

Dance in the world of Data & Objects

Overview

- Introduction of DanceOWL
- Related Work
- “Dance Data” Ecosystem
- Challenges in Modelling
 - ▣ Schemas for Cultural Heritage
 - ▣ Linguistic Approaches
- Conclusions

How it started...

“In a few years, if **whether** you can read notation **or not**, the dances of the world will be as close to you as your ~~local~~ **digital library**”



“Digital Information System for indexing, analysing, searching and comparing dances by movement”

What is DanceOWL?

- an OWL-2 ontology
- A data schema based on the concepts of Labanotation
- a (meta)data model to support semantic interoperability
- DanceOWL aims at
 - ▣ representing movement → machine understandable & searchable
 - ▣ making data related to dance movement subject to automated processing (e.g., similarity search)

DanceOWL is NOT

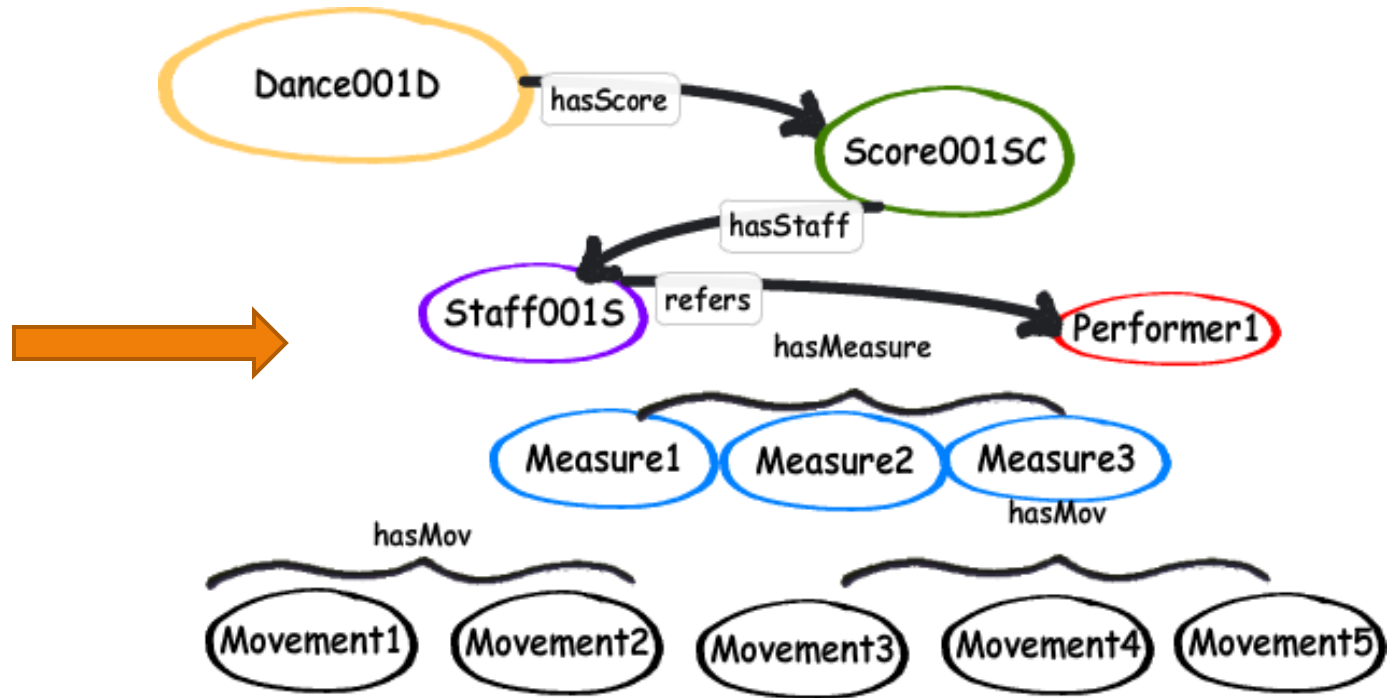
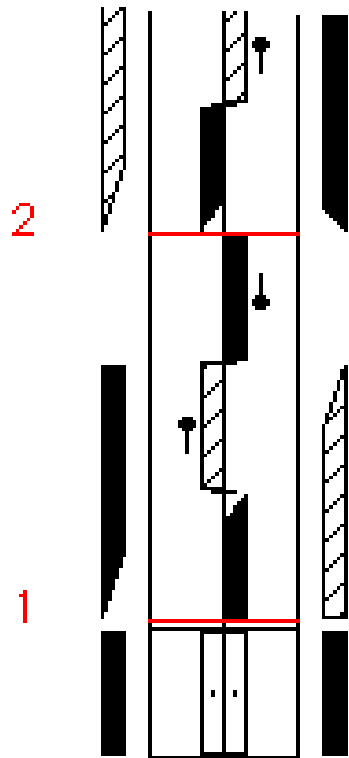
- ❑ a dance analysis model or a new notating system
- ❑ an aesthetic or philosophical statement

