LINKED DATA IN MUSIC AND ITS POTENTIAL FOR ITMA/TRADITIONAL MUSIC WEB RESOURCES

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Introduction

The Linked Irish Traditional Music project[1] at the Irish Traditional Music Archive (Dublin, Ireland) is an ambitious two-year undertaking to create linked data tools for better describing Irish traditional music and dance. Our main focus is on developing an ontology specific to Irish traditional music (song and instrumental) as well as dance, along with creating better organisational structures to support ongoing efforts to describe and make these traditions accessible across the web.

In this project, the scope of 'Irish traditional music and dance' is that used in the definition used by the Irish Traditional Music Archive (ITMA):[2]

> *The Archive understands 'Irish traditional music' as a broad term which encompasses oral-tradition song, instrumental music and dance of many kinds and periods. It interprets the term in the widest possible sense, and always tries to include rather than exclude material. Items are collected if they could be considered traditional in any way – in origin, or in idiom, or in transmission or style of performance, etc. – or if they are relevant to an understanding of traditional music and its contexts.*

Linked open data (LOD) has shown great promise in cultural heritage and digital humanities applications, making cultural heritage materials—those found within libraries, museums, and archives—accessible to wider audiences via the semantic web. Recent projects involving music linked data include the DOREMUS (DOing REusable MUSic Data) project,[3] the ongoing Linked Jazz project,[4] as well as the large-scale Europeana Sounds project,[5] for which the Irish Traditional Music Archive provided content.

There are numerous challenges when representing digital cultural heritage materials within linked data ontologies, with ontology development necessitating 'double experts'[6] in both ontology design and subject domains such as music. This paper will provide an overview of LITMUS to date, present some considerations for documenting and describing Irish traditional music and dance within a linked data ontology, and consider where the LITMUS project might take ITMA in the future.

Description and Access Challenges

Music traditions propagated primarily through oral transmission have additional considerations and present unique representational challenges outside current knowledge organization frameworks, the majority of which are based upon the norms of Western Classical and Western Popular music.[7] Among the few music ontologies developed, none adequately express orally-based traditions like Irish

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[2] For the full statement, see: https://www.itma.ie/about/our-work/definitions
[3] http://www.doremus.org/
[4] https://linkedjazz.org/
[5] http://www.eusounds.eu/
[6] David Stuart, *Practical ontologies for information professionals* (London: Facet Publishing, 2016).
[7] For more discussion on this topic, see: L.K. Weissenberger,'Traditional musics and ethical considerations of knowledge and documentation processes', *Knowledge Organization* 42:5 (2015), 290-295 [http://www.ergon-verlag.de/isko_ko/downloads/ko_42_2015_5_e.pdf]

traditional music and dance.[8] An ontology based upon the considerations of oral transmission will allow such items to be described and related to one another using terms musicians and dancers themselves use, and will reflect more accurate relationships than current music ontologies allow.

The LITMUS project must overcome challenges related to documenting traditional Irish music and dance practice. Relationships and terminology are made more difficult due to the informal nature of oral transmission. As collector and scholar Hugh Shields explained, '… terms to describe traditional singing have grown up in a haphazard way: a fact which disturbs its students more than its practitioners.'[9] Several challenges for describing and organising Irish traditional music and dance include the general disagreement among practitioners on common terminology or conflicting uses of terms, as well as terms with more than one applied meaning. An example of this is the term 'jig', of which there are multiple applied meanings:

1. As a dance type, the jig can be rendered within the idioms of sean-nós ('old style' percussive) dance forms, competition-based solo step-dance using both heavy shoes (a treble jig) or soft shoes (beginner's dances called light jigs), group dances such as within the competition step-dance (such as a dance choreographed for 8 dancers, termed an '8-hand jig', for example), ceili dances (Haymaker's jig), set dances within the solo step-dance tradition which are rendered in jig time, 6/8, such as St Patrick's Day, and the group-based meaning of set dances, where couples dance sets and figures.
2. Next, we also must remember that the term 'jig' applies equally to the dance tunes in 6/8, played both *for* dancers and *separate* from them; the term might also be seen as an umbrella term for dance tunes and dances that are based in 6/8 and 9/8 metres, where three quavers are grouped to form one beat. While dancers use shoe type to differentiate between types of jigs, musicians use tune rhythms to denote either a 'single jig', where crotchet-quaver combinations predominate, or 'double jig', where groups of three quavers predominate.[10]
3. Jigs can also be sung (termed 'jig songs'), usually in the Irish language, and several examples are to be found here: An Rogaire Dubh and Na Ceannabháin Bhána, just to list a 6/8 jig song and a 9/8 slip jig song.

Within the above terminology example, relationships between different meanings of the same term illustrate the interwoven nature of Irish instrumental music, song, and dance. Relationships between people, music, place, and other aspects of the traditions are predominantly based in oral transmission and the kinds of associations that produces.

Ontology Development Overview

Irish Traditional Music Archive staff provide guidance and expertise with regard to source materials, examples, contextual information, and bibliographic data throughout the development of the ontology, which is still ongoing. For the development of classes and entities, along with properties, our approach is to model a small number of highly-complex use cases to try and account for the scope and range of eventual representation in linked data. Two exemplar use cases are 1) the air/song with numerous titles, a few of which are 'Danny Boy' and '(London)Derry Air', and 2) the song, instrumental slow air, hornpipes, and set dance known as An Lon Dubh / The Blackbird.[11] Eventually, these graph models will be converted into classes and entities using OWL (Web Ontology Language).

