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HOW TO DIGITIZE THE FOLK SONG ARCHIVES?

Abstract. Beyond all question the Folklore song archives must be digitized. The problem is how? From our point of view three tasks must be accomplished. Primarily, the creation of a digital library, which must contain three information massifs: the authentic audio-file, the verbal and the note texts. Secondly, the digitized songs must be supplied with many technical, implicit musical and textual meta-data, which will transform the digital library in database, useful for science researches. On the third place, a specific software must be developed, e.g. an intelligent search program, overcoming the phonetic text records or a program solution, which visualizes the territorial spreading of selected through specific criteria songs on the geographical map. The purpose of the current presentation is to present an expertise on what kind of meta-data must be provided and what kind of software must be produced for the facilitation of the science researches in the fields of the ethnomusicology and the folkloristics.

Key Words: Digitization, Folk Song Archive, Indexing criteria

Initial context

This paper is a product of an attempt of expert assessment, which must identify different indexing criteria that will be used in a planned digital library with complex, multifaceted classification scheme. The library will be developed by a team of scientists from the Institute of Mathematics, Institute of Ethnology and Folkloristics with Ethnographic Museum, Institute of Art Studies at BAS and the Sofia University St. “Climent Ohridsky” for the needs of a project called “Information technologies for representation of Bulgarian folk songs in a digital library of music, notations and lyrics”, supported by “Science Research Fund” – Bulgaria.

We used this pragmatic purpose only as a starting point. We decided to analyze the structure of a folk song (as a unity of text and music) and to “decompose” it into smallest structural pieces, which still hold information. This procedure pursues two objectives: the better understanding and interpretation of the folk song and the tracing of the road to its description by formal criteria, necessary for the digitization of the folk song archives. In brief, we followed these goals:

- 1 Description of the formal features of the folk songs as musical and verbal works.
2. Choice of basic classifiers to be introduced into the developed digital library with the aim to allow a combined search following different criteria. The choice should be made with a few important things in mind:
 - a. the users’ necessities;
 - b. the condition of the physical records and the availability of necessary data;
 - c. the overall expedience – the labor consumption compared to the expected benefits from the digital library.

- d. an expert assessment defining whether different classification data should be used in automated search engines or non-automated indexes.

Necessary limitations

The short format of this text imposes certain limitations on the depth of the presented content.

- The expert content of the chosen classifiers will not be explained in the detailed description of all possible aspects, details and accents, nor will be discussed the issue of what scientific inquiries could be done using the digitized songs. Our approach to describing a “body” of folk songs is to identify, for the purposes of our project, a group of selected aspects of music and song text, and to describe each of these aspects. As Bruno Nettl says, the usual procedure in this method is to divide songs into a number of the so-called elements [Nettl, 1964: 135].
- This text does not discuss:
 1. the relationships between poetry, music and dance;
 2. the musical-folklore genres and their relation to the folklore situations (especially association of tunes with special occasions – contextual correlations of sound, social meaning of music);
 3. analysis of the performance process – interpretive analysis of ethno-historical and ethnographic data involving the music-making process (such analysis often is aimed to describe principles and procedures that are actualized in performance [Blum, 1992: 194]);
 4. implicitly from a musicological aspect: the formation of tonally specified modes and scales and the problem of tonality (to identify tonal centers and to distinguish a hierarchy of tones in a folk song); structuring of musical forms of the songs (giving the letter scheme for each tune – through identification of thematic material and through identification of divisions in the music, that is, the number of sections, motifs, phrases or parts [Nettl, 1964: 150]); verticality of the musical process (cases of multipart phenomena (music)– vocal or instrumental).

It is necessary to point out that mechanical description of the individual elements and general stylistic principles of one region’s folk songs, without consideration of the interrelationships and points of correlation, among them, could give a misleading total impression (see more on this matter in Nettl, 1964: 136-138). In spite of that this available information and classification procedure is the first step, which gives us the foundation to make the next one – development of analytic strategy and working hypotheses for outlining and identification of the general style (personal, local, regional, supra-regional) of particular pieces of music. Ethnomusicologists have agreed that to describe a style is to make an inventory of the full range of options [Blum, 1992: 182].

Last but not least: the empirical basis for the suggested classifiers in this text is the unpublished fundamental volume by Todor Dzhidzhev containing collection of 1100 folk songs recorded in the 1960s in the Thrace region. By analyzing the songs of this region we can outline the special configuration of the Thrace musical dialect.

