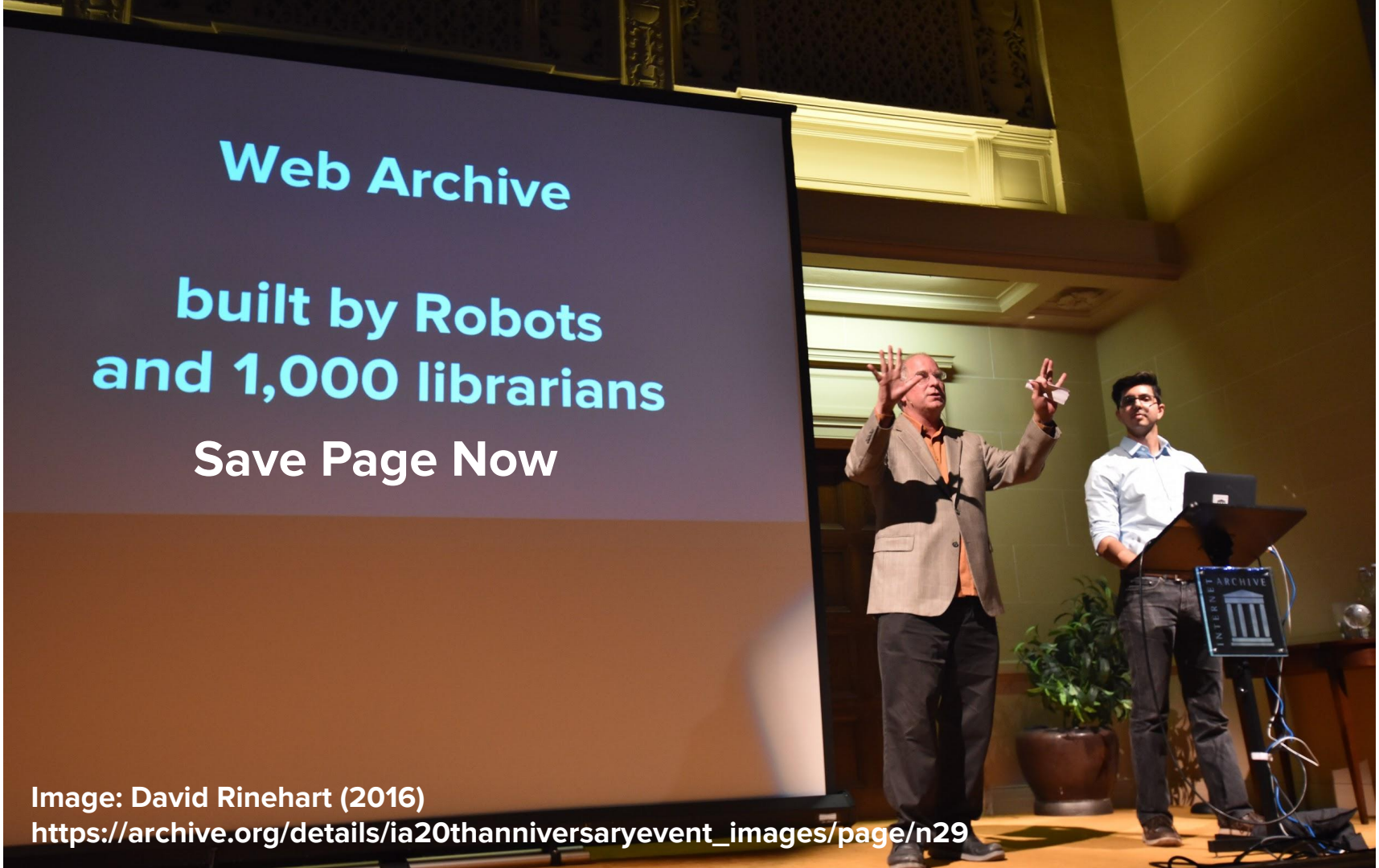


Image: David Rinehart (2016)
https://archive.org/details/ia20thanniversaryevent_images/page/n29

