

# Development of an Ontology of Bulgarian Dance Folklore

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**Abstract.** This article introduces an ontology of a Bulgarian Dance Folklore. There are a lot of specific performances (popular in Bulgaria as '*horá*'), but our experimental focus is on some Professor Dzhenev's works. An ontology classifying traditional dances according to several characteristics will be considered.

**Keywords:** Bulgarian Dance Folklore, Ontology, Protégé.

## 1 Introduction

A team of scientists at the '*Paisii Hilendarski*' University of Plovdiv deals with the Bulgarian cultural and historical heritage, increasing the scope of objects of interest with different subdomains of it, for example traditional costumes, described in Miteva et al. (2018) and Glushkova et al. (2018); National Revival houses (Madanska, 2022b; Madanska et al., 2021) with one of the modules of the architectural heritage topic, e.g. historical figures (Madanska, 2022a); an ontology in the field of humanities (Grancharova-Hristova et al., 2021); and now – traditional folklore dances.

There are some details that will be briefly covered. The subdomains of the Bulgarian cultural and historical heritage are developed as ontologies in order to be part of the *Cultural and Historical Heritage Ontology Network (CHH-OntoNet)*, but more information is published in Stoyanov et al. (2019) and Glushkova et al. (2019).

The domain discussed in this paper will be exactly the traditional folklore dances and in particular some of the works of the choreographer Professor Kiril Dzhenev (ArtBF.com, n.d.). In the sense of cultural heritage, could be easily assumed that the so-called '*horá*' are part of the intangible cultural heritage of Bulgaria. They include various specific movements, as well as features in the gradation of performances, background music, and more. This ontology is still a work in progress, but could be upgraded with similar and other details, and the work done so far will be demonstrated.

## 2 State of the Art

The field of folklore is popular area of interest of the scientists. There are projects both in Bulgaria and abroad, such as the following:

- Deepjyoti Kalita from the Department of Library and Information Science, Cotton University, Guwahati, India and Dipen Deka from the Department of Library and Information Science, Gauhati University, Guwahati, India work on *Ontology for preserving the knowledge base of traditional dances (OTD)* (Kalita & Deka, 2020). Author's aim is to preserve the knowledge base of traditional dance practices. Their ontology is developed using Protégé 5.2 and implemented in a local GraphDB repository to run queries over it. Kalita and Deka test OTD using the dances of the Rabha tribes of North East India.
- Mariya Drazheva worked on her PhD dissertation on theme: “*The Ethnokinetical Ontology of Bulgarian Folklore Dances*” and introduces her *DIF0N (Difon) The Bulgarian Folklore Music and Dance Digital Ontology*, as mentioned in (Drazheva, 2012).
- Scientists from the Bulgarian Academy of Science investigate a long period of time and efforts for developing a *Bulgarian Folklore Digital Library (BFDL)*, within the *FolkKnow – Knowledge Technologies for Creation of Digital Presentation and Significant Repositories of Folklore Heritage*, aiming to develop a web-based environment for a virtual presentation of the Bulgarian folklore heritage, kept in the funds of the Institute for Folklore of the Bulgarian Academy of Sciences (Paneva-Marinova et al., 2010). Their folklore ontology is developed using Protégé OWL Plug-in, as mentioned also in Luchev et al. (2008). More information about the project is presented in Bogdanova & Pavlov (2012).

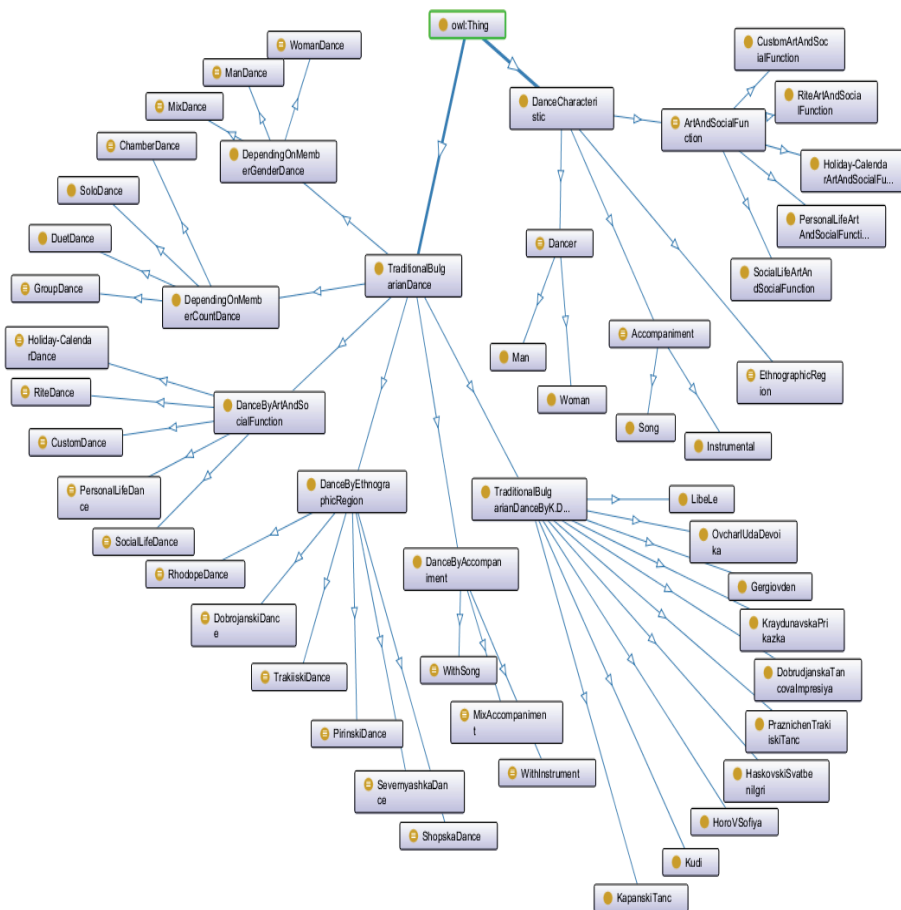
As a conclusion, the use of ontologies, and in particular those developed with Protégé, are up-to-date and suitable for our development as well.