Semantics \neq Meaning

“Meaning is more than words & deeper than
concepts” M. Johnson

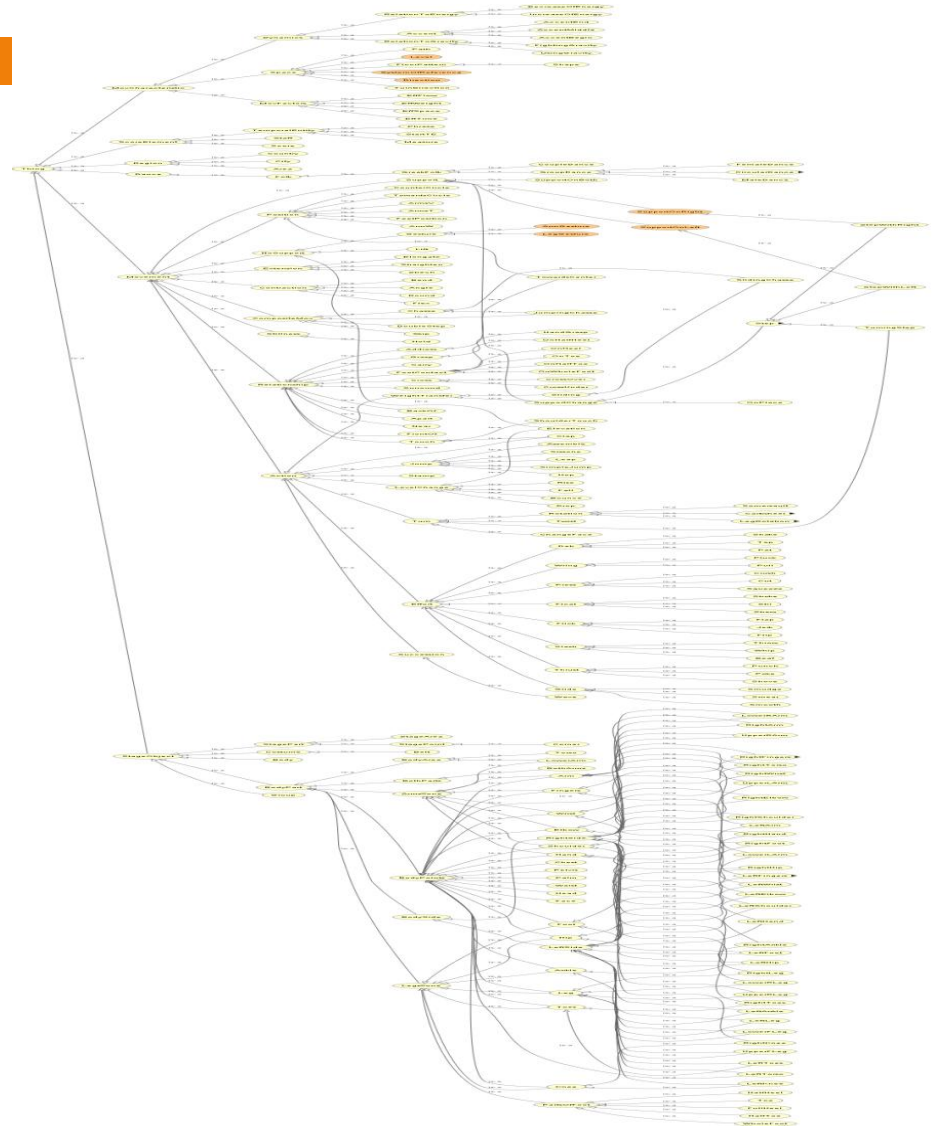
“Dance is always a new name given to the Earth”

The idea...



