Building a Minimal Viable Digital Identity (MVDI) from Digital Traces
A Narrative Review

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Research Question and Aim

Can we build trustworthy DIs from minimal digital traces?

Aim

To identify minimum viable digital data that can be used to build a digital identity (DI) that considers

- **Trust**
- **Privacy**
- **Security**

As fundamental principles

Use case

People without state issued documents

- **Migrants**
- **Refugees**

Digital footprint data associated with different groups of individuals

Alternatives digital data

- **Email addresses**
- **Social media profiles**
- **Online accounts across various platforms**
- **Community-based identification**
- **Biometrics (predominant)**

Usage limitations

- **Accounts existing across various platforms**
- **Data ownership**
- **Data sharing**
- **Validity**

Potential inequalities

- **Characteristics assessed in biometric ID system must be universal**
- **Should also be accessible and available to marginalised groups**
  - E.g., identity is assessed on what an individual possesses then this should be available to those most marginalised in society.

Building a MVDI complex; Ethical, acceptability, and adoption issues

Importance of context in DIs for migrants

- **Diversity**
  - People with no data to people with lots of (digital) data
- **Paradoxes**
  - e.g. privacy vs safety
- **Verifiable** which digital traces relate to the same individual?
- **Gaming** (false information to achieve their own goals)

- **Temporal elements**

One can look at the data informing Digital IDs as having use-by dates and usefulness dates

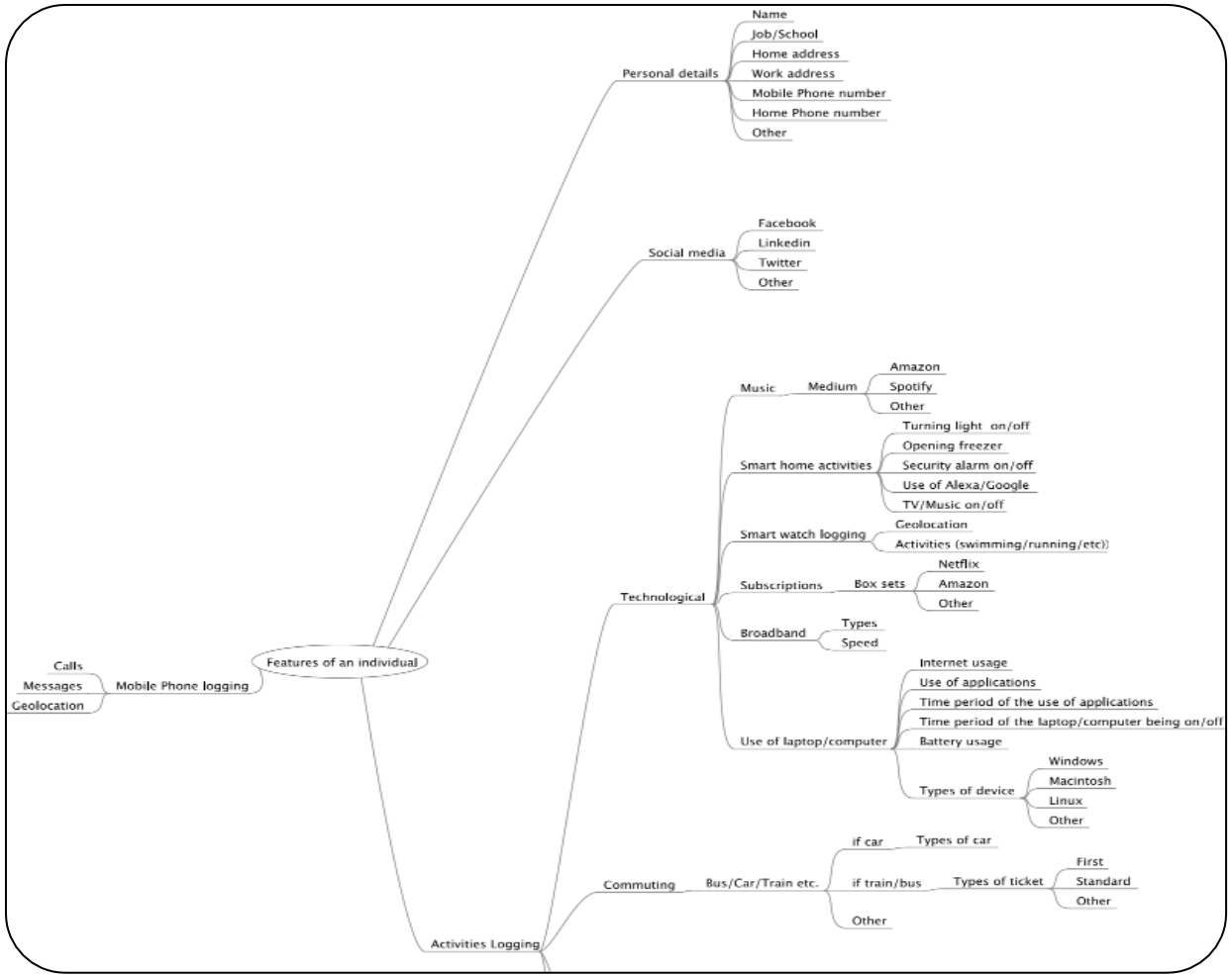
  - Needs, priorities, and context evolves over time
  - Relevant wider stakeholder groups evolve
  - Societal and ethical considerations change
  - Motivations and priorities change
  - Context - current geopolitical and societal priorities