Brewster Kahle
@brewster_kahle

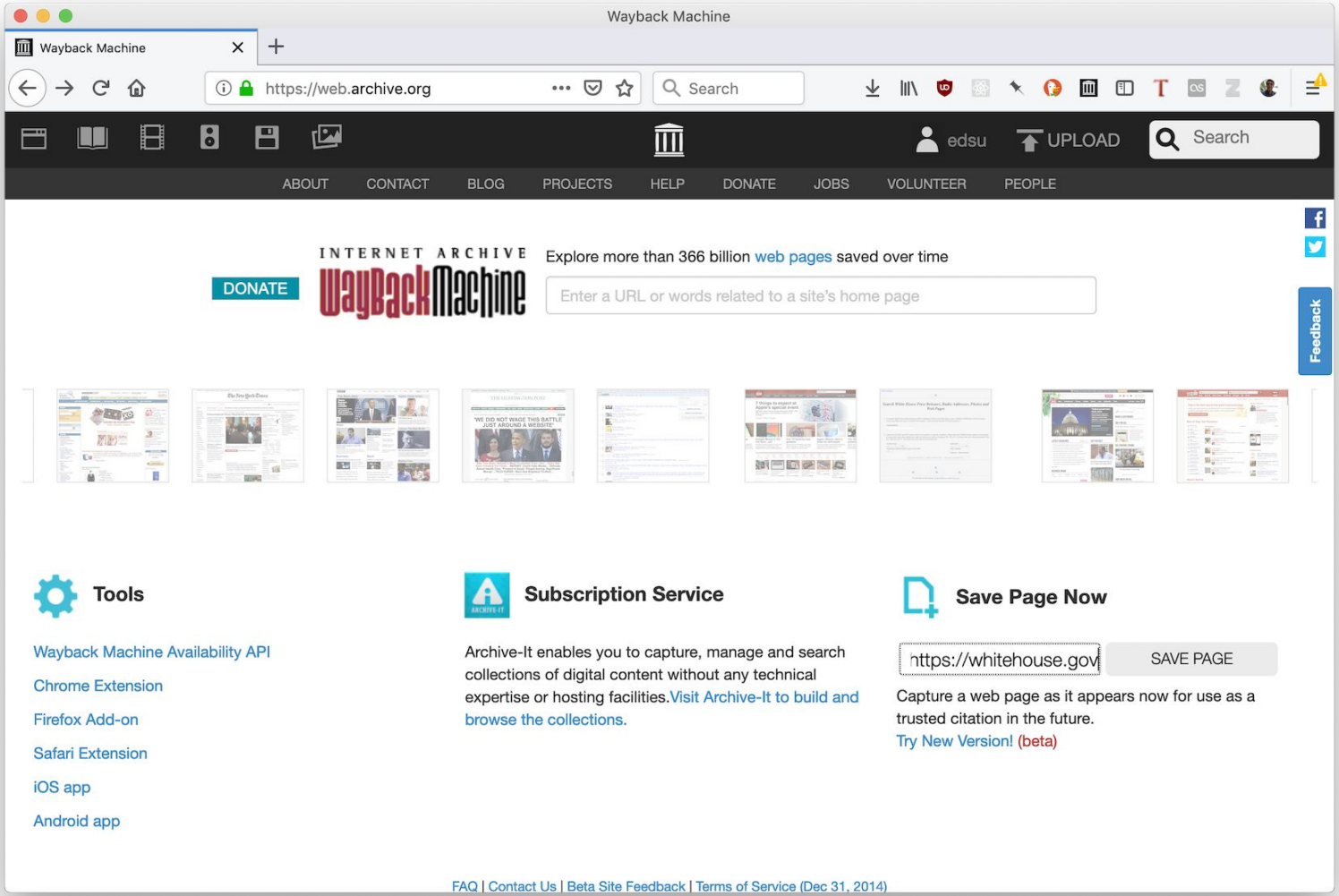
Following

651,621,510,000 web URL's now in the Wayback Machine by @internetarchive . Billions and Billions of web pages! users hitting "save page now" at 100 per second: web.archive.org

7:56 PM - 9 May 2018

68 Retweets **159** Likes

3 68 159


Wayback Machine
Wayback Machine
https://web.archive.org
Search
edsu
UPLOAD
Search
ABOUT
CONTACT
BLOG
PROJECTS
HELP
DONATE
JOBS
VOLUNTEER
PEOPLE
DONATE
INTERNET ARCHIVE
WayBackMachine
Explore more than 366 billion web pages saved over time
Enter a URL or words related to a site's home page
Feedback
Tools
Wayback Machine Availability API
Chrome Extension
Firefox Add-on
Safari Extension
iOS app
Android app
Subscription Service
Archive-It enables you to capture, manage and search collections of digital content without any technical expertise or hosting facilities. Visit Archive-It to build and browse the collections.
Save Page Now
https://whitehouse.gov
SAVE PAGE
Capture a web page as it appears now for use as a trusted citation in the future.
Try New Version! (beta)
FAQ | Contact Us | Beta Site Feedback | Terms of Service (Dec 31, 2014)

If You See Something, Save Something – 6 Ways to Save Pages In the Wayback Machine

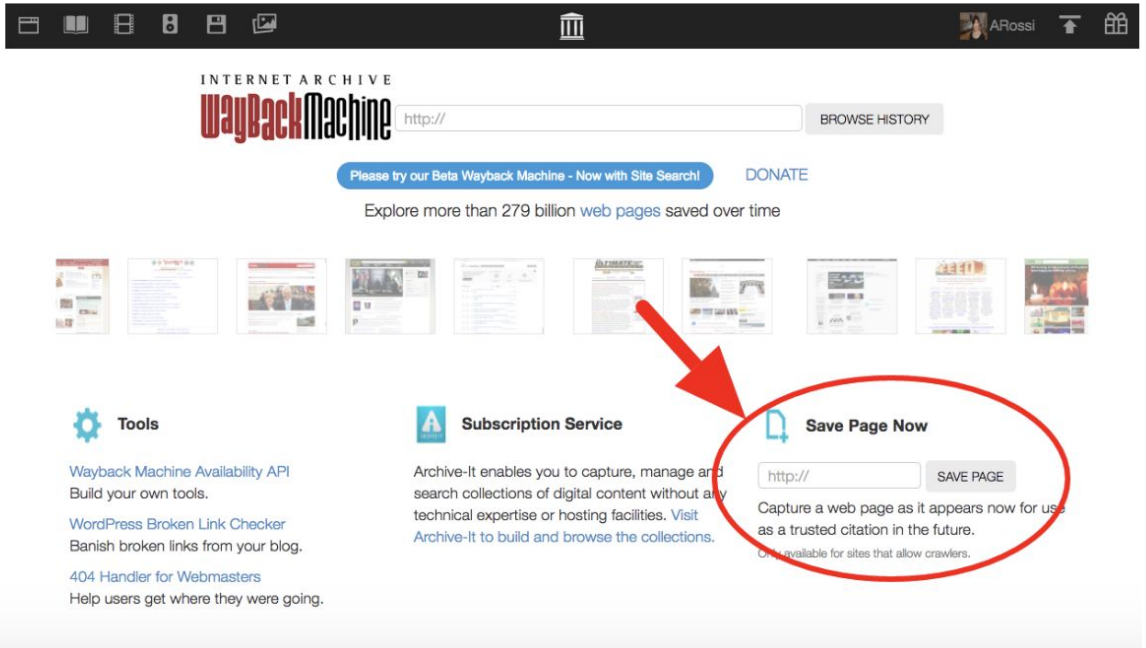
Posted on January 25, 2017 by Alexis Rossi

In recent days many people have shown interest in making sure the Wayback Machine has copies of the web pages they care about most. These saved pages can be cited, shared, linked to – and they will continue to exist even after the original page changes or is removed from the web.

