

Follow the User?!

Data Donation Studies for Collecting Digital Trace Data

Session **1** : Welcome & Intro to Digital Traces

Frieder Rodewald (University of Mannheim) & Valerie Hase (LMU Munich)

👉 Part of the SPP DFG Project [Integrating Data Donations in Survey Infrastructure](#)

Agenda

1. Intro to the workshop
2. What is digital trace data?
3. How can we collect digital traces?



Image by Hope House Press via Unsplash

1. Intro



Source: Image by Markus Winkler via Unsplash

Who are you?

Please raise your hand 🙋 if you

- are familiar with the term digital trace data
- have worked with APIs
- have worked with data donation
- have worked with automated content analysis
- regularly use programming languages (e.g., R, Python)

About us: Frieder Rodewald



PhD, University of Mannheim (DFG project on data donation)

Research interests:

- CSS (automated content analysis, digital traces, bias)
- Privacy concerns & behavior

More info: github.com/frodew & frieder-rodewald.de

About us: Valerie Hase



Akademische Rätin a. Z./Postdoc, LMU Munich (prev.: University of Zurich & LSE)

Research interests:

- CSS (automated content analysis, digital traces, bias, data access)
- Digital journalism, crisis communication






More info: github.com/valeriehase & valerie-hase.com

A big thank you to the organizers

Shoutout to the organizers behind the 7th COMPTExT, especially

- Fabienne Lind
- Veronika Ebner
- Marcin Stecker

What is the goal of this workshop?

-  Understanding digital data traces as a *type* of data
-  Understanding data donation as a *method* of data access
-  Working through key steps of data donation methods (user & researcher view)
-  Discussing when (not) to use data donation studies
-  Detailed implementation (e.g., server set-up)

Timetable



10:00–10:20

Session **1**: Welcome & Intro to Digital Traces



10:20–11:00

Session **2**: Data Donation Studies (Participant Perspective)



11:00–12:15

Session **3**: Data Donation Studies (Researcher Perspective)



12:15–13:00

Session **4**: Bias & Outro

2. What is digital trace data?



Source: Image by Markus Winkler via Unsplash

Which examples for digital trace data you know? 🤔

What is digital trace data?

Definition : *The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena*

- “records of activity (trace data) undertaken through an online information system” (Howison et al., 2011, S. 2)
- “individuals leave behavioural residue (unconscious traces of actions) when they interact online” (Hinds & Joinson, 2018, S. 2)

What is digital trace data?