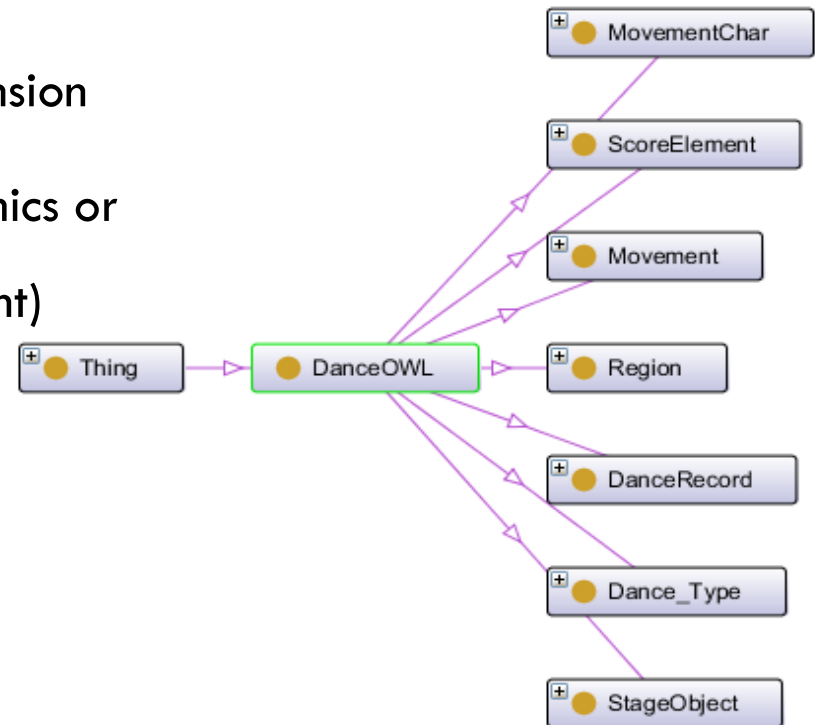
The Dance Ontology

- ~350 concepts & rules
- ~100 relationships
- ~720 individuals & 4000 axioms (experimental data)



DanceOWL Classes

- **Dance Genre or Type:** Folk, Ballet, Contemporary, Round Dance
- **Movement:** action, position, step, an extension
- **MovCharacteristic:** direction, level, dynamics or movement parameters (time, space, weight)
- **Score Elements:** phrases, measures, staff
- **Stage Object:** “dance stage” things, including dancers body and its parts.



Movement

- **Space** : Level, Direction, Size...
- **Time** : ST01 hasNext ST02, isDuring AG, hasDuration quaver
- **Body** : Right Elbow, Upper Left Leg
- **Dynamics** : Strong Accent, Tremolo, Efforts (Flick, Float...)
- **Class (type)**: Support, Turn, Relationship, Contraction

DanceOWL advantages

- Reasoning & Expression of rules
- Extensibility
- Searchability
- Temporal Modelling
- Human Body Representation
- Understandable terms

State-of-art

e.g., Inside Movement Knowledge, Transmedia Knowledge Base, Dance Digital Archive, Dancers!, Motion Bank

- Dance documentation
 - is a case-specific task depending on the work itself and the people involved
 - is a demanding process which requires different media and people to work together
- A “score” is only a script, open to different interpretations.
- Creating notations is one of many tools for documentation.

“Dance Data” Ecosystem

Output ?

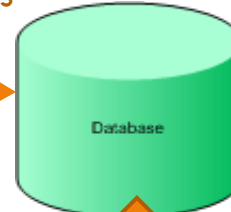


MoCap → 3D



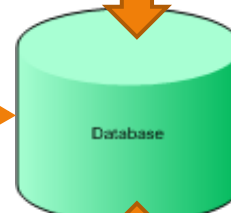
MoCap formats

?



Database

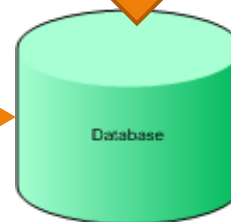
jpg, ASCII, pdf



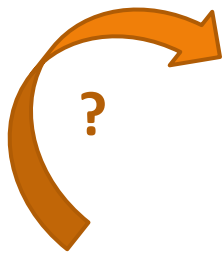
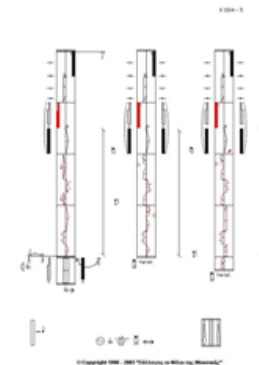
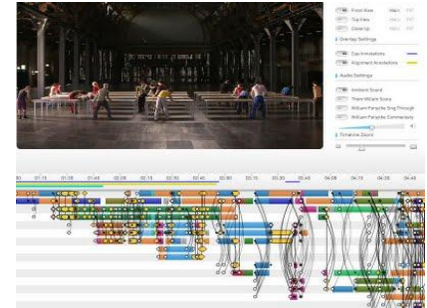
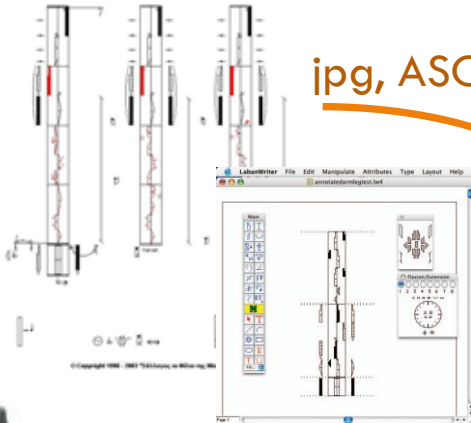
Database

