Scientific datasets associated with a research project can proliferate over time as a result of activities such as sharing datasets among collaborators, extending existing ones with new measurements, and extracting subsets of data for analysis. As such datasets begin to accumulate, it becomes increasingly difficult for a scientist to keep track of their derivation history, which complicates data sharing, provenance tracking, and scientific reproducibility. Understanding what relationships exist between datasets can help scientists recall their original derivation history. For instance, if dataset A is contained in dataset B, then the connection between A and B could be that A was extended to create B.

In our initial work, we developed a set of relevant relationships, proposed the relationship-identification methodology for testing relationships between pairs of datasets, developed a set of algorithms for efficient discovery of these relationships, and organized these algorithms into a new system called ReConnect to assist scientists in relationship discovery. We evaluated existing alternative approaches that rely on flagging differences between two spreadsheets and found that they were impractical for many relationship-discovery tasks. Additionally, a user study showed that ReConnect can improve scientists' ability to detect useful relationships between datasets.

While ReConnect helps with identifying relationships between two datasets, it is infeasible for scientists to use it for determining relationships between all possible pairs in a large collection. In this talk, we introduce an end-to-end prototype system, ReDiscover, that identifies, from a collection of datasets, the pairs that are most likely related. Our preliminary evaluation shows that ReDiscover can predict selected relationships with high precisions and within reasonable computational cost.
Biodata:

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