Towards Cataloguing Potential Derivations of Personal Data

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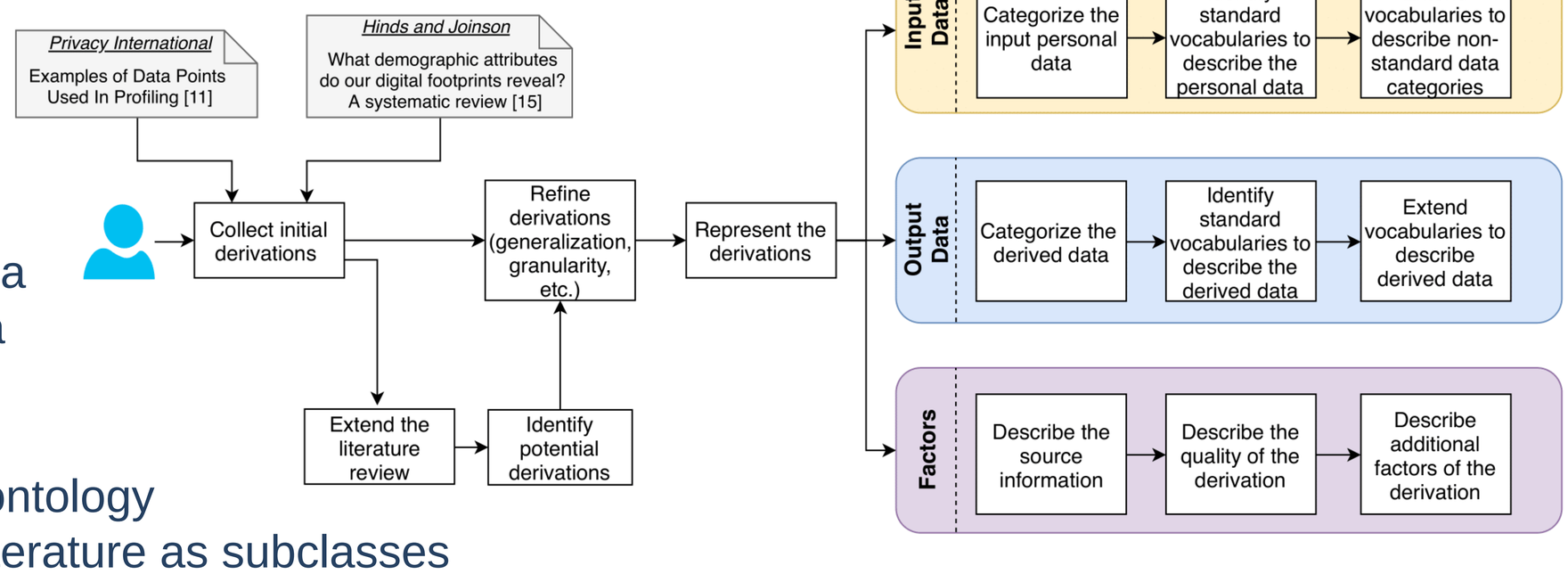
repository: github.com/coolharsh55/personal-data-inferences

Did you know that your race, sex, age and political opinion can be inferred from your twitter profile?