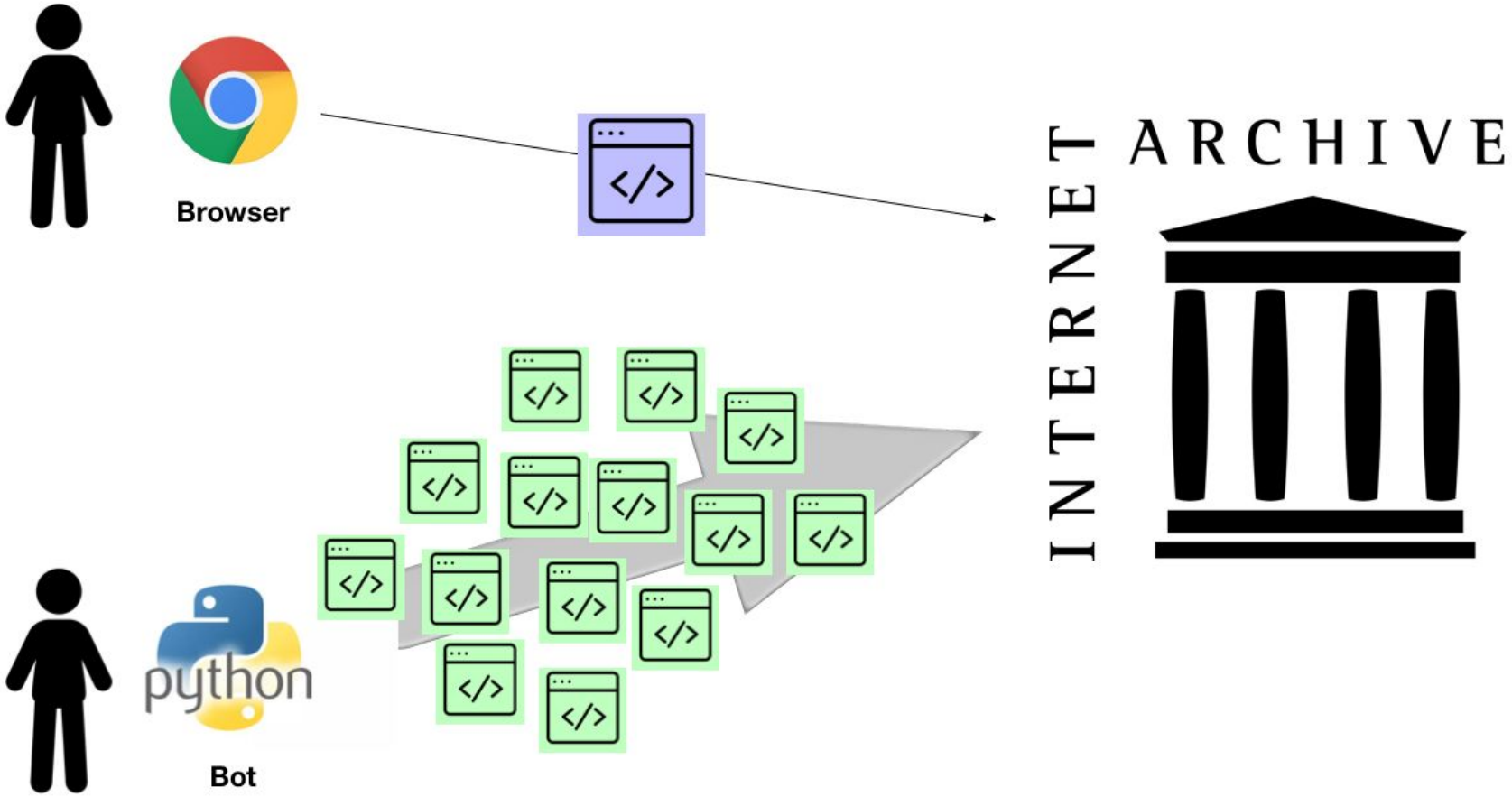
There are several ways to save pages and whole sites so that the Machine. Here are 6 of them.

1. Save Page Now

Put a URL into the form, press the button, and we save the pag permanent URL for your page.



https://blog.archive.org/2017/01/25/see-something-save-something/


Browser
INTERNET ARCHIVE
python
Bot

SPN has changed over time

SPN v1

- Heritrix
- *No difference between web & API submissions*

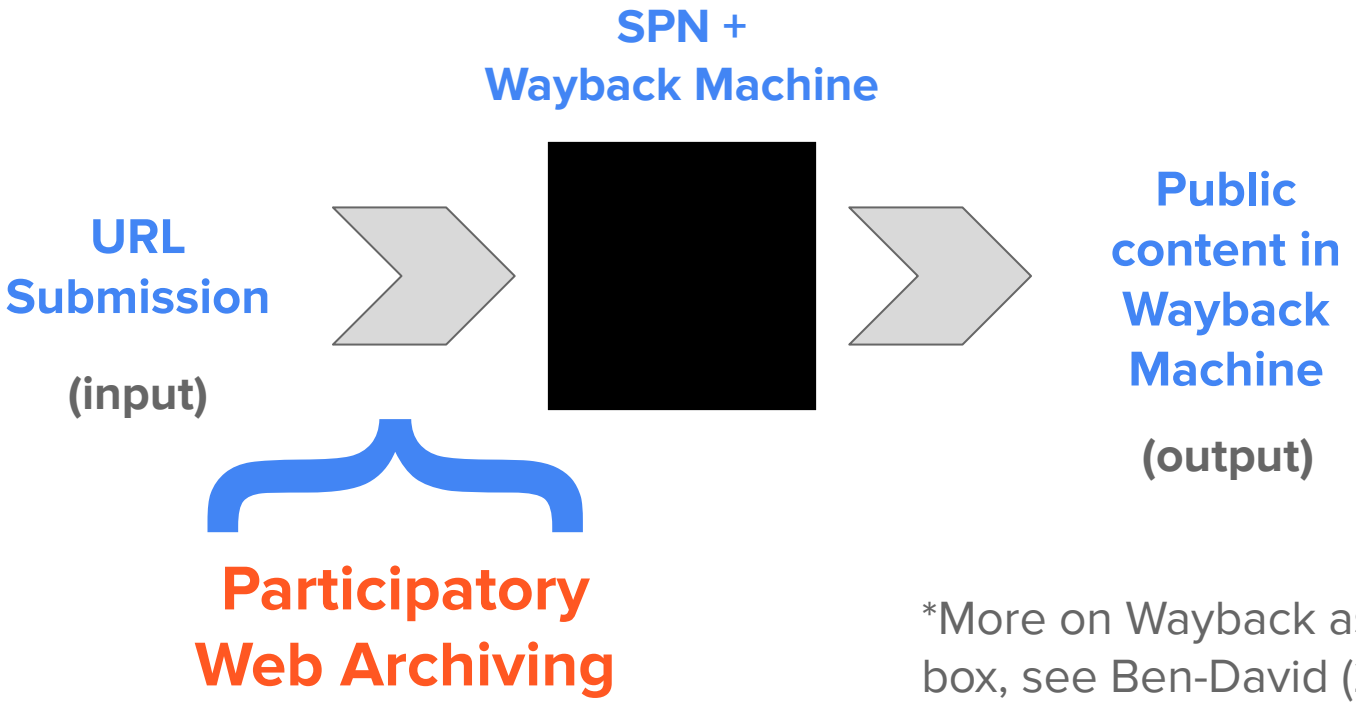
SPN v2

- Heritrix for API submissions
- Browser-based archiving for web submissions

SPN v3

- Server-based headless browser for API submissions
- Browser-based archiving for web submissions

SPN as black box



*More on Wayback as black box, see Ben-David (2018)