Video formats,

Video annotation

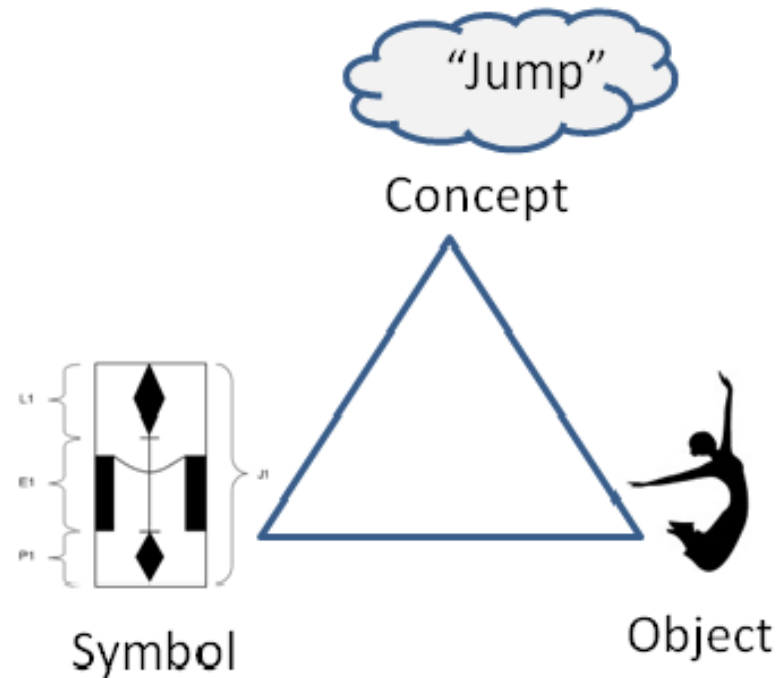


Database



Limitation of notation

- What does “Jump” mean?
- Is the “Jump” of the performer whose movement was scored the same with the one done by the one who interpreted the score?



Ogden & Richards 1923

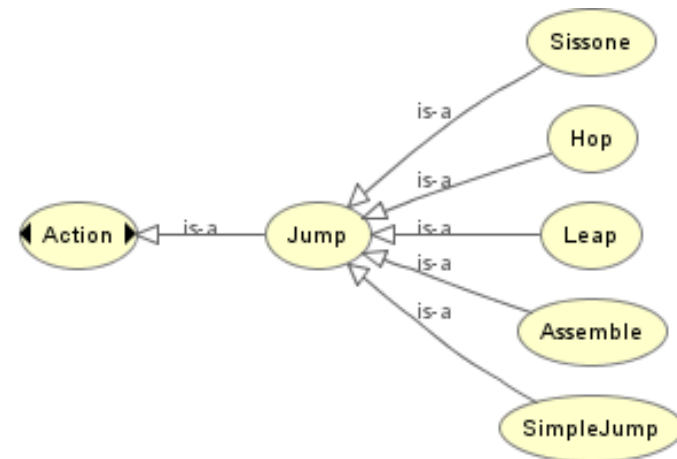
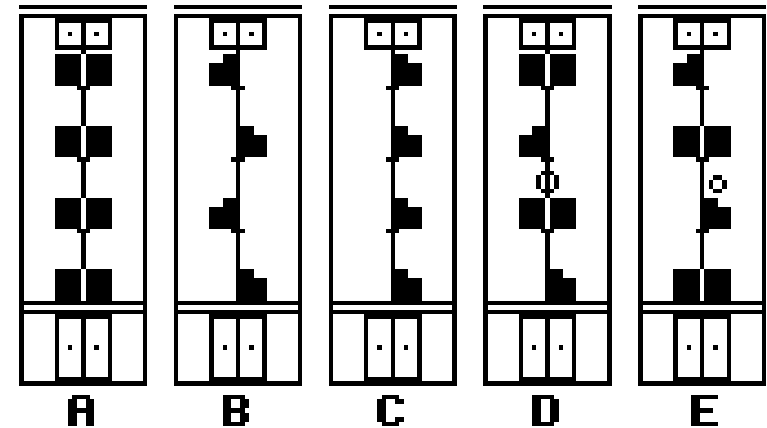
Dance OWL example: Jump

14

- Jump Class
 - 5 SubClasses
 - 3 Stages

In Description Logics :

