Music Recommendation Use Case

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Introduction. Context and motivation

- In recent years the **typical music consumption** behavior has **changed** dramatically.

- **Personal music collections have grown** favored by technological improvements in networks, storage, portability of devices, Internet services and peer-to-peer networks.
Introduction. Music Information Plane: Describing music titles
Introduction. **Music Information Plane:** Describing music titles

- **Song metadata** includes [Pachet, 05]
  - Editorial information
  - Acoustic information
  - Cultural information

- **Users** are represented by their profiles. Includes:
  - Demographic,
  - Geographic, and
  - Psychographic information
    - Music preferences, user listening habits, etc.
Music Use Case

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Music use case. **Metadata initiatives for Audio Content**

- **MM standards** for describing Audio Content
  - ID3v2, [http://www.id3.org/id3v2.3.0.html](http://www.id3.org/id3v2.3.0.html)
    - Unstructured key/value pairs
    - Unstructured key/value pairs
    - RDF data (not yet supported!)

  -> ID3, OGG, APE are tag based (*free* attribute value pairs)
  -> All these approaches focus on editorial information

- **Audio Ontologies (OWL)**
  - Kanzaki, [http://www.kanzaki.com/ns/music](http://www.kanzaki.com/ns/music)
    - describe classic music performances
  - Music Production, [http://moustaki.xtr3m.org/musicont/](http://moustaki.xtr3m.org/musicont/)
    - describe music production process
    - describe artists, relationships, and songs (editorial, plus *acoustic metadata*)

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Music use case. **OGG Vorbis proposed elements**

- **TITLE**: Track/Work name
- **VERSION**: The version field may be used to differentiate multiple versions of the same track title
- **ALBUM**: The collection name to which this track belongs
- **TRACKNUMBER**: The track number of this piece if part of a specific larger collection or album
- **ARTIST**
- **PERFORMER**: The artist(s) who performed the work.
- **COPYRIGHT**: Copyright attribution (e.g., ‘1999 Jack Moffitt’)
- **LICENSE**: License information, eg, 'All Rights Reserved', 'Any Use Permitted', a URL to a license such as a Creative Commons license
- **ORGANIZATION**: Name of the organization producing the track (i.e. ‘a record label’)
- **DESCRIPTION**: A short text description of the contents
- **GENRE**: A short text indication of music genre
- **DATE**
- **LOCATION**: Location where track was recorded
Music use case. **Solution**

- Two general approaches
  - Integration at RDF level (song & artist instances)
  - Ontology mapping?
Music use case. Concrete example

```xml
<rdf:Description rdf:about="http://www.garageband.com/artist/randycoleman">
  <rdf:type rdf:resource="#music:Artist"/>
  <music:name>Randy Coleman</music:name>
  <music:decade>1990</music:decade>
  <music:decade>2000</music:decade>
  <music:genre>Pop</music:genre>
  <music:city>Los Angeles</music:city>
  <music:nationality>US</music:nationality>
  <geo:Point>
    <geo:lat>34.052</geo:lat>
    <geo:long>-118.243</geo:long>
  </geo:Point>
  <music:influencedBy rdf:resource="http://www.coldplay.com"/>
  <music:influencedBy rdf:resource="http://www.jeffbuckley.com"/>
  <music:influencedBy rdf:resource="http://www.radiohead.com"/>
</rdf:Description>

<rdf:Description rdf:about="http://www.garageband.com/song?pe1|S8LT0LdsAbsKafeyYG0">
  <rdf:type rdf:resource="#music:Track"/>
  <music:title>Last Salutation</music:title>
  <music:playedBy rdf:resource="http://www.garageband.com/artist/randycoleman"/>
  <music:duration>00:04:27</music:duration>
  <music:key>D</music:key>
  <music:mode>Major</music:mode>
  <music:tonalness>0.04</music:tonalness>
  <music:tempo>72</music:tempo>
</rdf:Description>
```
Music use case. Other scenarios

- Possible ideas/scenarios
  - Create personalized playlists
    -> exploit song metadata (RDF), plus user profile
  - Upcoming gigs
    -> User FOAF profile (gelocation), geonames, RDF data about venues and events
  - Simplify navigation in music collections through personalized views
    -> Integrate RDF song instances into /facet
  - Semi-automatic annotation of music
    -> Link with Tagging UC
  - Semantic Podcast
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Automatic generation of a playlist based on overall audio similarity with songs:

- DEEP BLUE DAY (Brian Eno), SILVER MORNING (Brian Eno), HERESY, PT. 1 (Lustmord), PA TANAK (Robert Rich), HARRA (Brian Eno)

(These 5 songs are at the beginning of the playlist, then there are all the similar songs.)

