CIVIC DIGITAL FELLOWSHIP

Improving Access and Interoperability between the ADREC Metadata Shares and DMS using Natural Language Processing.

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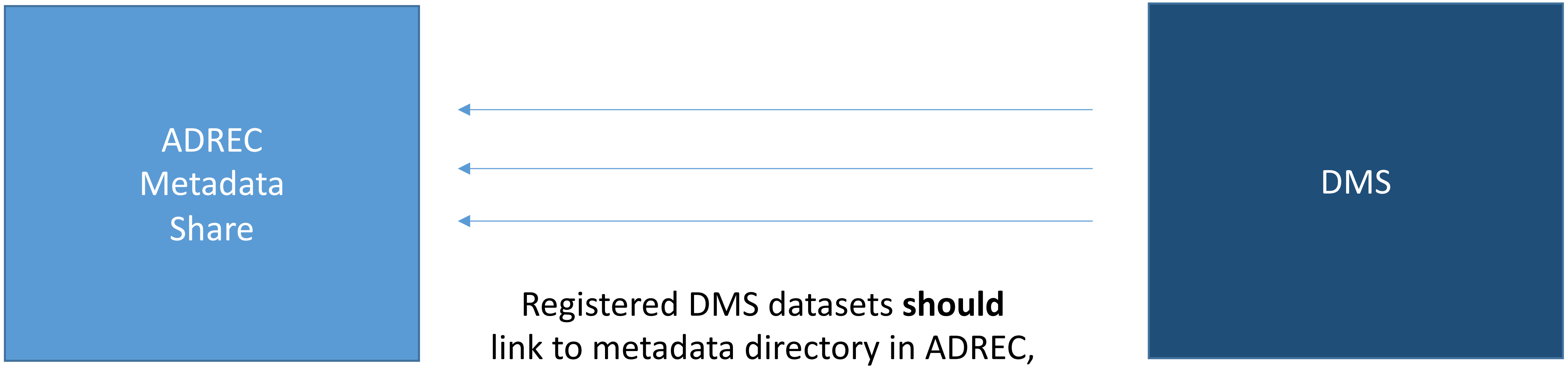
Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau.

Issue: ADREC resources inaccessible from DMS



ADREC Metadata Share

DMS

Registered DMS datasets **should** link to metadata directory in ADREC, **but** there are missing links

Additionally, datasets registered in DMS have different names than in ADREC

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Project Objectives

Continue upon the previous CDF's work to

1) Find the missing links between ADREC and DMS efficiently and accurately
2) API to access ADREC metadata associated with a given dataset/series in the DMS

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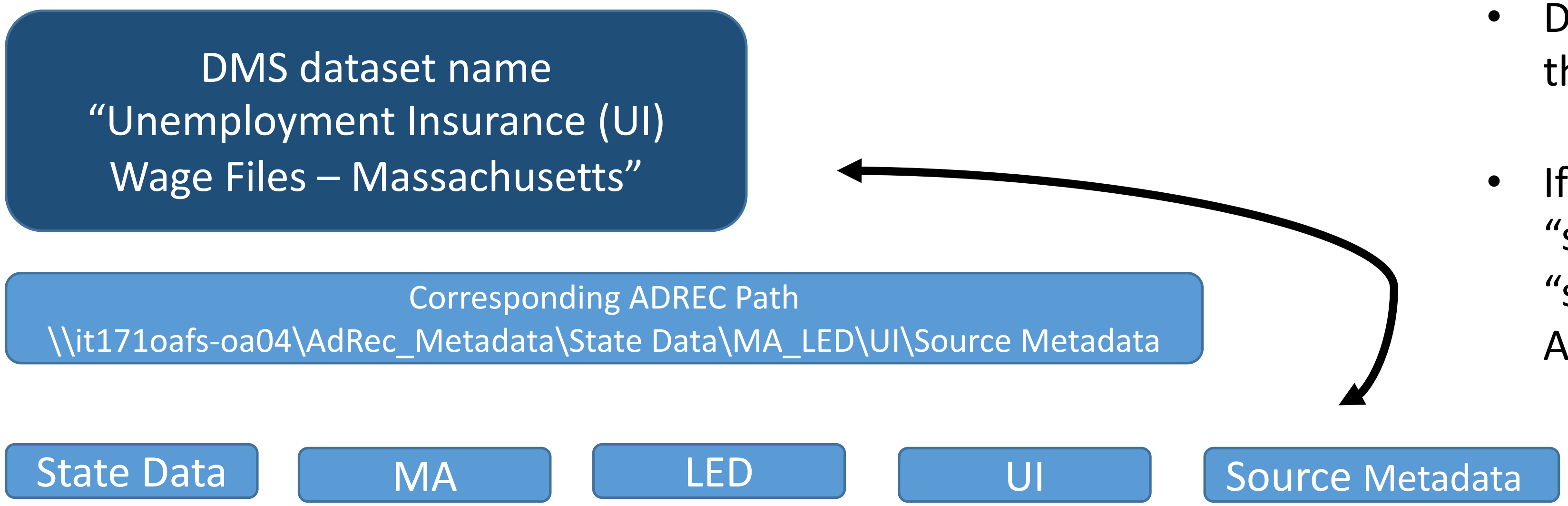
Solution and Breakthrough



