Federated queries over heterogeneous IGT collections

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Outline

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What is IGT

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Motivation

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- From 2006 to 2010 nominalisation strategy in Ossetian spoken in Dargavs changed according to fieldworkers' memory.
- Although it was impossible to check the data and make a reliable conclusion.

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- Not all the data was gathered well
- Careful checking require going through a lot of data, often in different formats, etc.

Idea and requirements

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$$\text{gathering} \rightarrow \text{filtering} \rightarrow \text{using}$$

Challenges (IGT as data)

- No fixed set of layers
- Alternative analyses
- Multiple different (partly incompatible) formats

$\Rightarrow$ Leads to separate silos of data

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  - And on support of off-the-shelf tools

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There is a technology that provides most of the requirements out of the box

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1. Uniform Resource Identifiers (URIs) should be used to name and identify individual things.
2. HTTP URIs should be used to allow these things to be looked up, interpreted, and subsequently "dereferenced".
3. Useful information about what a name identifies should be provided through open standards such as RDF, SPARQL, etc.
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Basically, it entails a **highly standartised text format(s)** with a tool stack (but conceptually datasets are a multigraph)

Linked Data: Pros and cons

+ It is based on text files, so it does not depend on a platform / technological stack / etc.
+ Allows connecting datasets to each other, breaking silos and making data accessible
+ Promotes rigid vocabularies and standards making data interoperable (for the most part)
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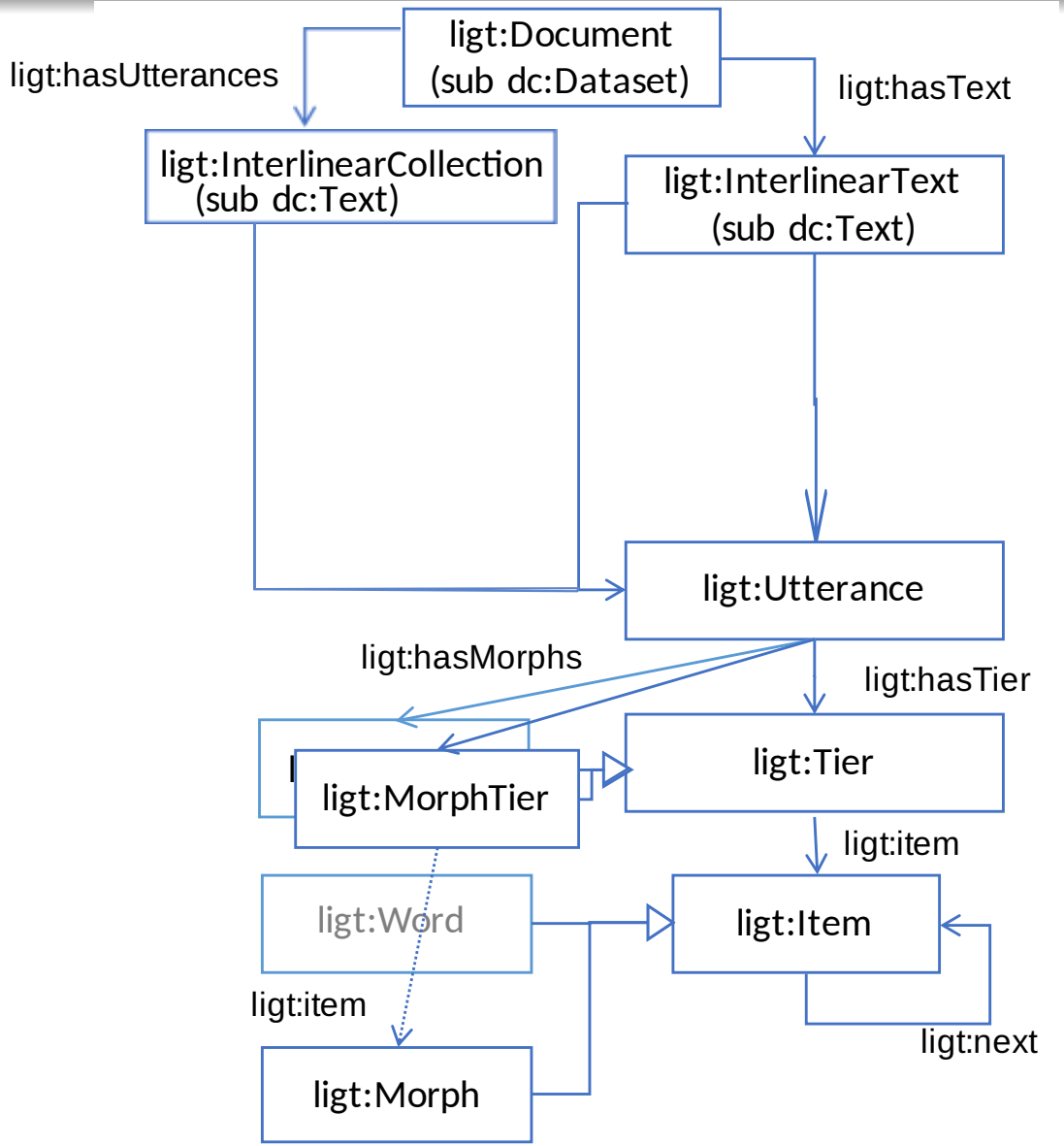
+ A lot of off-the-shelf tools allowing storing, searching, retrieving data
- Very steep learning curve, especially when things come to using the off-the-shelf tools
- Rigid vocabularies often lead to hacky modelling which decreases interoperability
- Slow for complex use-cases
- Relatively obscure which means less support

