Ontologies in the Time of Linked Data

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Overview

- Application scenario: Linked Jazz
- Bird’s eye view of Linked Open Data
- Ontology Building Methodology
Identify the network of relationships among jazz artists described in interview transcripts.
RDF Triples

Billy Strayhorn | composer of | Take the "A" Train

<http://dbpedia.org/resource/Billy_Strayhorn>
<http://purl.org/ontology/mo/composer>
<http://dbpedia.org/resource/Take_the_%22A%22_Train>
Knowledge Representation Languages

- RDF Schema (RDFS)
- Web Ontology Language (OWL)
- Simple Knowledge Organization System (SKOS)
Knowledge Representation Languages

RDF Schema (RDFS)

• Defines classes and properties
• Organizes them hierarchically
Knowledge Representation Languages

Web Ontology Language (OWL)

• Built on RDF and RDFS, but capable of representing complex relationships
• Logical combination of classes—intersections, unions, and complements
• Axioms on properties—transitive, symmetric, functional, inverse
Knowledge Representation Languages

Simple Knowledge Organization System (SKOS)

• OWL ontology
• Describes name authorities with \texttt{skos:prefLabel} and \texttt{skos:altLabel}
• Supports data mapping with \texttt{skos:exactMatch}, \texttt{skos:closeMatch}
Methodology

Six phases

• Specification
• Modeling
• Generation
• Linking
• Publication
• Exploitation

(Vila-Suero et al., 2014; Heath and Bizer, 2011; Villazón-Terrazas et al., 2011)
Purpose
• A model to describe the datasets created within the project

Scope
• Domain of jazz music
• Originally limited to jazz artists and social relationships
• Now includes music-related data (performances, discographies, etc.)
Linked Jazz Ontology Namespace

Best practice URI path:
http://(domain)/(type)/(concept)/(reference)

Linked Jazz Ontology Namespace:
http://linkedjazz.org/ontology

Example Linked Jazz Ontology URI:
http://linkedjazz.org/ontology/playedTogether
Vocabulary Selection

Friend of a Friend vocabulary (foaf)

Criteria
• Usage
• Maintenance and Governance
• Coverage
• Expressivity
## Source Vocabularies

<table>
<thead>
<tr>
<th>Source</th>
<th>URL</th>
<th>Description</th>
</tr>
</thead>
</table>
| bf:    | http://bibframe.org/vocab/  
- namespace for BIBFRAME: Bibliographic Framework Initiative |
| dbpedia-owl: | http://dbpedia.org/ontology  
- namespace for DBPEDIA: DBpedia ontology |
| event: | http://purl.org/NET/c4dm/event.owl#  
- namespace for EVENT: Event Ontology |
| foaf:  | http://xmlns.com/foaf/0.1/  
- namespace for FOAF: “Friend of a Friend” vocabulary |
| mo:    | http://purl.org/ontology/mo/  
- namespace for MO: The Music Ontology |
| owl:   | http://www.w3.org/2002/07/owl#  
- namespace for OWL: Web Ontology Language |
| rel:   | http://purl.org/vocab/relationship/  
- namespace for REL: Relationship vocabulary |
| rdf:   | http://www.w3.org/1999/02/22-rdf-syntax-ns#  
- namespace for RDF: Resource Description Framework |
| rdfs:  | http://www.w3.org/2000/01/rdf-schema#  
- namespace for RDFS: RDF Schema |
| schema: | http://schema.org/  
- namespace for SCHEMA: Schema.org |
| skos:  | http://www.w3.org/2004/02/skos/core#  
- namespace for SKOS: Simple Knowledge Organization System |
Core set of classes and properties for “person” entity
Sam Rivers talks about Dizzy Gillespie

So would you say that these types of influences early in your career can be accounted for as the heavy influence on your progressive style - your forward looking style?