## 3 An Ontology of Bulgarian Dance Folklore – with Focus on the Works Choreographed by Professor Kiril Dzhenev

The OWL-ontology of the Bulgarian Dance Folklore is developed using Protégé Desktop Editor (Musen, 2015).

The logical focus of the ontology is classification of traditional Bulgarian dances by five characteristics – belonging to an ethnographic region, art and social function of the dance, composition of the participants (by gender), number of participants, accompaniment of the dance. In order to describe the dances using them, the class hierarchy of the ontology has been developed; and 10 instances of dances (sets) by author Prof. K. Dzhenev (ArtBF.com, n.d.), i.e. the subclasses of the class ‘*TraditionalBulgarianDanceByK.Dzhenev*’ (Fig. 1 – illustrated as ‘*TraditionalBulgarianDanceByK.D...*’) has been included. The authors of the music accompaniment can be seen in (ArtBF.com, n.d.). Prof. Daniela Djeneva helped with presenting the theoretical

knowledge about the dance folklore, characteristics and their types, as mentioned also in Ivanova et al. (2023) which are adapted according to Kalcheva (2019) and Ilieva (2007), but also other sources were researched.



**Fig. 1.** A class hierarchy of the Bulgarian Dance Folklore Ontology (OntoGraf plug-in view).

Figure 1 illustrates the class hierarchy of the ontology, including classes which are important for characterizing the dance sets. The dances themselves are defined as sets (classes), because the ritual ‘*horo*’ could have a lot of performances (with different dancers, location, stage effects, etc.), but they are all based on the same conditions to be e.g. members of the ‘*Libe Le*’ class.

There are two types of classes included – defined and primitive. For instance, *ManDance*, *EthnographicRegion*, etc. are defined classes; and *Man*, *Song*, *Kudi*, etc. are primitive. Some of the classes are disjoint.

The object properties in the ontology are: ‘*fromEthnographicRegion*’, ‘*hasAccompaniment*’, ‘*hasArtAndSocialFunction*’, ‘*hasMemberGender*’ – subproperties of the

'hasCharacteristic' property. The ontology uses data property 'hasCountMembers'. The ethnographic regions are defined as individuals, namely: 'DobrudjanskaEthnographicRegion', 'PirinskaEthnographicRegion', 'RodopskaEthnographicRegion', 'SevernyashkaEthnographicRegion', 'ShopskaEthnographicRegion', 'TrakiiskaEthnographicRegion' (Vaglarov, 1976). There are annotations included as labels. Using the above properties and individuals, or other classes, some of the classes themselves are described. For instance, with descriptions similar to the description of the class 'Kapanski tanc' on Fig. 2.

The axiom that defines a class 'ManDance' as defined class is: (not (hasMemberGender some Woman)) and (hasMemberGender some Man). 'MixDance' is also described with the same property but also with 'only' restriction to the classes 'Man', 'Woman', with the axiom: (hasMemberGender some Man) and (hasMemberGender some Woman) and (hasMemberGender only (Man or Woman)).

The 'MixAccompaniment' class is defined with the axiom: (hasAccompaniment some Instrumental) and (hasAccompaniment some Song) and (has Accompaniment only (Instrumental or Song)), because that kind of accompaniment is both instrumental and with song. The example dance (Fig. 2) is only with instrumental accompaniment – so the axiom that is used to define the class 'WithInstrument' is the following: hasAccompaniment only Instrumental, and after reasoning the 'KapanskiTanc' is inferred as dance with instrumental accompaniment.