A. Information on the records

The first thing that would draw the interest of any user of the digital library is the available data about the recorded informational objects (the songs). This will be the gathered field research data about the digitized songs, which will provide the most accurate information about the songs.

Each folk song possesses identifiers which specify the time and place of its gathering. Some of these are: 1) signature (a unique number of the song); 2) informant (person who conveyed the song to the folklorist); 3) birth date of the informant; 4) recorder (name of the folklorist who gathered the song); 5) time of record (date when the song was gathered); 6) settlement (village in which the song was gathered); 7) municipality (governing the village); 8) administrative region (in which the village was located); 9) region of folk dialect; 10) the song genre according to the informant/recorder.

Assessment: Among the listed identification attributes of the recorded songs, those who represent important data that will be useful as a search criteria and means of analysis are 1) the information about the geographic regions where the song has been popular (i.e. the settlement, municipality, district, folk-dialect region), which will allow for territorial distribution of the folk examples; and 2) the time of recording, which will allow for historical/chronological overview of the folk tradition. The rest of the meta-data could be displayed in non-automated indexes.

What do we want to know about the musical aspects of the digitized folk songs and what information can we gather about their music?

Musical data (B + C)

Music combines three elements of diverse nature: 1) rhythm (the temporal aspect of music); 2) melody (the pitch relations in music, intonation and tone content); 3) simultaneous singing/playing in more than one parts/voices (different terms had been used in ethnomusicology to denote this phenomenon: polyphony, multi-part music, polyvocality, plurivocality, multiphony [Jordania, 2006: 23–24]). Each of these components can be described according to many different classifiers.

B. Rhythm. Rhythm is not a specific musical concept, it can be presented as a universal concept, an universal cosmic category and could be interpreted in an exclusively broad way [Velcheva, 2007: 49, 55]. According to Plato, the rhythm is some kind of regularity of the movement. It is well-known that “there is no music without rhythm” [Dzhudzhev, 1980: 391] and that the rhythm is a basic element, universal and most stable morphologic feature in the music (and not only in it). According to the ancient peoples rhythm is the male principle in music (it was thought to have great magical power), while intonation (tone contents) is thought to be the female principle, which obtains the forms endowed by rhythm [Dzhudzhev, 1980: 81]. Dzhudzhev shares the notion that the “roots of the primary models of all the rhythmical schemes and duration combinations in the new European music must be searched in the ancient Greek rhythm, which in turn is only a particular case of the poetry metrics. Testimony of this are the many relicts of poetry dimensions (metric feet) of Ancient Poetics so far collected in Bulgarian folk music [Dzhudzhev, 1980: 84].

Rhythm is: 1) an organizer of time; 2) a primary morphological feature; 3) a phenomenon that unifies everything – melody, poetical text, dancing steps, working and ritual gestures; 4) an organizer of the tone content; 5) a coherence („regularity”) in the ordination of time measure; 6) a basic and initial factor of music form-shaping (rhythm in musical form-shaping is a rhythm of higher order, which can be defined as occurrence of ratios at different scales associated with the proportions of the form (architectonics) – from small constructions, through larger parts to the relationship between cyclical works) [Velcheva, 2007: 55, 59].

Metrum/meter is a form of organization of the musical rhythm: “continuously repeated sequence of accentuated and non-accentuated, equal in duration rhythmic units” (Igor Sposobin); pulsation of metric times with different strength and accent’s magnitude (Plamen Arabov); metrum is the ratio of the accents, the rhythm – the ratio of the durations (Valentina

Holopova) [Velcheva, 2007: 58, 64–65]. Metrum is a tool (general measure) of measuring and coordinating of the rhythmic durations and accents. Metrum is identified by using such objective criteria as stress and repeated patterns in note-length [Nettl, 1964: 148]. Metro-rhythm is associated with the periodical measurement (regularity) of time and with the accents in the rhythmical movement. Metrum is an integral part of the rhythm, its implicit basis, outside which the rhythm (the ratio of durations) can not be perceived as such or becomes amorphous, devoid of quality precision [Velcheva, 2007: 60].