Focusing on minimal digital footprints to form a digital ID

Existing implementations

- Reviewing exiting initiatives aimed at harnessing the benefits of DI to improve service provision.
- Existing implementations are predominantly biometric.
  - **UNHCR:** worked with refugees from 12 countries about core digital services they require.
  - **Estonia:** developed a digital system for public services, banking, voting, etc (photo finger).
  - **India:** Aadhaar accessing public services, food rations, opening a bank account, registering etc (photo finger, iris).
- Produce a taxonomy for digital traces that will inform the requirements for a MVDI and associated affordances.

Digital traces taxonomy



Future scanning of novel and emerging technologies

Standard Approach

Digital traces mainly generated through Web-based services

- Social networking
- Search engines
- Online shopping
- Streaming

Present Adaptations

Proliferation of smart devices has introduced new approaches to capturing digital traces

- Smart homes
- Smart cities

Future

Choosing digital footprints & combining effectively from large number of emerging options

- Football vibration digit footprint
- Wi-Fi signal reflection
- Joint motion

References

- Drozdowski, P., Rathgeb, C., Dantcheva, A., Damer, N., & Busch, C. (2020). Demographic Bias in Biometrics: A Survey on an Emerging Challenge. IEEE Transactions on Technology and Society, 1(2), 89–103. https://doi.org/10.1109/TTS.2020.2992344EFG
- Kanwar, S., Reddy, A., Kedia, M., & Manish, M. (2022). The Emerging Era of Digital Identities: Challenges and Opportunities for the G20 (ADBI Policy Briefs) [ADBI Policy Briefs]. Asian Development Bank Institute. https://doi.org/10.56506/XCNN8924
- Lee, T. (2016). Biometrics and disability rights: Legal compliance in biometric identification programs. Journal of Law, Technology & Policy, 2, 209–244.
- Mohammed Al-Husban (2015) Digital public service integration in refugee camp: camp to city : just to time bureaucracy. Doctoral Thesis, University of Portsmouth. https://researchportal.port.ac.uk/en/studentTheses/digital-public-service-integration-in-refugee-camp
- https://www.unhcr.org/neu/70493-unhcr-strengthens-efforts-on-digital-identity-for-refugees-with-estonian-support.html
- B. Mukhopadhyay, S. Anchal, and S. Kar, ‘Person Identification Using Structural Vibrations via Footfalls for Smart Home Applications’, IEEE Internet of Things Journal, vol. 8, no. 17, pp. 13384–13396, Sep. 2021, doi: 10.1109/JIOT.2021.3066448.
- Y. Lang, Q. Wang, Y. Yang, C. Hou, H. Liu, and Y. He, ‘Joint Motion Classification and Person Identification via Multitask Learning for Smart Homes’, IEEE Internet of Things Journal, vol. 6, no. 6, pp. 9596–9605, Dec. 2019, doi: 10.1109/JIOT.2019.2929833.
- F. Wang, J. Han, F. Lin, and K. Ren, ‘WiPIN: Operation-Free Passive Person Identification Using Wi-Fi Signals’, in 2019 IEEE Global Communications Conference (GLOBECOM), Dec. 2019, pp. 1–6. doi: 10.1109/GLOBECOM38437.2019.9014226.

Thank You

Any Questions?