$\text{Hop} \sqsubseteq \text{Jump} \sqcap ((\exists \text{hasPreparation.SupportOnLeft} \sqcap \exists \text{hasLanding.SupportOnLeft}) \sqcup (\exists \text{hasPreparation.SupportOnRight} \sqcap \exists \text{hasLanding.SupportOnRight}))$



DanceOWL: Analysing the concept

J1 isa Jump

hasPreparation P1

hasElevation E1

hasLanding P2

P1 isa Position

hasMov(hasSup) S1

S1 isa SupportOnBoth

isa FeetApart

hasLevel Low

E1 isa Elevation

hasMov (hasLegG) LG1

hasMov R2

LG1 actedBy RightLeg1 and LeftLeg1

hasDirection OnPlace

R2 isaTouch

hasMember RightLeg1

hasMember LeftLeg1

L1 isaPosition

hasMov(hasSup) S2

S2 isa SupportOnBoth

isa FeetApart

hasLevel Low

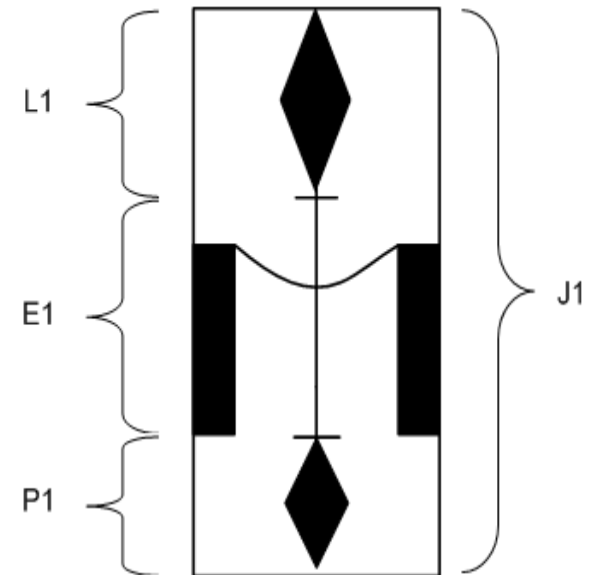


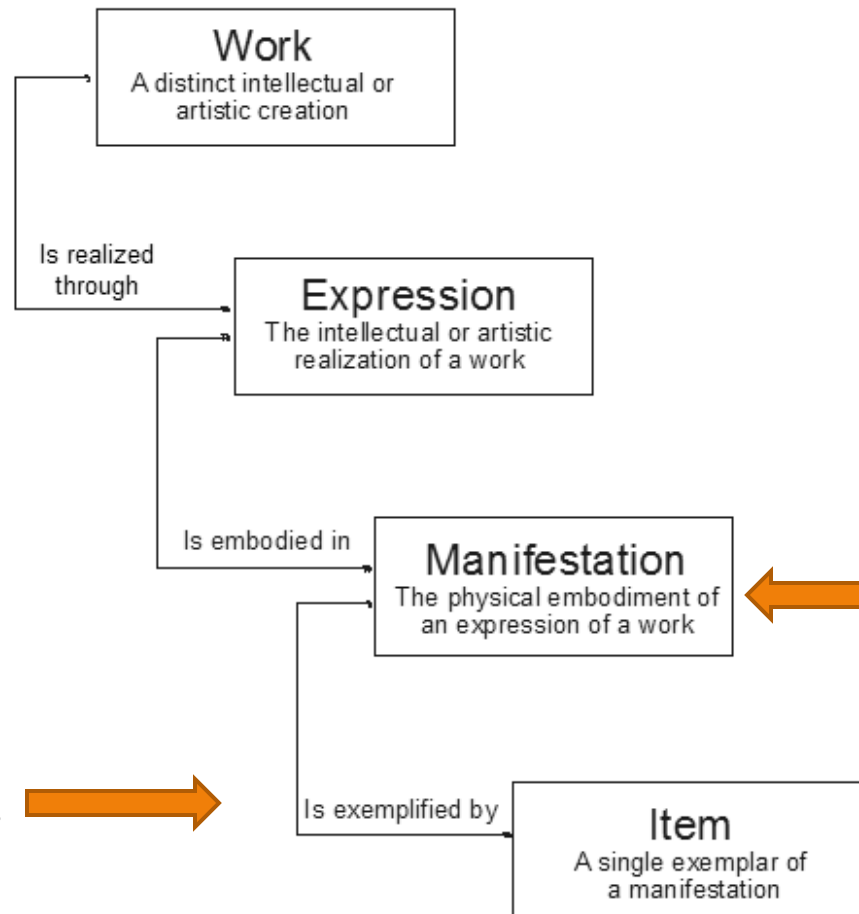
Fig. 1. - Jump from an open position to an open position and a touch during the lift.