Methods for describing metro-rhythmic system in Bulgarian folk music are developed by the Bulgarian ethnomusicologists Dobri Hristov, Vasil Stoin, Stoyan Dzhudzhev, Todor Dzhidzhev. The rhythmic structure and the main metro-rhythmic song features could be described by means of the following basic classifiers:

B.1. Measure. It gives concreteness of the metro-rhythmic's manifestation. Measure expresses the length of the metrum with number of note values in a single metro-rhythmical entity (bar). It is written with two digits in the beginning of the stuff. Both digits indicate the number of metric times and the concrete note value of each of them, at any time [Velcheva, 2007: 66–67].

B.2. Bar (the single rhythmical entity of which a melody is consisted – melodies with consecutive times of the same length are called measured and melodies without bars are called non-measured) [Dzhudzhev, 1980]. In principle, a melody consist of plurality of small equal metric units (bars, separated by bar-lines break up the melody into small equal metric units). The bar is part of the musical work, which begins on strong (heavy) metric time and ends before the next strong time [Velcheva, 2007: 67]. Bars are metric forms of measurement of rhythmic schemes. They derive from the metric feet (a combination of two or more syllables with equal or different lengths, which form a metric body or bar). Different types of metric feet (disemos, trisemos, tetrasemos etc.) correspond exactly with the two-time's, three-time's, four-time's bars in music [Dzhudzhev, 1980: 83, 87].

The count of the bars in each song will give the opportunity to systematize the songs according the morphological principle, which is kept in the process of form construction. In one group will be distributed the songs, which follow the principle of the formal quadrature (according to which the number of bars at the melody should be 8, 16, 32, etc. [Dzhudzhev, 1980: 423]). To other groups will be related the songs, constructed on other morphological principles (e.g. correlation of rhythm with the number of syllables per line).

In Bulgarian folk music have acquired spread multitude bar-metric forms, divided by Stoyan Dzhudzhev into four major groups: 1) simple bars, 2) complex bars, 3) combined metric groups, 4) hetero-metric rows [Dzhudzhev, 1980: 97].

One of the most specific metro-rhythmic phenomena in Bulgarian folk music is the *neravnodelnost* (presence of irregular, asymmetric relationship between duration elements), with “most typical” manifestation in the field of metrum [Dzhidzhev, 1981: 24, 26]. The first in the world theoretical explanation and systematization of the manifestations of this phenomenon was made in 1913 by Dobri Hristov in his work "Rhythmic foundations of our national music" [Hristov, 1967; Dzhidzhev, 1981: 67]. Romanian scholar Constantin Brăiloiu uses the term *aksak* (the system of *aksak* rhythms involves exclusive use of two units having the ratio 2:3 or 3:2 [Blum, 1992: 176-177]) to denote the uneven rhythmical systems of Eastern Europe and western Central Asia.

B.3. Non-measured melodies. The term "non-measured (non-bared) songs" was introduced by Dobri Hristov [Hristov, 1967: 39]. Timothy Rice prefers the term “non-metrical” [Rice, 2004: 54]. These are melodies, performed in free, non-measured rhythm. Non-measured melodies (as non-bared forms of the musical rhythm) can not be related to certain metrum and can not be accurately measured. Their musical rhythm is free, unregulated, non-measured; their metric pulsation is not rigorous and is characterized by

frequent smaller or more sensitive detentions. For Dzhudzhev main features of the non-measured songs are: 1) slow motion (tempo); 2) lack of metric pulsation; 3) availability of free extensions; 4) presence of rich ornamentation [Dzhudzhev, 1975: 152-153]. To these characteristics of non-metrical songs Timothy Rice adds that these highly ornamented and non-metrical songs provide the singers with an opportunity to show off their vocal technique [Rice, 2004: 54].

B.4. Rhythmical cores. Stoyan Dzhudzhev suggests the category of “rhythmical cores” with meaning combinations of short and long times in elementary rhythmic groups called metric feet. Stoyan Dzhudzhev identifies some of the most popular metric feet of classical poetics, which are the base of the most of the bars and the measures in Bulgarian folk music [Dzhudzhev, 1980: 87-96]. Rhythmical cores compound the rhythmic base of the folk songs, while the combinations of two or more durations (with equal or variable length) serve as metric construction of the rhythmic skeleton of a concrete song (an example of a single rhythmic core, which is the basis of the whole song is shown by Dzhudzhev [1975: 394]).

Rhythmical cores are made of differently arranged short and long rhythmic units (halves, quarters, eighths). Rhythmical cores form the rhythmic beat of the whole melody and thus they bring the internal organization of the song.