Definition 💡: *The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena*

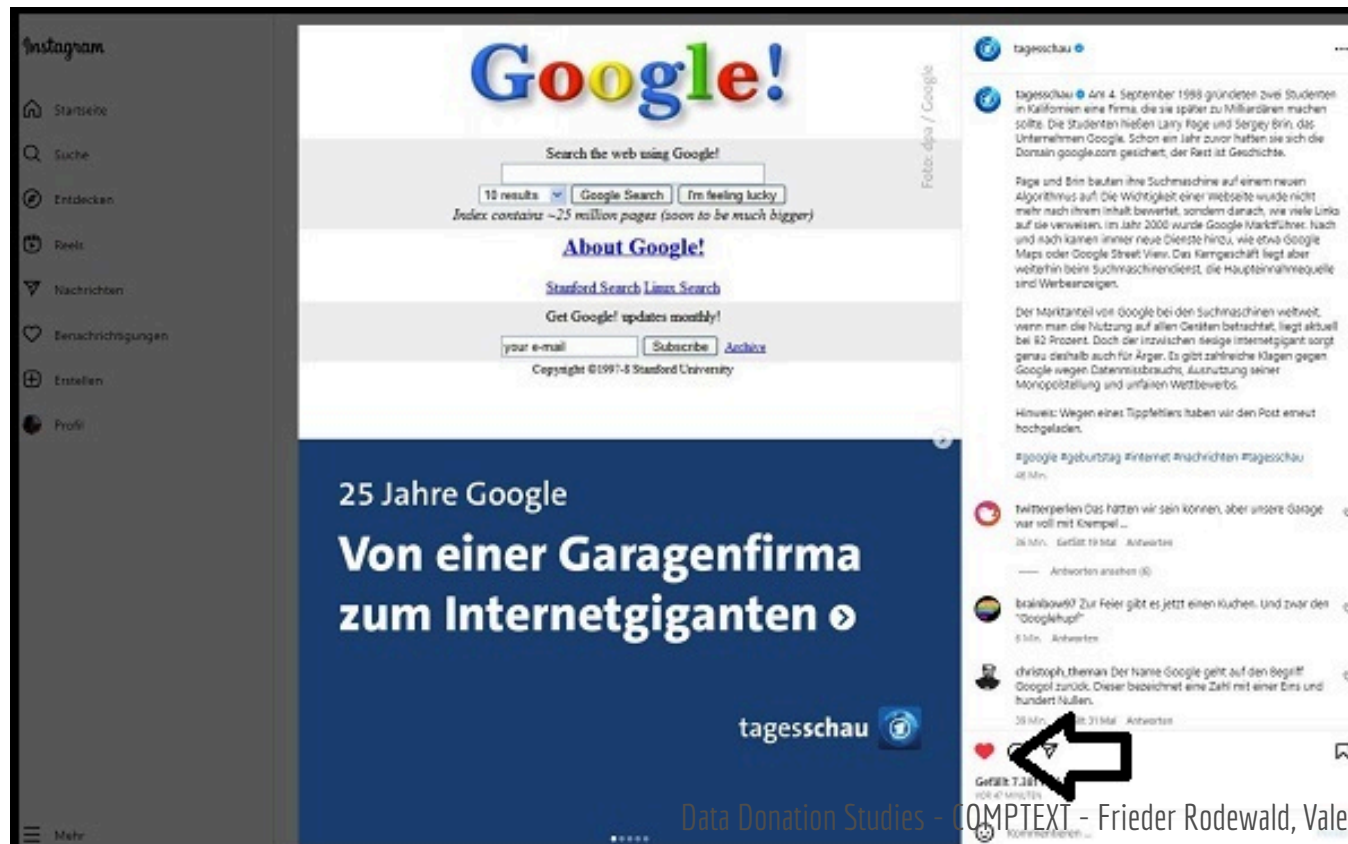
- e.g., tweets, likes, shares on social media
- e.g., geo data (locations, movements)
- e.g., digital payments
- e.g., Spotify playlists

What is digital trace data?

Definition 💡: *The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena*

- e.g., tweets, likes, shares on social media

Example: Instagram Like



What is digital trace data?

Definition 💡: *The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena*

- e.g., tweets, **likes**, shares on social media

Example: Instagram Like



```
{
  "likes_media_likes": [
    {
      "title": "tagesschau",
      "string_list_data": [
        {
          "href": "https://www.instagram.com/p/Cwwp6TyIETJ",
          "value": "\u00f0\u009f\u0091\u008d",
          "timestamp": 1688963882
        }
      ]
    }
  ],
}
```

Where can we find/collect digital trace data?

- Apps (e.g., running apps)
- Social media platforms (e.g., Instagram)
- Payment systems (e.g., Paypal)
- Wearable devices (e.g., smart watch)

Which types of data does this include?

Depending on the data collection method... (Haim & Hase, 2023; Ohme et al., 2024):

- often fine-grained (e.g., time-stamped)
- often longitudinal (e.g., over years, within-individual change)
- often less reactive (e.g., less concerns about social desirability)

Which types of data does this include?

Depending on the data collection method... (Haim & Hase, 2023; Ohme et al., 2024):

- Digital user profiles/settings (e.g., privacy settings)
- Digital activities (e.g., usage, messages, etc.)
- Digital targeting (e.g., ad exposure, algorithmically inferred interests)
- Analog activities (e.g., travelling, sleeping, sports)

Which (latent) constructs can we measure?

- **Internet use** (Parry et al., 2021) related to ...
 - well-being (Ohme et al., 2024)
 - voting (Bach et al., 2021)
- **News engagement** (Reiss, 2023) related to ...
 - news diversity (Jürgens & Stark, 2022)
 - public opinion formation (Yan et al., 2022)
- **Movements** related to ...
 - Mobility during pandemics (Li et al., 2021)
 - Social networks (Sepulvado et al., 2022)

Why are digital traces becoming more popular?

- Problems with self-reported data (e.g., via survey)

“How many minutes a day do you use the internet to consume news?”



Source: Image by Scott Graham via Unsplash

- „internet”?
- „news”?
- „how many minutes”?

Why are digital traces becoming more popular?