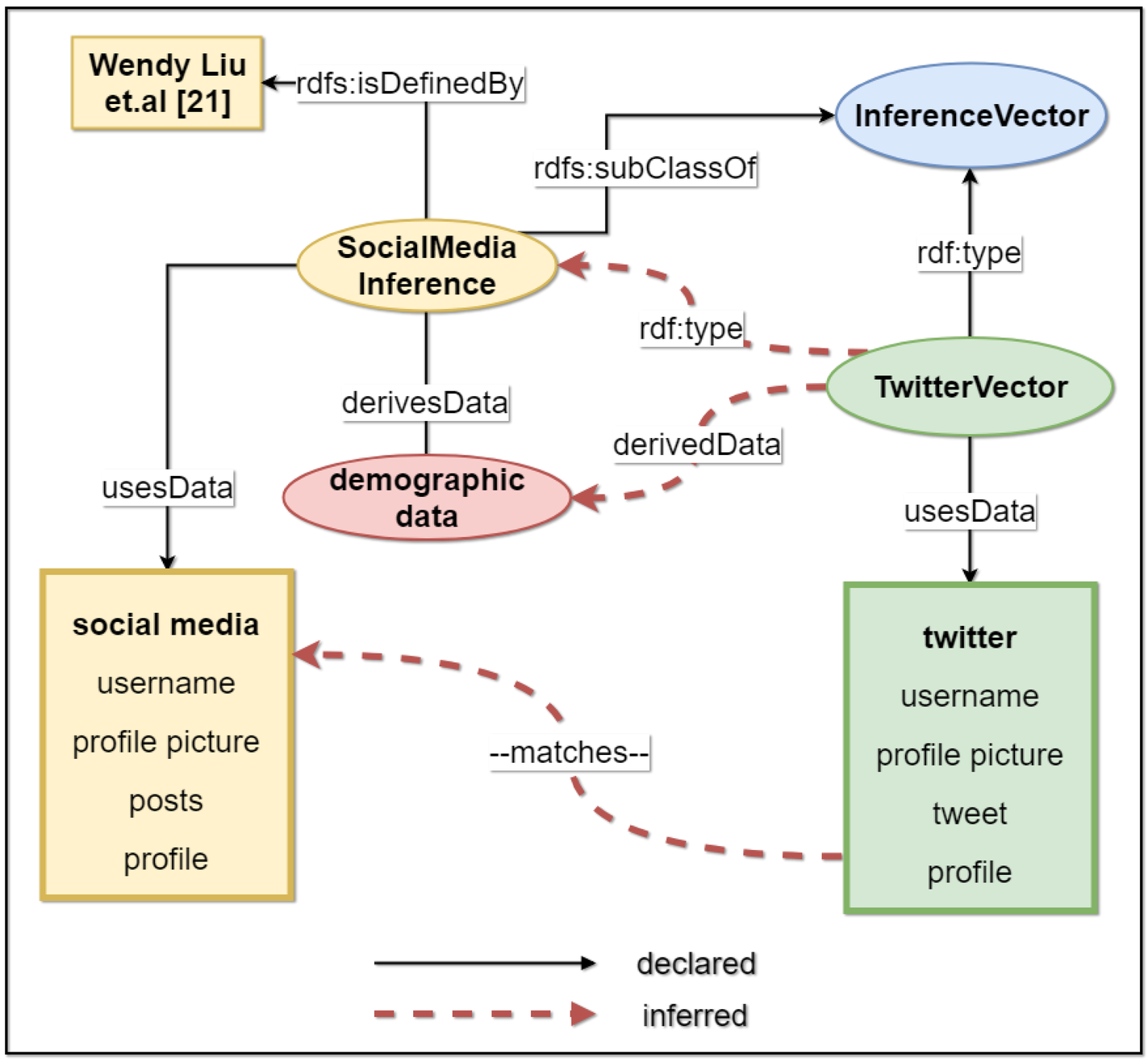
Or that demographic data can be inferred from your keyboard and mouse movements?

Aim: Determine and document what additional data can be derived from a given set of personal data



Proof-of-concept:

1. Create personal data ontology
2. Define derivations in literature as subclasses
   `rdfs:subClassOf InferenceVector`
3. Associate set of personal data with instance of `InferenceVector` through `usesData`
   `TwitterVector rdf:type InferenceVector`
4. Execute HermiT reasoner
5. Reasoner infers derivations through `rdf:type` relations between instances and subclasses of `InferenceVector`



Methodology:

1. Collect derivations from literature
2. Refine selected derivations as
   `{input → output[source]}`
3. Represent derivations in RDF+OWL

The bulk of personal data about you is *derived* data which means it is *inferred* from some existing data. Information about what data is derived is not transparent, and thus affects the understanding of privacy risks for users. The most famous example is deriving political opinions from tweets and Facebook interactions. This was extensively used by Cambridge Analytica to create psychological profiles for political campaigns based on information derived from users data.

Future Work:

- Create a community tool to collect derivations in a central repository
- Use SWRL for defining complex rules for derivations
- User-study to understand impact of information about derived data on privacy and ethics related risks

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