Motivating Research Questions

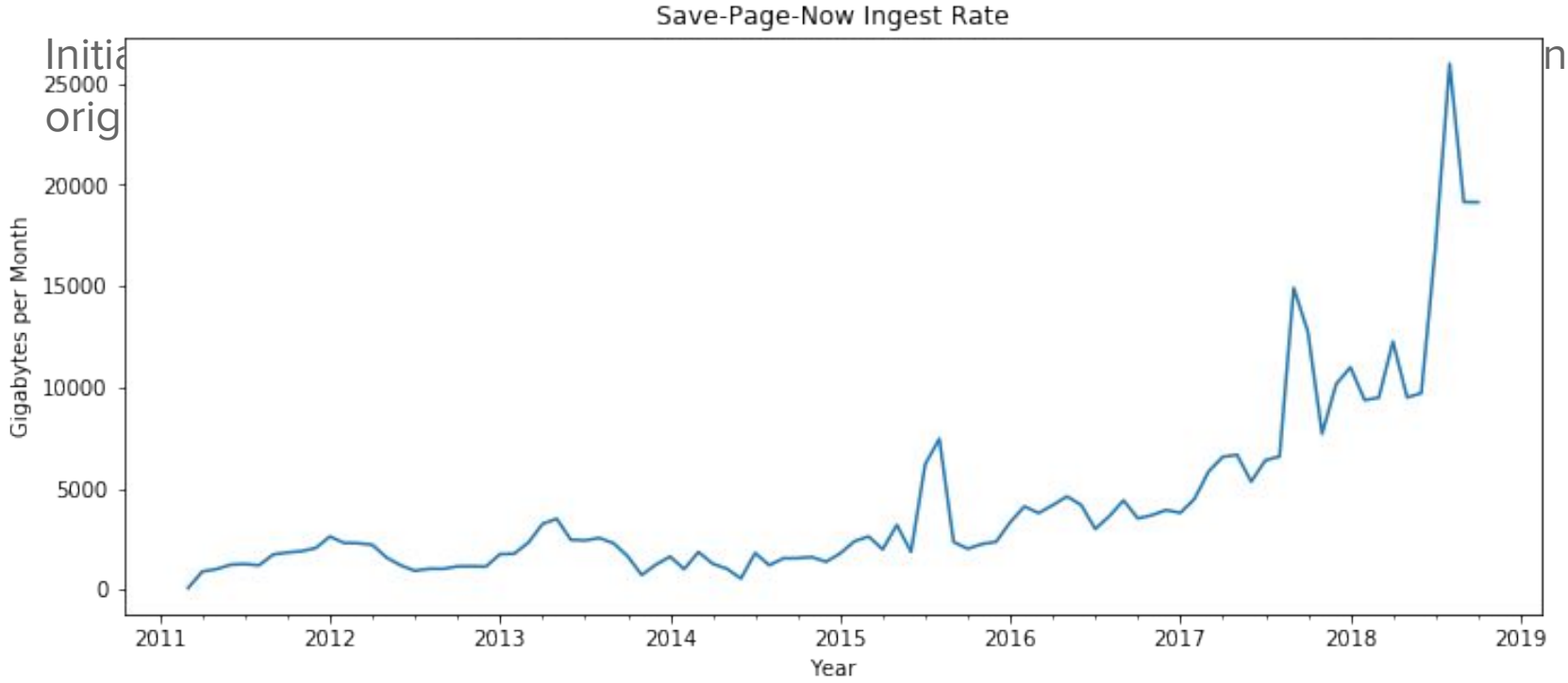
Aim: *to understand SPN as form of participatory WA infrastructure*

- **RQ1**: What is saved via SPN and how has the ‘collection’ changed over time?
- **RQ2**: To what extent are SPN resources available on the live Web and in other web archives?
- **RQ3**: In what ways is automation a factor in archival production and what purposes does it serve?

Methodology

Methodological Frame (High Level)

- Initia nd orig



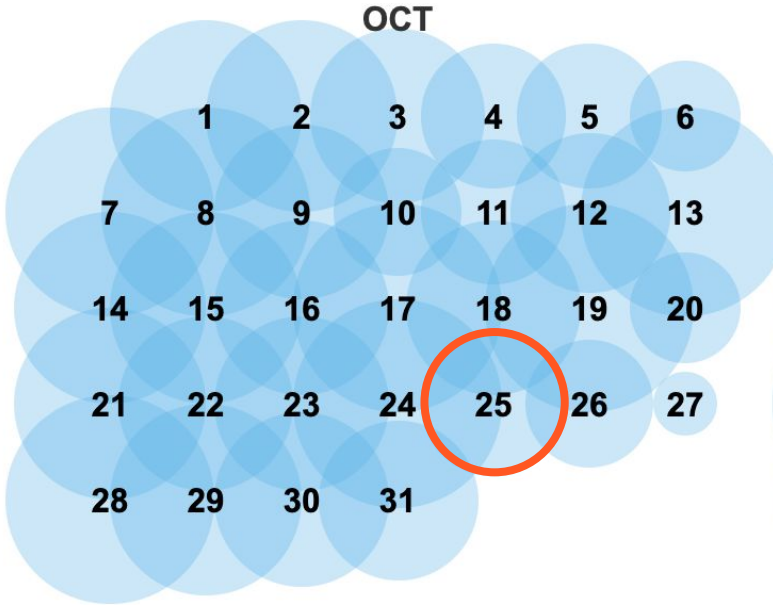
INTERNET ARCHIVE

WayBackMachine

Sample:

- One day per year
- 5 years of data
- Oct 25, 2013 - 2018

SPN first made public on homepage on October 25, 2013



WARCs downloaded via API

XSEDE
Extreme Science and Engineering Discovery Environment

python

+

warcio

+

Archives Unleashed

AUT Toolkit

Related Work

- Studying Web Archival Practices
  - ?Provenance (Maemura et al.)
  - Seeding practices in WAs (Summers and Punzalan 2017)
  - Ethnographic research at the Internet Archive - characterising ‘backstage’ of Wayback Machine and projected role of SPN in diversifying seeding (Ogden et al. 2017)
  - *(That new report...)*
- Characterising the Internet Archive Wayback Machine (IAWM)
  - language and geographic distribution of IAWM content (AlSum et al., 2014; Thelwall and Vaughan, 2004)
  - IAWM use - examination of IA access logs (AlNoamany et al., 2013); circulation of IAWM links on live Web (Zannettou et al., 2018)
  - IAWM as sociotechnical assemblage and web archival research as forensics (Ben-David and Amram 2018)
- (But nothing studying SPN specifically - SPN as platform?)