- Problems with self-reported data (e.g., via survey)
 - Self-reported data may be subject to specific bias, like social desirability (Parry et al., 2021; Scharkow, 2016)
 - Response rates in surveys are declining (Luiten et al., 2020)

Why are digital traces becoming more popular?

- Problems with self-reported data (e.g., via survey)
- Availability
 - cheap (e.g., via APIs)
 - large data sets (“big data”)






Why are digital traces becoming more popular?

- Problems with self-reported data (e.g., via survey)
- Availability

Be careful: These “advantages” are often claimed, but **not** empirically proven.

Digital traces are neither necessarily less biased, nor cheaper, or larger (we will discuss this in Session 4).

(Dis-)advantages of digital trace data

-  More fine-grained, often longitudinal measures due to timestamps
-  Partly measurement of new variables (e.g., algorithmic inference)
-  Bias due to errors in representation and measurement
-  Implementation can be expensive
-  More data does not mean better data!

Summary: What is digital trace data?

- **Definition:** *The recording and storing of activities on digital platforms to draw conclusions about digital and analog phenomena*
- **Further literature**
 - Keusch & Kreuter (2021)
 - Haim & Hase (2023)
 - Ohme et al. (2024)

3. How can we collect digital traces?



Source: Image by Markus Winkler via Unsplash

Which methods do you know/have you used for collecting digital trace data? 🤔

Platform- and user-centric methods

- **Platform-centric** (based on platform cooperation)
 - API (Jünger, 2021)
 - Cooperation with platforms (Wagner, 2023)
- **User-centric** (based on user cooperation and informed consent) or “follow the user” approaches (Caliandro, 2024)
 - Data donation (Carrière et al., 2024)
 - Linkage (Sloan et al., 2020)
 - Sensors (Struminskaya et al., 2021)
 - Tracking (Christner et al., 2022)

Platform- and user-centric methods

- Restrictions of platform-centric methods
 - Discontinuation of APIs ([Freelon, 2018](#))
 - Concerns about bias ([Schatto-Eckrodt, 2022](#); [Ulloa et al., 2025](#))
- User-centric methods become more popular, given ...
 - Changes in law that enable such studies (GDPR, DSA)
 - Presumably (!) less biased data
 - Ethical considerations (informed consent)

Summary: How can we collect digital traces?

- **Summary**

- Central methods including platform-centric methods (e.g., APIs) and user-centric methods (e.g., data donation)
- Key differences: control over samples & measurements, legal & ethical contexts

- **Further literature**

- Haim & Hase (2023)
- Ohme et al. (2024)

Questions?

References

- Bach, R. L., Kern, C., Amaya, A., Keusch, F., Kreuter, F., Hecht, J., & Heinemann, J. (2021). Predicting Voting Behavior Using Digital Trace Data. *Social Science Computer Review*, 39(5), 862–883.
<https://doi.org/10.1177/0894439319882896>
- Caliandro, A. (2024). Follow the user: Taking advantage of Internet users as methodological resources. *Convergence: The International Journal of Research into New Media Technologies*, 13548565241307569.
<https://doi.org/10.1177/13548565241307569>
- Carrière, T. C., Boeschoten, L., Struminskaya, B., Janssen, H. L., De Schipper, N. C., & Araujo, T. (2024). Best practices for studies using digital data donation. *Quality & Quantity*. <https://doi.org/10.1007/s11135-024-01983-x>
- Christner, C., Urman, A., Adam, S., & Maier, M. (2022). Automated Tracking Approaches for Studying Online Media Use: A Critical Review and Recommendations. *Communication Methods and Measures*, 16(2), 79–95.
<https://doi.org/10.1080/19312458.2021.1907841>
- Freelon, D. (2018). Computational research in the post-API age. *Political Communication*, 35(4), 665–668.
<https://doi.org/10.1080/10584609.2018.1477506>
- Haim, M., & Hase, V. (2023). Computational Methods und Tools für die Erhebung und Auswertung von Social-Media-Daten. In S. Stollfuß, L. Niebling, & F. Raczkowski (Eds.), *Handbuch Digitale Medien und Methoden* (pp. 1–20). Springer Fachmedien Wiesbaden. https://link.springer.com/10.1007/978-3-658-36629-2_41-1