I think all the influences combined - we're all sponges you know if we're open enough, people that are not open get it anyway, we don't remember where we got it from but we think it's original so I'm pretty cautious about saying this or that about my originality because things come to me - I don't know where they come from - If I came out with it, it could very well be someone else's, so I'm careful about things about originality because there are so many facts and phrases and ideas bombarding us at all times. Whether we're receptive or not, it doesn't really matter - it comes in anyway. Some of it pierces the armor, so to speak. But, my influences were of course Charlie Parker and Lester Young before that and Coleman Hawkins. Coleman Hawkins, Lester Young, Charlie Parker, Dizzy Gillespie and Miles Davis really influenced me at that time.
Linked Jazz 52\textsuperscript{nd} Street Relationships
Modeling

Person

- foaf:Agent
  - rel:influencedBy
  - mo:collaborated_with
- foaf:Person
  - rel:knowsOf
  - foaf:name
- foaf:knows
  - rel:hasMet
  - rel:acquaintanceOf
  - rel:closeFriendOf
  - rel:mentorOf
Linked Jazz Minted Predicates

- `lj:playedTogether`
- `lj:touredWith`
- `lj:inBandWith`
- `lj:bandLeaderOf`
- `lj:bandMemberOf`
Enriched “person” entity classes and properties
Tree view of the expanded model in Protégé
Expanding the Ontology

Individual and Group Entities
- Music Group
- Solo Music Artist
- Organization
- Record Label

Spatial Entities
- Place
- Venue
- Event
- Session

Temporal Entities
- Work [Song]
- Audio
- Image
- Video
- Release

Object Entities
- Instrument
Data Mapping

<table>
<thead>
<tr>
<th>Column</th>
<th>Linked Jazz</th>
<th>JDISC</th>
<th>MusicBrainz</th>
<th>BRIAN discography</th>
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<td>DOB</td>
</tr>
<tr>
<td>Date of Death</td>
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<td>End date</td>
<td>End date</td>
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<td>Birthplace</td>
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<tr>
<td>Death place</td>
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<tr>
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<tr>
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<td>Skills/instrument</td>
<td>Skills/instrument</td>
</tr>
<tr>
<td>Band or group</td>
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owl:sameAs

<http://linkedjazz.org/resource/Sam_Rivers>  
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<http://dbpedia.org/resource/Sam_Rivers>  
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<http://viaf.org/viaf/164803380/>  
<owl:sameAs>  
<https://musicbrainz.org/artist/f86342be-eef7-445b-90c9-250bdf3f0b3b>
<http://linkedjazz.org/resource/Sam_Rivers>
<owl:sameAs>
<http://dbpedia.org/resource/Sam_Rivers>
<owl:sameAs>
<http://viaf.org/viaf/164803380/>
<owl:sameAs>
<https://musicbrainz.org/artist/f86342be-eef7-445b-90c9-250bdf3f0b3b>
<http://xmlns.com/foaf/spec/#term_Person>
<owl:equivalentClass>
<http://schema.org/Person>
<owl:equivalentClass>
<http://dbpedia.org/ontology/Person>

Class hierarchy:

- Thing
  - dbpedia-owl:Artist
  - dbpedia-owl:Instrument
  - dbpedia-owl:Person ≡ schema:Person ≡ foaf:Person
  - dbpedia-owl:Place
  - foaf:Agent
    - foaf:Group
      - foaf:Person ≡ dbpedia-owl:Person ≡ schema:Person
      - mo:MusicArtist
      - schema:Person ≡ dbpedia-owl:Person ≡ foaf:Person
owl:equivalentProperty

LodView page for Sam Rivers
SPARQL Query to return Sam River’s relationships

```
SELECT ?relationship ?person WHERE {
}
LIMIT 50
```

<table>
<thead>
<tr>
<th>relationship</th>
<th>person</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
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Traditional vs. LOD Ontologies

- Specification
- Modeling
- Generation

- Exploitation
  - Structure can be complex with strict logical formalisms
  - Terms created to capture entire domain of interest
  - Difficult to reuse

- Specification
- Modeling
- Generation
- **Linking**
- **Publication**
- Exploitation

- Lightweight, open structure
- Built from the bottom up with extensions and adjustments
- Easy reuse of terms through mixing and mapping
Thank you

Questions or comments?

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Find us at:
linkedjazz.org

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