Pilot Research Question - v3

Aim: to understand SPN as form of participatory WA infrastructure

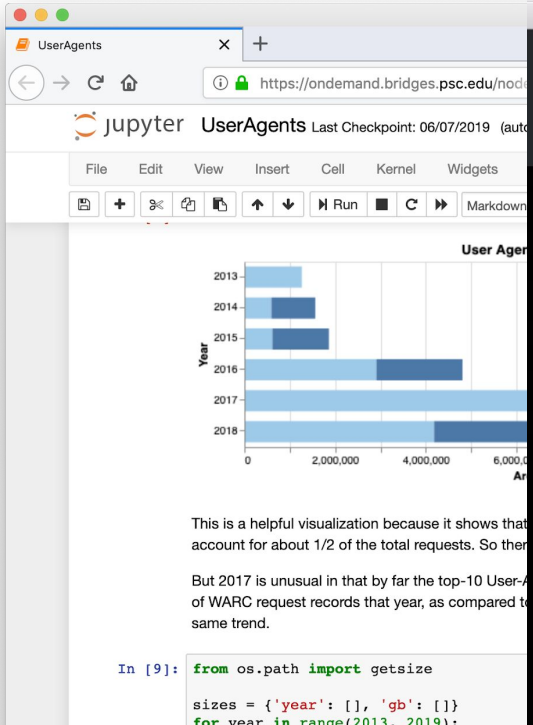
- RQ: What is the role of automation in the use of SPN?

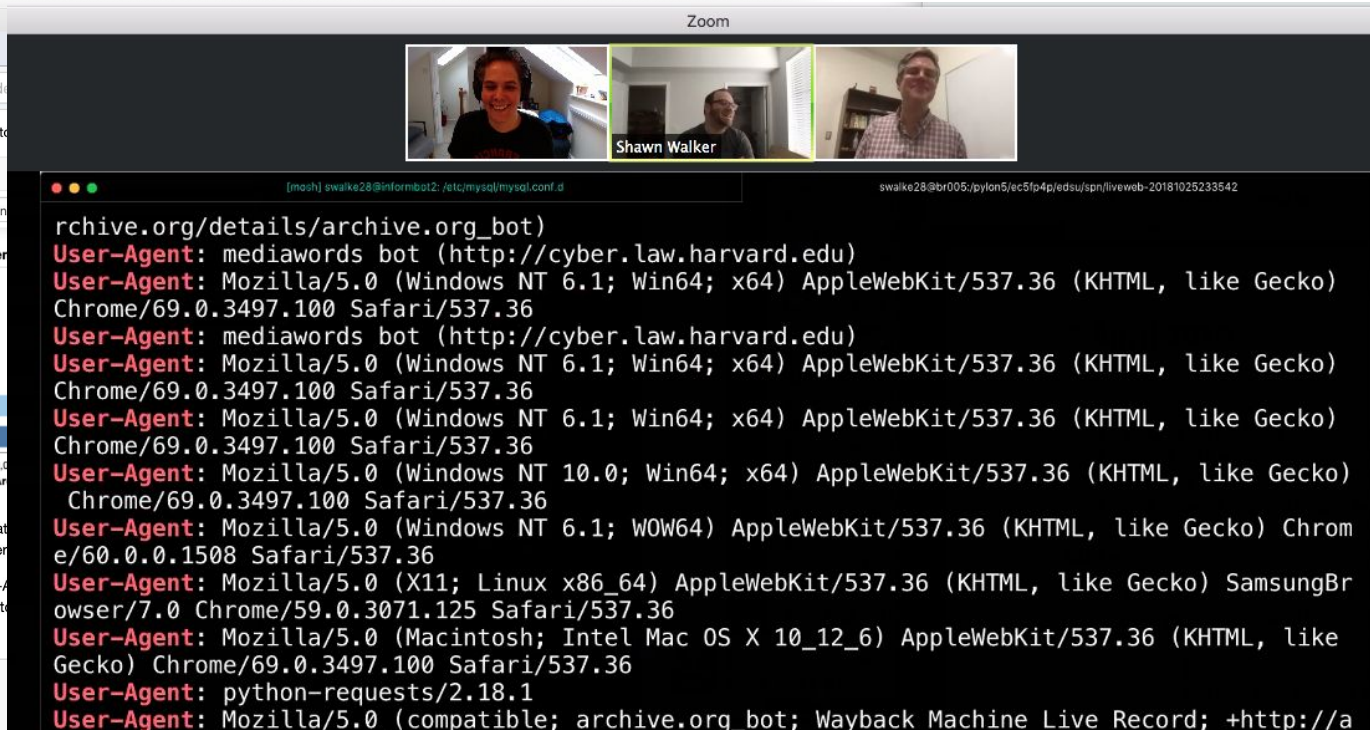
We will look at this through 3 dimensions:

- Diversity - what is saved
- Liveliness/Ephemerality - how at risk are target resources
- Novelty - how new/novel are target resources

Methodological Frame (High Level)

- Importance of collaborative working





URLs

What URLs in the WARC data represent user intention to archive something?

HTTP Content-Type

HTTP Status Code

Eliminating .js, .css, .jpg, etc

Need for WARC request records.

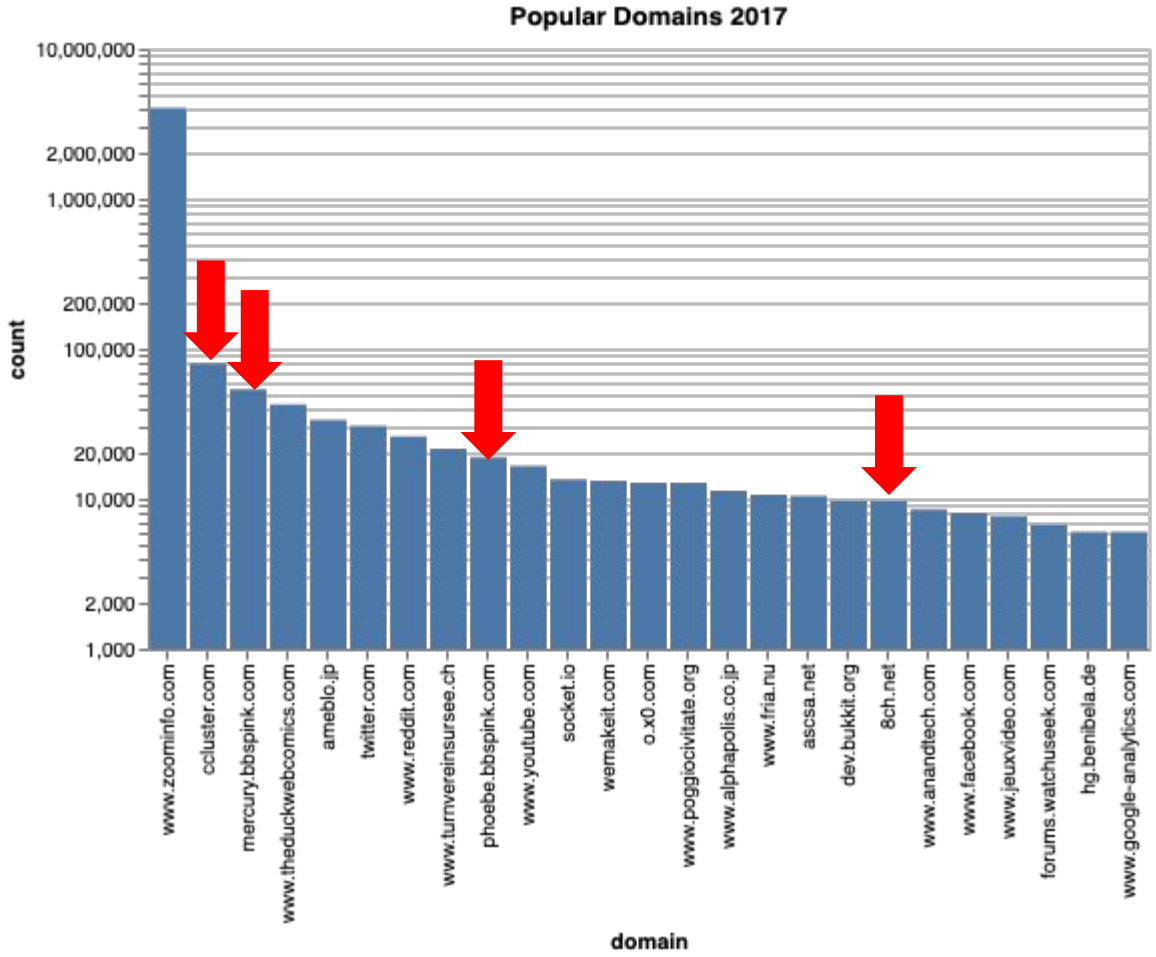
Top Hostnames / URLs lists (slippery).