B.5. Rhythmical schemes (series of long and short durations, arranged in a certain order [Dzhudzhev, 1980: 82]). Rhythmical schemes form the skeleton and outline the rhythmical graph of the song melodies. Rhythmical schemes can be identified through a procedure called *stylization* (simplification by elimination of the ornaments, followed by the collection of single duration, sang on single syllable, in one common duration – as one rhythmical unit [Dzhudzhev, 1980: 397-398]). Rhythmical schemes of the melodies must always be juxtaposed with the metric schemes of their verbal texts in order to identify the relationship between poetry and music form [Dzhudzhev, 1975: 329]. Rhythmical schemes of the notated songs can be grouped (classified) in different rhythmical tables. The fact that certain rhythmical schemes are common to several (more or fewer) folk melodies, gives the possibility to outline groups of related songs (the relationship is on the base of the common rhythmical scheme for different melodies). Rhythmical schemes can be the fundament for investigations of the archaic pre-forms and of the rhythmic peculiarities of the notated songs (predominantly quarter's, eighth's, etc. rhythm, formation of various rhythmic shapes, etc.).

B.6. Rhythmical stereotypes. Ready model (1) combination of different shorter or longer durations; 2) the order in which they are located; 3) their absolute and relative length) that lives in the collective musical consciousness of the people. Rhythmical repeated patterns (formulas, models) should be identified and noted. They are "ready arsenal" of folk-musical memory, they are passing from musician to musician and from generation to generation. Rhythmical schemes exist “in the mind of the people” in the form of rhythmical stereotypes (Theodore Vaymer called them "sound-feet" by analogy with classical feet in metric poetry [Dzhudzhev, 1980: 85]). Todor Dzhudzhev notes that rhythmical stereotypes are phenomena established for centuries in the minds of an ethnic community and are "a piece of the national spirit of the people" [Dzhudzhev, 1981: 30].

B.7. Rhythmical genealogy makes possible the detection of kinship (morphological relationship) and relations of genealogical dependence (genealogical connection) between the digitized folk-musical samples. In folk music the morphological similarities are expressed in terms isorhythmic, isometric, isochronic, isophonic, isomorphic, homophonic, etc., while the morphological differences are expressed respectively with the terms heterorhythmic, heterometric, heterochronic, heterophony, heteromorphic, alofophonic and others [Dzhudzhev, 1975: 332]. The classification of the songs according to the degrees of affinity or divergence along iso- (rhythms, meters, chronics) – hetero- (rhythms, meters, chronics) gives

opportunities for their genealogical classification and for the alignment of the digitized folk-musical material according to the evolutionary (diachronic) principle.

Isochronics and heterochronics strophes are different types of musical-rhythmic organization. Isochronous melodies are formed of equal duration (regular rhythmic units) and are exact copies of verses size. Heterochronous melodies are produced by different types of durations (irregular rhythmical units).

For Todor Dzhidzhev isochronics (presented in a relatively small number of folk songs) is a primary metric and rhythmic organization [Dzhidzhev, 1981: 24]. Isochronous rhythmic sequences (rhythmic skeleton of the song contains only one type of music figures, for example, only quarters or eighths, etc.) are the basis for rhythmic schemes of songs that belong to the more archaic layers of folklore. Stoyan Dzhudzhev notes that isochronics is one of the most simple and primitive forms of musical thinking [Dzhudzhev, 1975: 337].

According to the evolutionary musical folkloristics the musical rhythm has evolved from isochronics to heterochronics. Some researchers (Bela Bartok, Stoyan Dzhudzhev) agree that heterochronous samples are probably derived variations of isochronous, among them a genealogical connection exist, and that the heterochronous variants are at an advanced stage of rhythmical development (Bela Bartok: "one beat, composed of unequal values may /.../ be viewed as a variation of initial rhythm with equal values" [Dzhudzhev, 1975: 338]).

Assessment: Among the listed classifiers for describing metro-rhythm of over 1000 folk songs transcribed by Todor Dzhidzhev, bar and measure are this rhythmic aspects of the music which ought to be included as classifiers in the digital library, as the only objective indicators, because their ordering is independent of the subjective interpretation of the future users (the subjective interpretation is unavoidable with any kind of systematization – creation of systematic catalogues, indexes, etc.) and so their value can be given unambiguously.