Generate another playlist >>

1. BRIAN ENO - DEEP BLUE DAY
2. BRIAN ENO - SILVER MORNING
3. LUZBURG - HERESY, PT. 1
4. ROBERT RICH - PA TANAK
5. BRIAN ENO - HARRA
6. ACACEMIA DI MONTEPUELIO, RUSTY KIAN, MICHELE FERRUCCI, ORCHESTRA E GR""""FONICA
7. THE FLYING BURRITO BROTHERS - KILD HORES
8. SOLOVIEFF, PHILIPP WAGNER AND HERBERT VON ERFURTH - HUTCHERSON SIRIUS
9. THE GREEN FIELDS OF AMERICA - SAN ANTONIO / MILWAUKEE / HITS / THE INTER
10. RINE DIAMOND - INSANITY
11. LOUIS JOHN-KARL - KOPPEN
12. THE GREEN FIELDS OF AMERICA - THE KERRY JIG / DIMITIS KONOV / FADO
13. FRANK JAMES AND HIS ORCHESTRA - QUIETLY LAGDON
14. MAHARANII STYLE BAND - THE FIRST MAHARANII
15. VIKRAL FOX - THE PRINCE OF DENMARKS HARP - TRUMPET VOLUNTEER IN A
16. COLECTIVE SOUL - IN A MOMENT
17. JOHN M. - YOU'RE STILL HERE
18. FREDDY JOHNSTON - DOWN IN LOVE
19. THE FLYING BURRITO BROTHERS - WILD HORES
20. RALPH VARDON WILLIAMS - A SEA SYMPHONY, DEHOLE, THE SEA ITSELF
21. JAMES HOLLANDER - HI AHU ANNULE EDTOR
22. PERCY JOHNSTON - REMEMBER ME
23. JOHN M. - YOU'RE STILL HERE
24. JIMMY CLIFF - SITTING IN LIMBO
25. VARIOUS ARTISTS - HALLOWEEN CHORUS
26. ANGEL TUPPER - BLACK EYE
27. DAVID ORRINAN - IN MY SUN GRANDPA
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Music use case. **Other scenarios**

- Tag propagation based on audio similarity
- Aim: to semi-automatically annotate a music collection
  - Pandora example: 400 attributes, manually annotation
Music use case. Other scenarios

1- Extract mid-level features from the audio. (i.e: beats per minute (BPM), tonality (Key and mode), timbre characteristics, etc.)
2- User tags his collection
3- The system could propose a set of tags newly incoming songs, based on audio similarity metrics
4- The user can accept or reject the tags proposed by the system.
Music use case. Other scenarios

- Examples of music tagging (from Last.fm)
  - [http://www.audioscrobbler.net/data/webservices/](http://www.audioscrobbler.net/data/webservices/)
  - [http://ws.audioscrobbler.com/1.0/tag/toptags.xml](http://ws.audioscrobbler.com/1.0/tag/toptags.xml)
  - [http://ws.audioscrobbler.com/1.0/artist/U2/toptags.xml](http://ws.audioscrobbler.com/1.0/artist/U2/toptags.xml)
  - [http://ws.audioscrobbler.com/1.0/tag/Rock/topartists.xml](http://ws.audioscrobbler.com/1.0/tag/Rock/topartists.xml)
  - [http://ws.audioscrobbler.com/1.0/tag/Rock/toptracks.xml](http://ws.audioscrobbler.com/1.0/tag/Rock/toptracks.xml)
  - [http://ws.audioscrobbler.com/1.0/user/RJ/tags.txt](http://ws.audioscrobbler.com/1.0/user/RJ/tags.txt)