- Problems with isolating the targeted intention (wanted to use referrers, probs of using mimetype?)

RQ1: SPN Collection Development

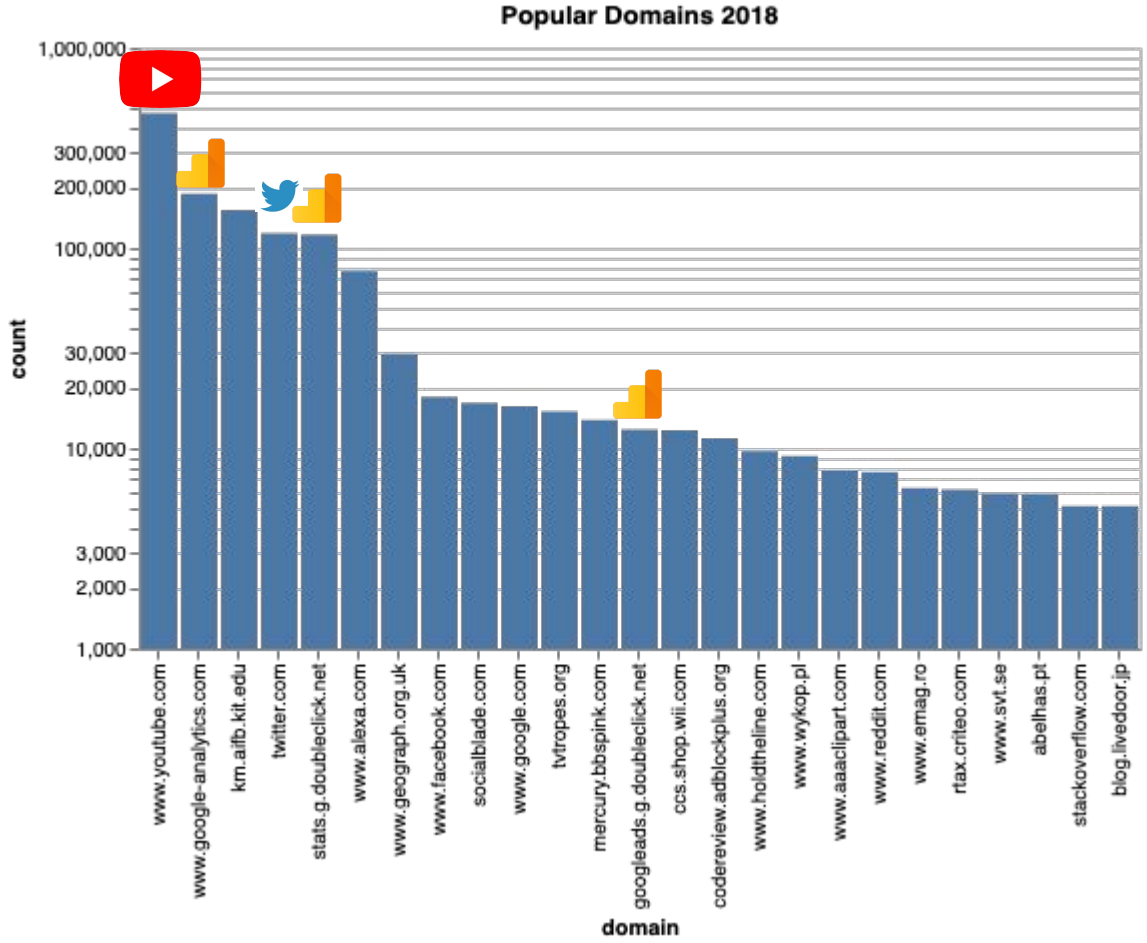
zoominfo


Hey guys!
Check out my imageboard
It's called 600chan
It has a /b/ board!!!!
It's also better than 4chan and 8chan combined
Plz visit my website, no one goes there...


Popular Domains 2017
count
10,000,000
2,000,000
1,000,000
200,000
100,000
20,000
10,000
2,000
1,000
www.zoominfo.com
ccluster.com
mercury.bbspink.com
www.theduckwebcomics.com
ameblo.jp
twitter.com
www.reddit.com
www.turnvereinsursee.ch
phoebe.bbspink.com
www.youtube.com
socket.io
wemakeit.com
o.x0.com
www.poggiocivitate.org
www.alphapolis.co.jp
www.fria.nu
ascsa.net
dev.bukkit.org
8ch.net
www.anandtech.com
www.facebook.com
www.jeuxvideo.com
forums.watchuseek.com
hg.benibela.de
www.google-analytics.com
domain