DMS dataset name
“Unemployment Insurance (UI)
Wage Files – Massachusetts”

Corresponding ADREC Path
\\it171oafs-oa04\AdRec_Metadata\State Data\MA_LED\UI\Source Metadata

- DMS dataset name corresponds to the file path to an ADREC directory
- If the DMS dataset name is like a “sentence,” then it’s related to the “sentence” that spells out the ADREC directory

Employ natural language processing “bag of words” technique to compute a similarity score between pairs of dataset names and relevant ADREC paths

Bag of Words: [“cats”, “dogs”, “I”, “like”]

Sentence: “I like dogs”

Corresponding Vector: [0, 1, 1, 1]

Solution and Breakthrough

Step 1: Pre-process data by larger categories

State Data

Federal Data

Commercial Data

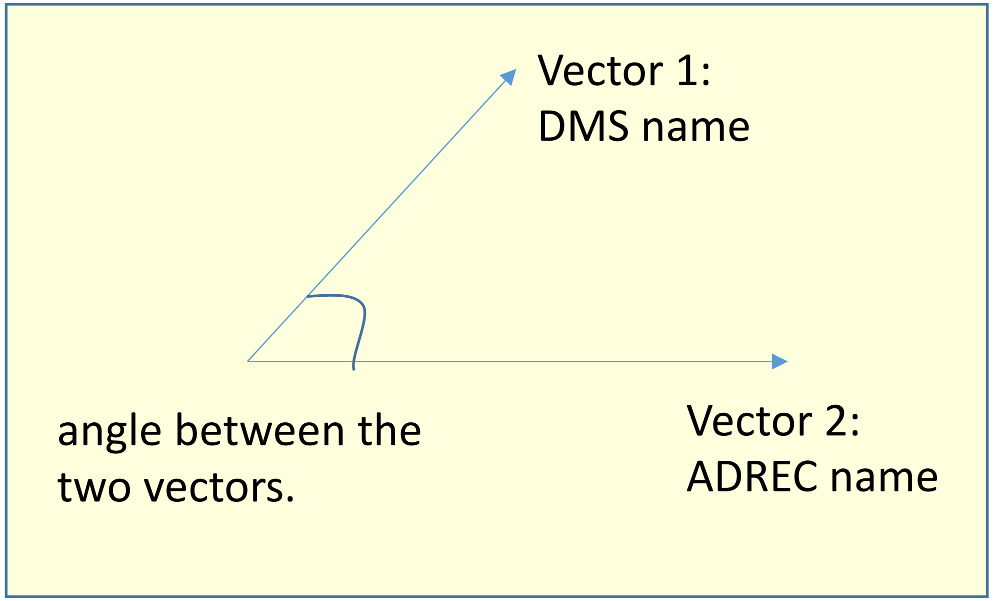
Step 2: Create dictionaries that map common acronyms to specific terms found in DMS

Step 3: Replace terms in DMS dataset names with corresponding acronyms found in ADREC

Step 4: Vectorize DMS dataset names and ADREC file paths using "bag of words"

Example vector: [0 1 0 0 2 0 3 1]

Step 5: Calculate the cosine similarity between pairs of vectors.



Conclusions

✓ Accurate database of matched records

Tools and Skills: Python, basic NLP toolkits (Sklearn), Subversion

✓ In Progress: API

Tools and Skills: Java, REST API Principles, Spring Boot, SQL, Maven, Subversion, Junit

For future consideration: Standardizing DMS naming schemes

Need for Census to adopt consistent naming schemes for a secure, private search engine that doesn't compromise Title 13/26/FTI data

Next step: Incorporating linkage results into an API

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