Outline

Basic idea


ligt:Document
(sub dc:Dataset)
ligt:hasUtterances
ligt:hasText
ligt:InterlinearCollection
(sub dc:Text)
ligt:InterlinearText
(sub dc:Text)
ligt:Utterance
ligt:hasMorphs
ligt:hasTier
ligt:MorphTier
ligt:Tier
ligt:item
ligt:Word
ligt:Item
ligt:item
ligt:next
ligt:Morph

Simple example

https://s.zazuko.com/qD7XtT

Simple example

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.2#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
SELECT (COUNT(?lang) as ?n_lang) ?val
WHERE {
  ?morph ligt:gloss ?val ;
         rdfs:label ?label .

  BIND(LANG(?label) as ?lang)
  FILTER(?val = UCASE(?val) && ?lang != '')
} GROUP BY ?val ORDER BY DESC(?n_lang)
```

Marker	#
3SG	2650
1SG	2397
NEG	1400
2SG	1306
PST	1099

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  - Converting datasets
  - Setting up a SPARQL endpoint
  - Querying data

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$\Rightarrow$ **on-the-fly conversion** via a service

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On-the-fly conversion

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- Ligt users do not need to worry about licensing and storing the data since potentially it is possible not to store the converted version
- It can even be done on the frontend with JS, no server required

Example: querying examples in cldf datasets

demo in the command line

Example: extracting 1SG morphs for several unconverted datasets

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.3#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT ?gram ?lang
{
  ?s a ligt:Morph ;
     rdfs:label ?gram ;
     ligt:gloss "1SG"@en .

     BIND(LANG(?gram) AS ?lang)
} LIMIT 10

***

./comunica-sparql-file \
http://CONVERTER/https://github.com/cldf-datasets/apics/raw/master/cldf/example
./grambank.ttl -f get-grams.rq
```

Example: extracting all possible causatives for each language

```
PREFIX ligt: <http://purl.org/ligt/ligt-0.3#>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>

SELECT DISTINCT (group_concat(?gram; separator=" | ") as ?grams) ?morph_val ?la
{
  ?doc a ligt:Document ;
       ligt:hasUtterances/ligt:utterance/ligt:hasMorphs/ligt:item ?s .
  ?s a ligt:Morph ;
     rdfs:label ?gram ;
     ligt:gloss ?morph_val .

     BIND(LANG(?gram) AS ?lang)
     FILTER(REGEX(?morph_val, "CAUS"))
} GROUP BY ?lang ?doc ?morph_val LIMIT 100

***

./comunica-sparql-file ./apics ./grambank.ttl -f get-caus.rq
```

LLOD advantages: Mapping annotations

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- In practice, this means adding one line for each mapping:

```
<http://purl.org/olia/unimorph.owl#ABL> apics:hasValue "ABL"@en .
<http://purl.org/olia/unimorph.owl#ABS> apics:hasValue "ABS"@en .
<http://purl.org/olia/unimorph.owl#ACC> apics:hasValue "ACC"@en .
<http://purl.org/olia/unimorph.owl#ACT> apics:hasValue "ACT"@en .
<http://purl.org/olia/unimorph.owl#ADJ> apics:hasValue "ADJ"@en .
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<http://purl.org/olia/unimorph.owl#ACT> apics:hasValue "ACT"@en .
<http://purl.org/olia/unimorph.owl#ADJ> apics:hasValue "ADJ"@en .
```

- After this process we can operate with concepts: case, gender, aspect instead of strings

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- Adding intermediate annotations: annotate what you found to find it easier next time
- When dealing with remote data (or converted remote data), it is possible to add and save annotations **locally**, keeping some notes, alternative annotations, etc.

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? What could be potential queries that make linguistic sense?

? What potential linguistic use-cases this can be used for?

`https://github.com/max-ionov/ligt`