C. Melody. Melody is related to the movements in pitch in music. According to Svetlana Zaharieva: the relationships between different pitches, which have crystallized in melody, are bearers of musical specifics and are considered as the "purest", the most specific aspects of music from the musicological perspective, because they are just musical, without non-musical sides, which can be found in rhythm for instance, from the perspective of the poetic or dancing formation" [Zaharieva, 1979: 54].

The melodic line in folk music: 1) is a bearer of intonation of musical type; 2) is clearly outlined with its relief, extreme pitches (the initial, the top and final tone); 3) manifests itself as intonation models – individualized and structurally outlined melodic-linear entities; 4) in each village (micro-dialect region) dozens of such intonation models used to be performed; 5) "in specific way it actualizes and "illustrates" the sound space, in which the moving and subtle musical matter is disposed, structured and focused" [Zaharieva, 1979: 19].

In studies of folk music to achieve searching and classification (grouping) of melodies according to their tonal material and some of their similar (identical) intonation features, musicologists (particularly that of the Bulgarian musicology tradition) have outlined several sound categories, describing the following elements of the melodic structure: 1) Tone range/ambitus; 2) Sound order/scale; 3) Melody schemes; 4) Components of the melody line (pre-thematic elements): sound linearity; skip–gradualness; 5) Melodic cores; 6) Music formulas and themes; 7) Melodic stereotypes (cadence stereotypes, ornaments, introductions and endings).

C.1. Tone range/ambitus (the interval between the highest and lowest tones in the melody of each tune) [Dzhudzhev, 1980: 252]. The grouping of songs according to their ambituses allows the detection of samples from the most archaic strata of folklore (according to Stoyan Dzhudzhev "the simpler, more primitive melodies have lesser tone range" [Dzhudzhev, 1980: 252]). If we agree with the thesis of Dzhudzhev, then we will outline the stage difference among the notated songs.

C.2. Sound order/scale (all tones of a melodic contour, sorted in ascending or descending order according to their pitch, without consideration of their role in the melody) [Dzhudzhev, 1980: 249, 270, 276]. The tone content of the melodies (sound substance or the tones which construct melodies) can be arranged in sound orders (sound sequences, tone rows, intonation schemes, scales). The sound order is the unity of all the tones of the melody, arranged successively in height upward or downward trend. The sound order is determined within the borders of the ambitus and can be different even in the case of common ambitus [Dzhudzhev, 1980: 249, 270, 276]. Quality characteristics of the sound orders: 1) diatonic, pentatonic, chromatic and enharmonic sequences; 2) complete (all the diatonic distances are present in the tone sequence) or incomplete/interrupted (some of the diatonic sequences remain empty) sound orders; 3) depending on the number of tones in a tone sequence there is: dichords (ambitus second), threechords (ambitus tierce), tetrachords (ambitus quart), pentachords (ambitus quint), heksachords (ambitus sixth), heptachords (ambitus seventh), oktochords (ambitus octave).

As Bruno Nettl writes, the first classification of scales is simply an enumeration (the terms ditonic, tritonic, tetratonic, pentatonic, hexatonic, and heptatonic simply indicate the number of tones in the scale) and tells us not really very much about music [Nettl, 1964: 145]. According to Stoyan Dzhudzhev, during the process of differentiation, construction and numbering of the tone sequences the major degrees, the basic tones (and their service in melody) and the intervals between them must be identified, also sleeping harmonious relationships (links) in the melody must be discovered [Dzhudzhev, 1980: 272-275]. Dzhudzhev explains the necessity of this procedure with the fact that the tone sequence (scheme) influences the internal structure of the melody (the tone order affects the intimate nature of the melody and shows how the tone content is organized), as well because of the implicit feature of the tone sequences, defined as "multilateralism of the tone orders" (quality of the identical tone orders to possess different musical meanings) and because of the fact that a melody is tonal (modal) undefined, if only its tone order is present in absence of its main degrees and modal functions. As Dzhudzhev underlines, one tone sequence can frame several modes, i.e. the modes are determined in the field of the tone order and can be different within the same tone order [Dzhudzhev, 1980: 252, 276]. According to Bruno Nettl a mode is the way in which the tones of a scale are used in composition and, scale and mode are usually presented on a staf [Nettl, 1964: 146].