YouTube

Google Analytics



User-agents and Automation

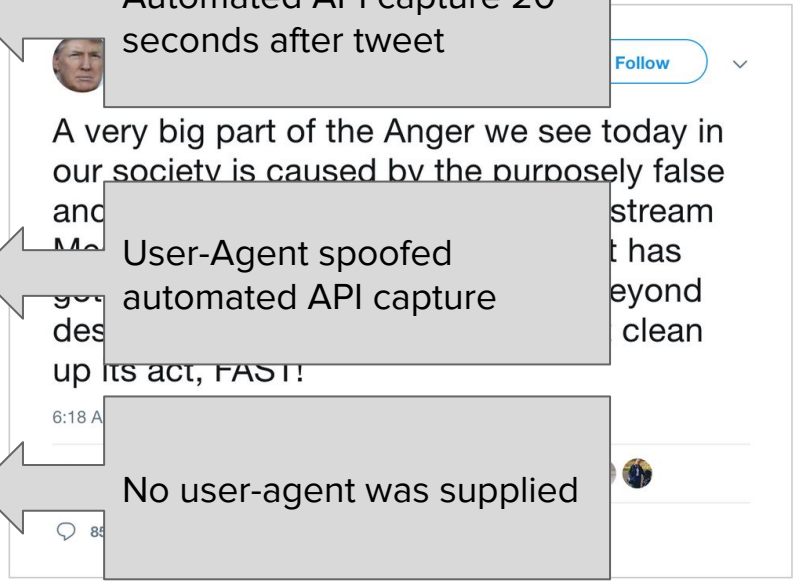
	date	user_agent
0	2018-10-25T11:18:39Z	python-requests/2.13.0
1	2018-10-25T11:37:07Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
2	2018-10-25T12:00:22Z	python-requests/2.18.1
3	2018-10-25T12:01:45Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
4	2018-10-25T12:11:19Z	python-requests/2.18.1
5	2018-10-25T12:21:36Z	python-requests/2.18.1
6	2018-10-25T12:31:56Z	python-requests/2.18.1
7	2018-10-25T12:43:07Z	python-requests/2.18.1
8	2018-10-25T13:19:18Z	Chrome 41.0.2227.0
9	2018-10-25T13:54:52Z	Firefox 40.1
10	2018-10-25T13:58:42Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
11	2018-10-25T13:58:43Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
12	2018-10-25T14:32:02Z	Safari 5.1.7
13	2018-10-25T15:13:25Z	Chrome 41.0.2227.0
14	2018-10-25T15:37:12Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
15	2018-10-25T15:37:12Z	Mozilla/5.0 (compatible; archive.org_bot; Wayback Machine Live Record; +http://archive.org/details/archive.org_bot)
16	2018-10-25T15:53:29Z	Firefox 33.0
17	2018-10-25T16:32:46Z	Chrome 41.0.2228.0
18	2018-10-25T17:08:11Z	Chrome 41.0.2228.0
19	2018-10-25T17:44:50Z	Firefox 36.0
20	2018-10-25T18:21:49Z	Chrome 41.0.2228.0
21	2018-10-25T18:58:06Z	Safari 6.0
22	2018-10-25T19:34:05Z	Chrome 41.0.2227.1