Dance Ontology: why is it challenging?

What is dance or “a dance” ?

Can Cultural Heritage Models apply in dance?

□ FRBR :

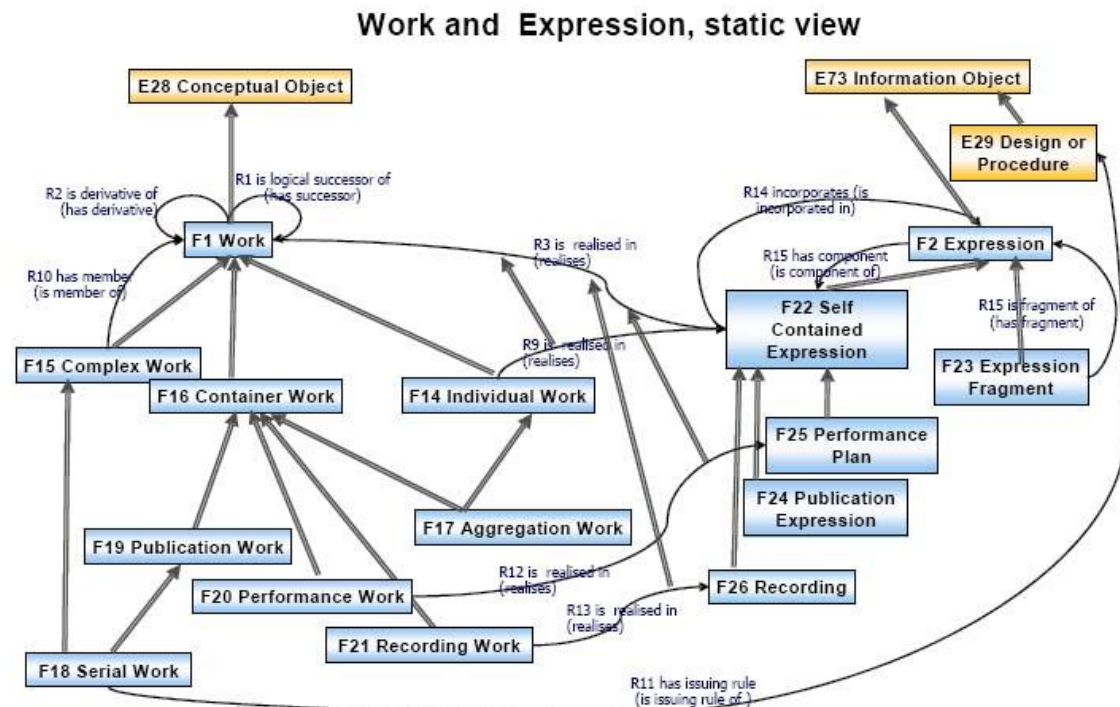


Tangible items (digital or physical) are only objects **related to** the work, the items of the work itself, do not exist after the performance is over. →

In case of Performance and Dance, the embodiment is the performance itself, an event, a specific place and moment in time, embodied by specific people. ←