Similar axioms, with the property 'hasArtAndSocialFunction' and universal restrictions to the functions, that are subclasses of the class 'ArtAndSocialFunction', are used for describing the subclasses of the class 'DanceByArtAndSocialFunction', which are: 'CustomDance', 'Holiday-CalendarDance', 'PersonalLifeDance', 'RiteDance', 'SocialLifeDance'. For example, 'Holiday-CalendarDance' is described with the axiom: hasArtAndSocialFunction only Holiday-CalendarArtAndSocialFunction. Other functions of the dances could be: 'CustomArtAndSocialFunction', 'RiteArtAndSocialFunction', 'PersonalLifeArtAndSocialFunction', 'SocialLifeArtAndSocialFunction'.

The subclasses of the 'DependingOnMemberCountDance' class are: 'GroupDance' (used as class naming for mass dance), 'DuetDance', 'SoloDance', 'ChamberDance', and some of them are described with some range of integer values, which are conditionally included.

The class 'EthnographicRegion' is enumerated class with the axiom: {DobrudjanskaEthnographicRegion, PirinskaEthnographicRegion, RodopskaEthnographicRegion, SevernyashkaEthnographicRegion, ShopskaEthnographicRegion, TrakiiskaEthnographicRegion}. The individuals are used in the axioms that define the subclasses of the class 'DanceByEthnographicRegion', which are 'DobrojanskiDance', 'ShopskaDance', 'PirinskiDance', 'RhodopeDance', 'SevernyashkaDance', 'TrakiiskiDance' with the property 'fromEthnographicRegion' and has value restriction. To illustrate, 'PirinskiDance' is equivalent to fromEthnographicRegion value PirinskaEthnographicRegion.

That's why the above axioms define the subclasses of the class 'TraditionalBulgarianDanceByK.Dzhenev' and they are inferred as their subclasses after reasoning – look at the yellow background statements on Fig. 2.

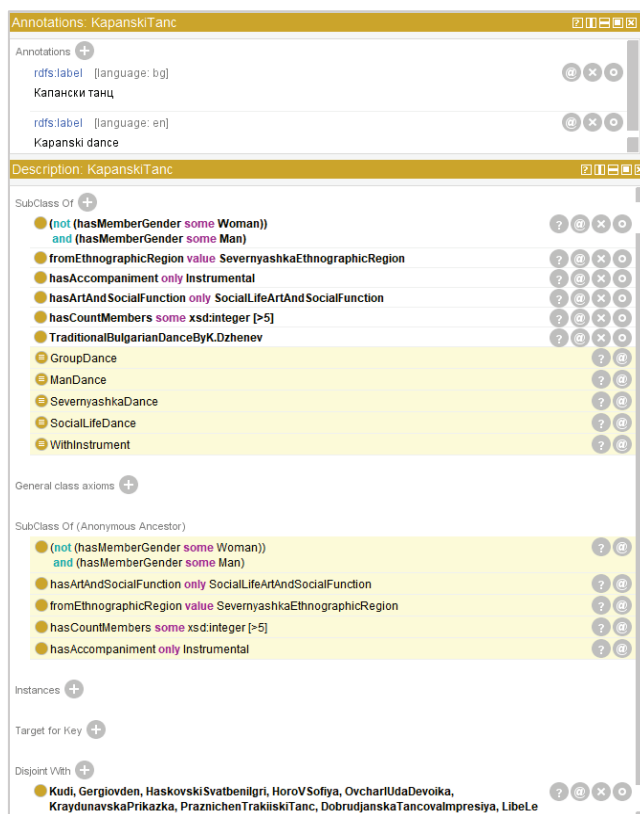


Fig. 2. Class description of 'KapanskiTanc'.

Some of the classes are defined with necessary and sufficient conditions, but they still do not have instances, nevertheless in future the ontology could be upgraded with more dances and axioms, and also the ontology could be modified changing the existing ones if needed. Also the specific performances could be included as individuals. For the future development of the project related to folk dances, we have decided to use the Cataloging Cultural Objects standard (Baca, et al., 2006), to integrate the ontology into *CHH-OntoNet*.

## 4 Conclusions

The scientific area is interesting for our country, and is part of the intangible Bulgarian cultural and historical heritage. Bulgarian people have been dancing traditional folklore

performances for decades, that preserve the memory of someone's love story, someone else's pain, common rites or feasts, that bring families and friends together in one place, meet strangers, celebrate special occasions such as weddings and many others. All this is national memory, and scientists from different areas of study work also together – some on the side of the information and knowledge, others digitizing and formalizing them.

An extended team of scientists has been working for many years for developing a computer system related to the cultural and historical domain of interest, and the work is still ongoing – at first, simply as part (Trendafilova, 2007) of *DeLC (Distributed e-Learning Center)* (Ganchev et al., 2009; Stoyanov, et al., 2012; Stoyanov, 2012), and later as an independent project *Virtual-Physical Space "Bulgarian Cultural and Historical Heritage"* (Stoyanov et al., 2021). We believe that *the tradition* of our team will expand with more elements of the Bulgarian way of life and culture.

Team's work is on its digitizing and formalizing as continuation of the project of the scientific lab with the same topic, and the intentions are the same as all of the participants of the *International Conference Digital Presentation and Preservation of Cultural and Scientific Heritage*.

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