- Hinds, J., & Joinson, A. N. (2018). What demographic attributes do our digital footprints reveal? A systematic review. *PLOS ONE*, 13(11), e0207112. <https://doi.org/10.1371/journal.pone.0207112>
- Howison, J., Wiggins, A., & Crowston, K. (2011). Validity Issues in the Use of Social Network Analysis with Digital Trace Data. *Journal of the Association for Information Systems*, 12(12), 767–797. <https://doi.org/10.17705/1jais.00282>
- Jünger, J. (2021). A brief history of APIs. In *Handbook of Computational Social Science, Volume 2* (1st ed., pp. 17–32). Routledge. <https://www.taylorfrancis.com/books/9781003025245/chapters/10.4324/9781003025245-3>
- Jürgens, P., & Stark, B. (2022). Mapping Exposure Diversity: The Divergent Effects of Algorithmic Curation on News Consumption. *Journal of Communication*, 72(3), 322–344. <https://doi.org/10.1093/joc/jqac009>
- Keusch, F., & Kreuter, F. (2021). Digital trace data. In *Handbook of Computational Social Science, Volume 1* (1st ed., pp. 100–118). Routledge. <https://www.taylorfrancis.com/books/9781003024583/chapters/10.4324/9781003024583-8>
- Li, X., Xu, H., Huang, X., Guo, C., Kang, Y., & Ye, X. (2021). Emerging geo-data sources to reveal human mobility dynamics during COVID-19 pandemic: Opportunities and challenges. *Computational Urban Science*, 1(1), 22. <https://doi.org/10.1007/s43762-021-00022-x>
- Luiten, A., Hox, J., & Leeuw, E. de. (2020). Survey Nonresponse Trends and Fieldwork Effort in the 21st Century: Results of an International Study across Countries and Surveys. *Journal of Official Statistics*, 36(3), 469–487. <https://doi.org/10.2478/jos-2020-0025>
- Ohme, J., Araujo, T., Boeschoten, L., Freelon, D., Ram, N., Reeves, B. B., & Robinson, T. N. (2024). Digital Trace Data Collection for Social Media Effects Research: APIs, Data Donation, and (Screen) Tracking. *Communication*

- Methods and Measures*, 18(2), 124–141. <https://doi.org/10.1080/19312458.2023.2181319>
- Parry, D. A., Davidson, B. I., Sewall, C. J. R., Fisher, J. T., Mieczkowski, H., & Quintana, D. S. (2021). A systematic review and meta-analysis of discrepancies between logged and self-reported digital media use. *Nature Human Behaviour*, 5(11), 1535–1547. <https://doi.org/10.1038/s41562-021-01117-5>
- Reiss, M. V. (2023). Dissecting Non-Use of Online News – Systematic Evidence from Combining Tracking and Automated Text Classification. *Digital Journalism*, 11(2), 363–383. <https://doi.org/10.1080/21670811.2022.2105243>
- Scharkow, M. (2016). The Accuracy of Self-Reported Internet Use—A Validation Study Using Client Log Data. *Communication Methods and Measures*, 10(1), 13–27. <https://doi.org/10.1080/19312458.2015.1118446>
- Schatto-Eckrodt, T. (2022). Hidden biases – The effects of unavailable content on Twitter on sampling quality. In *Grenzen, Probleme und Lösungen bei der Stichprobenziehung* (pp. 178–195). Halem.
- Sepulvado, B., Wood, M. L., Fridmanski, E., Wang, C., Chandler, M. J., Lizardo, O., & Hachen, D. (2022). Predicting Homophily and Social Network Connectivity From Dyadic Behavioral Similarity Trajectory Clusters. *Social Science Computer Review*, 40(1), 195–211. <https://doi.org/10.1177/0894439320923123>
- Sloan, L., Jessop, C., Al Baghal, T., & Williams, M. (2020). Linking Survey and Twitter Data: Informed Consent, Disclosure, Security, and Archiving. *Journal of Empirical Research on Human Research Ethics*, 15(1-2), 63–76. <https://doi.org/10.1177/1556264619853447>
- Struminskaya, B., Lugtig, P., Toepoel, V., Schouten, B., Giesen, D., & Dolmans, R. (2021). Sharing Data Collected with Smartphone Sensors. *Public Opinion Quarterly*, 85(S1), 423–462. <https://doi.org/10.1093/poq/nfab025>
- Ulloa, R., Mangold, F., Schmidt, F., Gilsbach, J., & Stier, S. (2025). Beyond time delays: How web scraping distorts measures of online news consumption. *Communication Methods and Measures*, 1–22.