Cultural Heritage Schemas

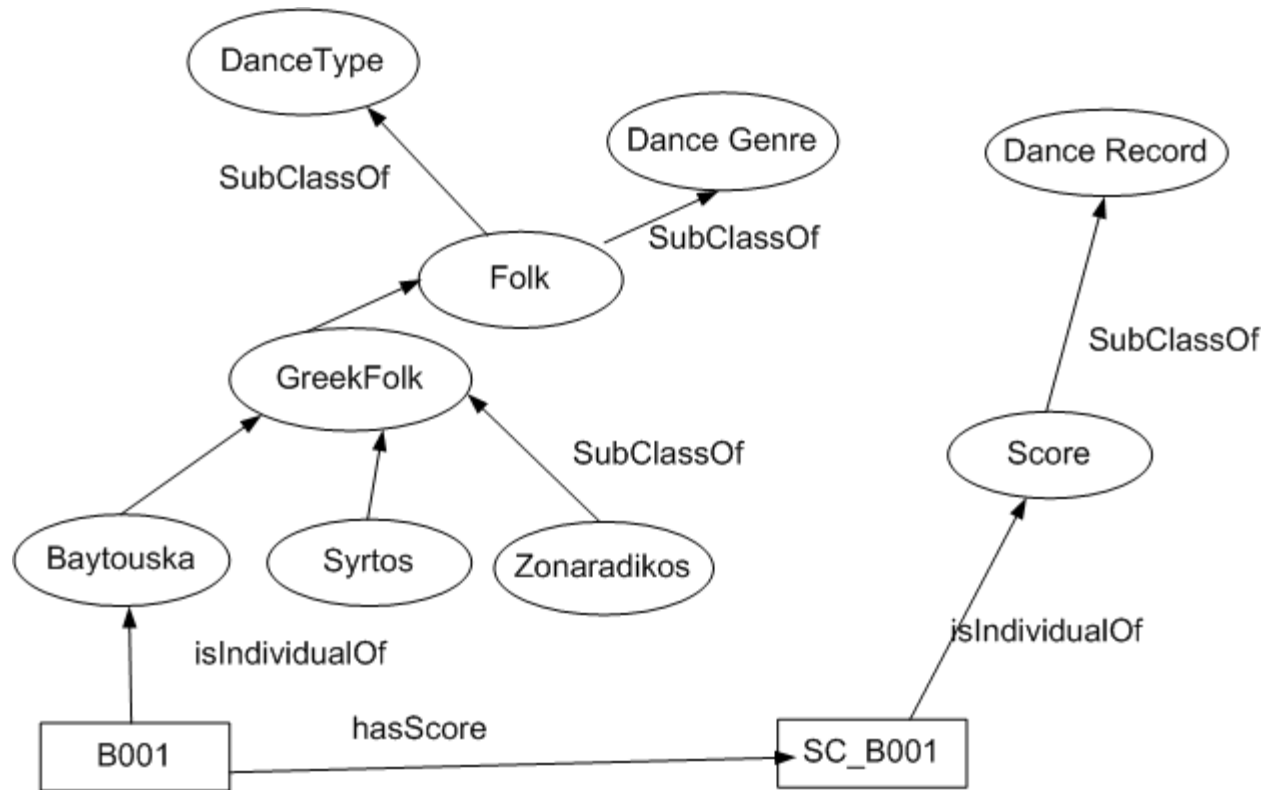
- FBRoo: F20 Performance Work, F25 Performance Plan, F21 Recording Work, F31 Performance, F26 Recording (M. Doerr et al. 2008)



Challenges in case of Dance

- F31: Individual Performance or Performance Production? (C. Doty 2013)
- Hamlet or Swan Lake is a Performance Work, Bolshoi's 2012 Swan Lake is a Performance Production, a performance on 27th of July is an Individual Performance, a DVD is a Recording.
- A Labanotation score would be a Performing Plan (prescription) or a Recording (description) ?

Dance Records vs. Genres



From scores to DanceOWL

Source: Thrace Research Program

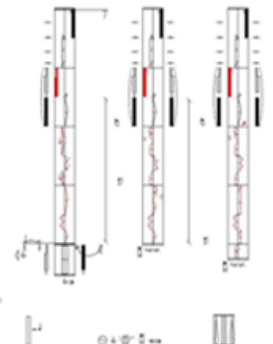
ΕΡΕΥΝΗΤΙΚΟ ΠΡΟΓΡΑΜΜΑ ΘΡΑΚΗΣ

Είδη: Ερευνητικό πρόγραμμα "Θράκη - Μακεδονία"