In addition to developing the classes and entities within the ontology, the properties[12] are a particular focus. The LITMUS ontology's properties are derived both from existing ontologies and also from these written or oral liner notes. The methodology for developing the ontology properties centres around content analysis of album liner notes, which is rich in contextual detail. Selected recordings represent

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[8] For more detailed explanations, see: L.K. Weissenberger, *Stories, songs, steps, and tunes: a linked data ontology for Irish traditional music and dance.* Paper presented at the ISKO-UK biennial conference, London, UK, 2017 [http://doi.org/10.5281/zenodo.1002056].

[9] Hugh Shields, *Narrative singing in Ireland: lays, ballads, come-all-yes and other songs* (Dublin: Irish Academic Press, 1993), v.

[10] In everyday practice, it might be unusual to hear musicians use 'single jig' or 'double jig' when discussing tunes, however the terms would appear within compilation books of tunes and tutors, as well as between scholar-musicians of Irish traditional music.

[11] An Lon Dubh is rarely performed as a song today. It is heard as a non-metred instrumental air as well as metred dance tunes derived from the air, and a set dance with regional and stylistic variants in dance steps.

[12] Properties describe relationships; Stuart's (2016) definition is 'attributes that describe classes'.

musicians from a variety of eras, geographic locations, instrumental and vocal traditions, and both solo and group recordings. The length and detailed nature of some album notes made them better candidates for analysis over those where only tune or song names/lyrics were provided. For older recordings where the musician can be heard talking and giving information about the tunes, these musings were recorded as 'oral liner notes'.

A small example of liner notes used can be seen in Fig. 1, taken from an album of Johnny "Batt" Henry's fiddle music, recorded over the span of almost two decades (1964, 1977-8, 1973, and 1981) and compiled in an album released in 2012. The notes are by renowned fiddle player James Kelly, who has an encyclopaedic memory of people, places, and tunes.

Language used within the album notes appears fairly consistent from the 1970s up to the albums released within the past few years. For example, musicians and singers note which tunes/songs are related to the one they are performing. Likewise, they often explain what makes the particular version of tune or song performed on the album different from the others. Musicians frequently provide sources for their tunes, such as where they first heard the tune or from whom they learned their version. In explaining these relationships, album notes reference titles, or events, or geographic places, other musicians, as well as collectors and published collections.

This methodology for developing ontology properties allows us to analyse language used by practitioners over time to express relationships found in transmission and learning of Irish traditional music. Anecdotally speaking, the language contained within the album notes mirrors language used when introducing tunes and songs in both formal and informal performance settings. Using practitioners' own language will benefit the application of the ontology within traditional music collections in Ireland, as well as when applied to other European and non-European music collections.

Looking to the Future

The Linked Irish Traditional Music (LITMUS) project's overall aim is to improve searching and access to web-based Irish traditional music, song and dance resources through the development of a linked data ontology, and eventual framework. Once completed, the LITMUS ontology will facilitate research in a variety of disciplines–including musicology/ethnomusicology, ethnochoreology, digital humanities, and library and information science–as well as enable discovery of new resources for students and performers of Irish music and dance worldwide. As global interest in Irish traditional music remains high, this will necessitate further digitisation efforts and investment in the Irish Traditional Music Archive's digital library infrastructure to reach users worldwide.

For future projects stemming from LITMUS, we look to incorporate aspects of crowdsourced knowledge and aim for closer collaboration with the traditional music and dance communities. A similar project to LITMUS, the Linked Jazz project led by Cristina Patuelli of the Pratt Institute, derived many of their relationship data for musician-musician relationships from oral history interviews of jazz musicians; transcriptions were either made by Linked Jazz researchers or crowdsourced by the public. For large-scale linked data implementation, strategic crowdsourced knowledge generation could prove a tremendous asset to our diverse and ever-expanding collections.

Although tailored to Irish traditional music, it is hoped that LITMUS will provide a working model for other European and non-European traditional musics with similar considerations. Properties are potentially the most transferrable aspect of the ontology for other traditional/folk music outside the Irish tradition as the types of relationships and descriptors/attributes useful for describing relationships in Irish traditional music and dance may very well extend to other European and non-European music/dance traditions also reliant upon oral transmission. Collaborative efforts between the Irish Traditional Music Archive and other institutions with folk or traditional music and dance materials may be fertile ground for further development and implementation of the ontology.

Abstract

LITMUS (Linked Irish Traditional Music) is a two-year cultural heritage linked data project at the Irish Traditional Music Archive in Dublin, Ireland. It focuses on the creation of a linked data ontology specific to Irish traditional music and dance–the first such ontology based around a music primarily propagated by oral transmission. While efforts to accurately represent, describe, and organise traditional music have numerous challenges, the methodologies used to develop the ontology centre around text-based sources from traditional musicians' album notes, mirroring language used by musicians when introducing tunes and songs in both formal and informal performance settings. Using practitioners' own language will benefit the eventual application of the ontology within traditional music collections in

Ireland, and have potential applications to other European and non-European folk/traditional music collections with similar considerations.

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