C.3. Melody schemes. They reveal the melody (intonation) scheme of the song. Melodic schematization (stylization) requires the disregard of the decorative and ornamental elements, of the unstable tones, while those levels of the tone order which are located in the key positions in the melody (tonal center, openings, conclusions, semi-conclusions, heavy moments, culmination, etc.), or others, which have characteristic mode and tonal function, must be preserved. Their discovery is possible with a simple procedure: the names of the characteristic tones or the numbers of their degrees on the mode's tone order must be inscribed on the appropriate place of the metric scheme of the text [Dzhudzhev, 1980: 397]. Melodic schemes can be the basis for studies on the archaic schematic melodies-prototypes (primary versions of the survived nowadays song melodies).

C.4. Components of the horizontal melodic line (pre-thematic elements): sound linearity, skip-gradualness. Melody linearity (melodic contour) is expressive and constructive factor in the field of the melody, perceived through the logic of movement (with melody-linear processuality). To analyze the development of the sound-linear process, schematization which represent the different directions of the sound-musical movement in the dynamics of the melody-linear processes (equal – ascending – descending) can be drawn. These schemes can be important points in the observation of the dynamization of the sound-height process (Svetlana Zaharieva nominates the different directions of the melody line's

movement "real engines of modal process" [Zaharieva, 1979: 28]). The main melodic curves are: 1) straight one-tone's line (absolutely monotonic; holders of balance and stability; static factor associated with the restoration of the balance or its forthcoming distortion); 2) linear ascending (sound-linear centrifugal) melodic movement (bearer of tension and modal instability); 3) descending linear (centripetal) melodic movement (bearer of dilution and tension drop), 4) wave/"zigzag" (Curt Sachs) melodic line (sometimes they have intermittent melodic structure, otherwise they are close to the monotonous recitative intonation – wavy movement between two tone heights).

The main constructive elements of the melody line and energetic factors in the field of linearity are the skip and the gradual motion (the characteristics of the melody line are described by Lev Abramovich Mazel [Zaharieva, 1977: 70]). The regularity skip-filling (as conflicting principles of melodic organization) is a powerful tool for processual organization of the musical movement. The melodic construction of many folk songs is founded on the second foot motion. According to Curt Sachs musical examples of "one-foot" melody belong to the most archaic layers of recorded music folklore [Zaharieva, 1979: 18, 23].

The main melodic curves (the directions of the movement of the melody wave) and the main building elements of the melody line (skip and gradual movement) are intonation-melodic "pre-thematic" elements with expressive and constructive meaning. Their identification and separation is conditional. These intonation-melodic indicators can be used as useful meta-data for classification of the folk examples and can be the departure point for many analytical and theoretical conclusions, hypotheses and interpretations.

C.5. Melodic cores or intonational theses (following the terminology of Boris Asafyev, 1930-47 [Blum, 1992:177]) are little, but individually outlined tone combinations, which have their own expressive characteristic. Melodic cores (musical idioms into minimal units) are smaller units within sections. On the one hand, melodic core may be undeveloped rhythmic and intonation scheme with a function of tonal center [Dzhudzhev, 1980: 404]. On the other hand, melodic cores (when they are functioning as intonation-thematic nuclei-formulas) may be structurally separate, and individualized enough in regard to the metro-rhythm, the mode and the melody-linear construction [Zaharieva, 1977:118]. The multiplication of the melodic core is achieved through multiple repetitions (with or without variations). Under the impact of two form-shaping principles – repetition and permutation – the primary melodic core serves as the main thematic impulse for musical development and for poetry invention.

The discovery of melody cores among the digitized songs will give an idea of the shape of the smallest and most indiscrete, completed and compact intonation complexes of the implicit musical organization.

C.6. Music formulas and thematics. The term "music formulas" is useful for different approaches (culturologicals, aesthetics, sound-constructives, etc.). It is known that in the folk sound thinking and in the folk music the creative process on the level of the mythic-ritual consciousness operates with ready examples (models, prototypes, motives, ideas, formulas). Thus a single example does not have the status of unique creative unit (artistic work, opus) [Dzhudzhev, 1980: 375; Zaharieva, 1979: 13]. From the sound-constructive point of view the "music formula" is completely independent entity which does not exceed (except in rare cases) the structural level of the metric article (respectively hemstitch) [Zaharieva, 1977: 128]. A music formula is made up of pre-thematic elements (the skip and the gradual movement, combined with the directions of the melodic line) [Zaharieva, 1979: 48]. According to Svetlana Zaharieva the formula's technique of compositional construction is related to the primary level of musical thinking and is widespread in the midst of the primary layers of musical creativity (ritual songs). Zaharieva supposes that the application of the formula's technique among those song genres is functionally determined – many of the ritual

songs have formula-invocatory nature, they represent a kind of magic, when the hypnotic-exorcist moment has some expressive value. The compulsive repeated reproduction of the magic spell formula creates a magic hypnotic effect [Zaharieva, 1977:117].