Automated API capture 20 seconds after tweet

User-Agent spoofed automated API capture

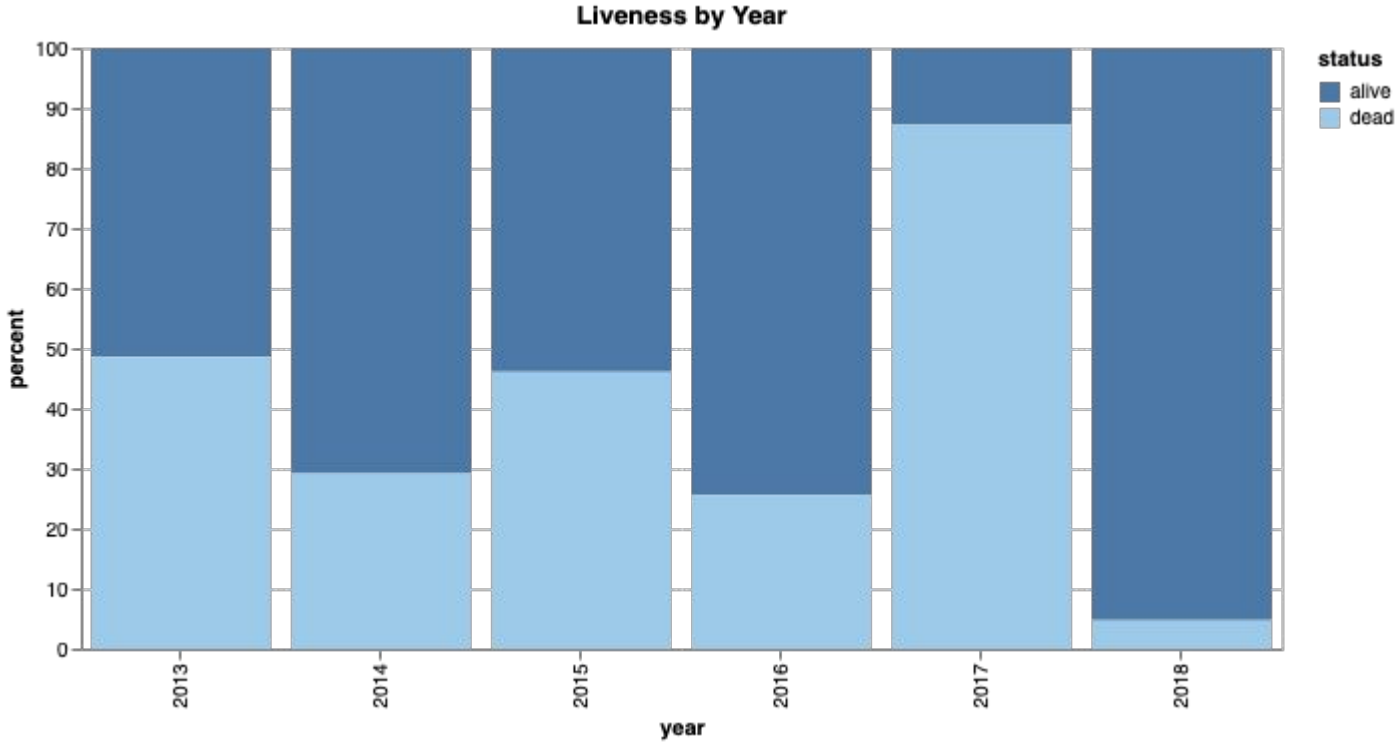
No user-agent was supplied

All of these are automated captures



RQ2: Measuring Live(li)ness

- Sample of the URLs in dataset
- 2017 - ZoomInfo URLs die



RQ3: Assessing the Role of Automation

Assessing the Role of Automation

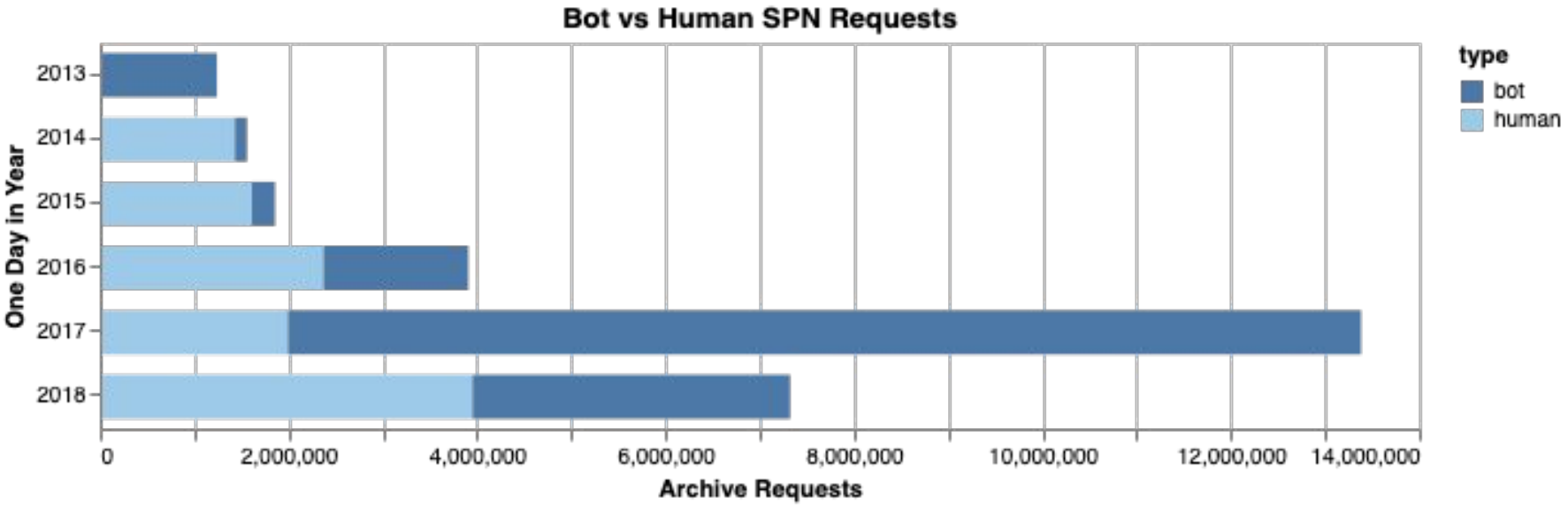
1) Hypothesised two types of SPN interactions -

    - Software as **intermediary** (home page tool, browser extension) - SPN *mediates* intent of user and transports to archive
    - Software as **actant** (API, cron) - SPN *transforms* selection and transports to archive

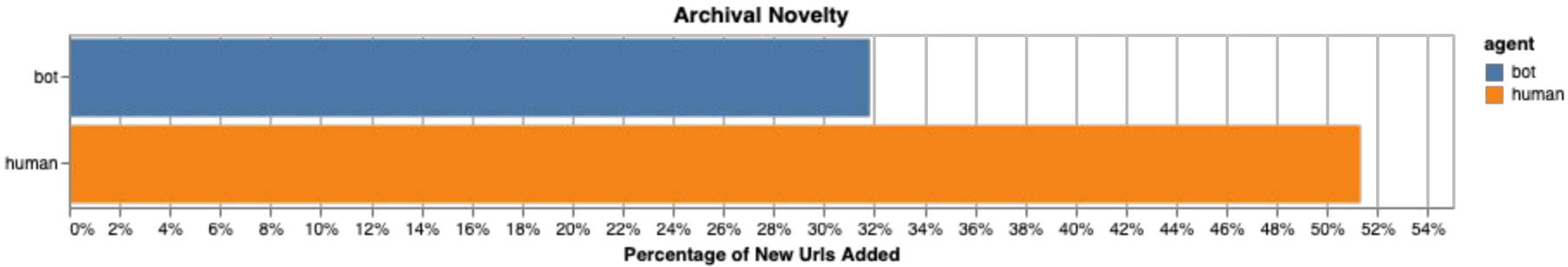
2) User-Agents as proxy for detecting automation

    - User-Agents and grouping User-Agent Families
    - Percentage of traffic from different types of Users

Bots vs Browsers?



Novelty


Archival Novelty
bot
human
0% 2% 4% 6% 8% 10% 12% 14% 16% 18% 20% 22% 24% 26% 28% 30% 32% 34% 36% 38% 40% 42% 44% 46% 48% 50% 52% 54%
Percentage of New Urls Added
agent
bot
human

Discussion - Reading the Tea Leaves (methods)

- Assessing archival intention - Answering questions like ‘why’ require qualitative research methods to identify why things are being archived.
  - How to combine with quantitative?
- Zooming in / Zooming out - close/distant reading (Nicolini 2009)
  - Tools - usefulness of AUT and ArchiveSpark; python + jupyter notebooks made results more legible, accessible for collaboration
  - Detecting anomalies - e.g. Zoominfo - ?impact of sample
- Shifting infrastructure - added difficulty of studying a system like SPN over time, in a constant ‘state of becoming’ (Barad 2003)
  - e.g. the way that SPN records user agents changed over time - highlighted dangers of looking at data as disconnected from software that produces it
  - Trace experiments helped (some). SPN3 is coming...

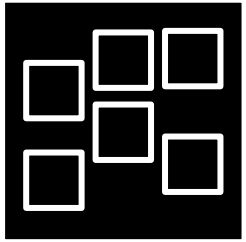
Discussion - Reading the Tea Leaves

- Diversity
- Ephemerality
- Novelty

Limitations

- Sample strategy - it's **one day a year.**
- Detecting automation
- Conceptualizing web archival attributes (e.g. 'novelty')
- URLs - delineating targets ➜ inferring intentionality

Reflexivity as Strategy



- Complex layering of data and findings (boxes within boxes), ways that proxies/data abstraction often creates more questions + uncertainty
- Problematizing *situatedness* (Haraway 1988) of so-called big data (+ extra complexities of SPN) - recognizing that data views are always partial, '*cooking data with care*' (Bowker 2005; Geiger and Halfaker 2018)
- Value of triangulation, epistemological flexibility - WA research as *boundary work* (Star and Griesemer 2015; Gieryn 1983) - requires a lot of translation

Future work...

Future Work

Wider statistical analysis?

warcio toolkit?

Interviews (Brügger, 2012)

Access to WARC data in web archives.

Research raised more questions than it answered (as typical of WA research)

Acknowledgements

XSEDE

Extreme Science and Engineering Discovery Environment

This work used the Extreme Science and Engineering Discovery Environment (XSEDE) Bridges and Bridges Storage at the Pittsburgh Supercomputing Center through allocation TG-ECS180012. Extreme Science and Engineering Discovery Environment (XSEDE), which is supported by National Science Foundation grant number ACI-1548562.