Σύνθετη Αναζήτηση

Χαρακτηρισμός Δεδομένου

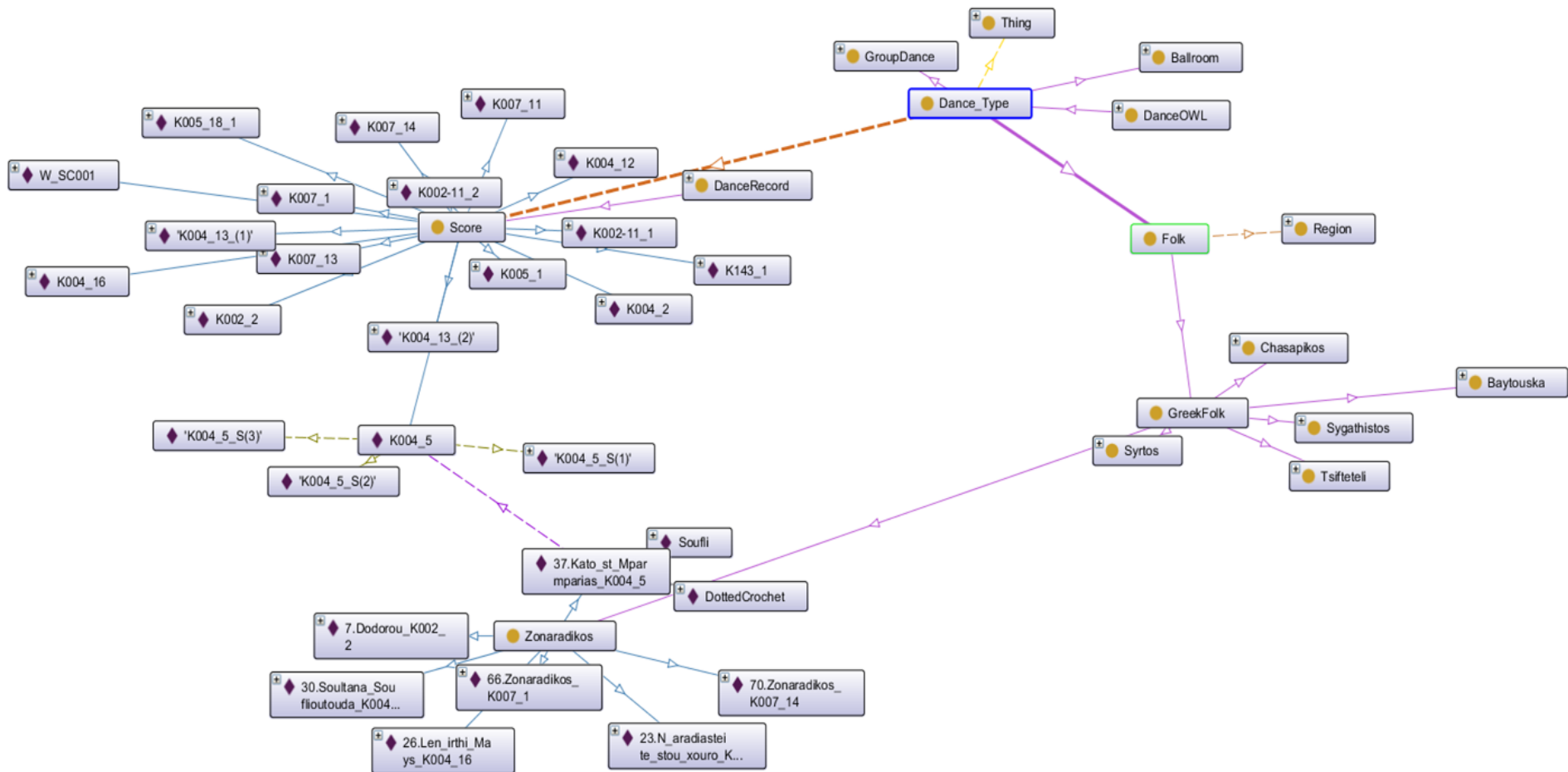
- Τύπος Δεδομένου: Χαρός
- Τύπος Κατηγορίας: Νουβί: Έβρου
- Όνομασία: Ταξινόμηση κατά την περίσταση
- Κύκλος Ζωής: []
- Κύκλος Χρόνου: []
- Αγροτικός Κύκλος: []
- Άλλες Περιστάσεις: []
- Κατά το είδος: []
- Κατά την Εκτέλεση: []
- Κατά το Περιεχόμενο: []
- Στοιχεία σχετικά με τον Χαρό: Γένος Χαρού: []
- Σύνθεση Χορευτών: []
- Ταξινόμηση κατά τον Χορευτή: Φύλο: []



DanceOWL

Labanotation scores and text descriptions

The Dance Ontology in Protégé



Defining before comparing...

- what is movement?
- what characterises it?
- how can be segmented into “moves and steps”?
- take into account which concepts and objects & the media are used to provide these “data”!

Movement Segments

| Language | Dance (Kaepler) | Dance (IFMC) | Dance Work | DanceOWL |
|-------------------------|----------------------------|------------------|-------------------|-------------------------|
| Phoneme | Kineme | Element | Element | Movement |
| Morpheme | Morphokines | Cell | Cell | ? |
| Word | Motif | Motif | Motif | ? |
| Language Clause | Choreme | - | - | |
| Sentence | Phrase | Phrase | Phrase | Phrase |
| | | | Segments | |
| | | | Units | |
| Larger Grammatical Unit | Larger Movement Structures | Macro-Structures | Work-Choreography | Dance Type Individual |
| Language Genre | Dance Genre | Dance Type | | Dance Type, Dance Genre |

Conclusion

- Dance is not an object, nor a concept!
 - ▣ we can annotate objects related to it.
 - ▣ we can use concepts related to dance analysis to prescribe and describe its movement.
 - ▣ dance knowledge can be more accessible and searchable.

Thank you!

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<http://www.madgik.di.uoa.gr/>

Previous work:

- El Raheb K., Ioannidis Y., *A Labanotation Based Ontology for Representing Dance Movement*. In: Proceedings of 9th International Gesture Workshop, Athens, Greece, May 2011, LNCS/LNAI Vol. 7206, Springer, 2012.