The term "musical thematics" is associated with the ability of the sound material in certain expressive and constructive concentration to reach some notional musical integrity and specific musical expression [Zaharieva, 1979: 12, 21]. Intonation-thematic complexes are bright, relief and enough shaped sound structures; they possess musical and notional visibility and thematic individuality. According to Svetlana Zaharieva "thematic unities" are short and have the character of musical formulas (in constructive sense). Thematic formulas grow on the basis of specific musical shaping principles (repetition, variability, contrast, reprise, etc.) [Zaharieva, 1979: 47-48].

The differentiation (the indexing) of the musical formulas helps the individualization of folk-musical pieces (tracks) with similar intonations and functions.

C.7. Melodic stereotypes. Stoyan Dzhudzhev claims that there are "rambling" melodic stereotypes, common to a significant number of chants (songs and instrumental melodies), which can be found in: 1) various cadence curves; 2) ornaments; 3) introductions and endings, specific to the different modes [Dzhudzhev, 1975: 359].

Cadence stereotypes occupy the pre-final positions. They have specific means and ways of shaping. They appear on the position before the poetic caesura or at the end of the intonation cycle. The cadence always brings an interruption, an occurrence of the static origin in the process of the form construction [Zaharieva, 1979: 59-60]. The extensions of the cadence stereotypes are structurally distinguished and have a particular structural significance (of temporary detention/delay or end/break of the musical movement). Svetlana Zaharieva notes that the moment of the caesura forms conditions for musical individualization of the tone complexes [Zaharieva, 1977: 113]. The cadence complexes are often monotonous (recitatives) and sometimes function as cadence intonation (melodic) formula.

Ornaments are peripheral sound entities with different structure, which has not essential and defining function in the melody, but serve as decoration. In the notation they are marked with special signs (for the gruppetto, the tremolo, the mordent, etc.) or with notes in small font. Ornaments give the opportunity for accumulation of sound material around the caesura and the verses ends. By ornamentation the monotony and uniformity are avoided – they are "result of sense of acoustical delight" [Dzhudzhev, 1975: 180] and performers use them for a sound diversity and ornamentation. As a specific decorative supplement the ornaments produce difference and contrast (melody-rhythmic tension) between two or more homophones (often isorhythmical) parts of the same melody.

Stoyan Dzhudzhev identifies some specific for the Bulgarian folk musical style melodic jewels and other ornamental (decorative) elements: *atsane*, *tresene* (tremble), *hlatsnuvane* (hiccup), *ikane*, different types of shouting, melodious and quickly pronounced words (dry recitative), various types of exclamations, sighs, *prekrashki*, moans, all kinds of verbal inlays and short refrains (*le*, *lele*, *aman*, *oh*) and others [Dzhudzhev, 1975: 180, 191–192].

Assessment: Basis for classification of melodic structure reproduced for each tune in the digital library among the indicated components can be the following: tone range (ambitus) and sound order/scale. The grouping/classification of folk songs according to tone range (ambitus) and sound order is independent from subjective interests and interpretations.

Implicit verbal data (D + E)

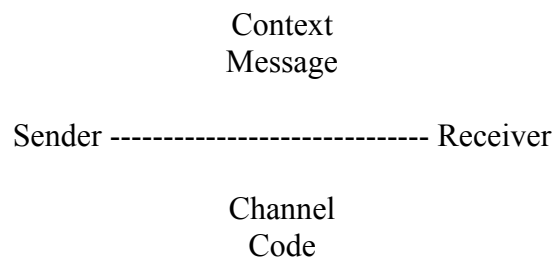
How should we implicitly index the verbal data, to ease the searching and finding of different, still unknown information about the verbal content of the digitized folk songs? In

other words how to organize the lexical data for easier data mining? We must start with a small portion of theory.

D. Context of Song Performance

The meaning of a folk song arises at the crossing point between its text and the context in which it is used. The context orientates the understanding of the text and is the constituent part of the message. In the social world we have utterances, not texts. The utterance is richer than the text, because it includes the specific situation in which it is pronounced. There is a paradox: the text seems to us primary, but is in fact secondary – it is a fixation of utterance with important informational losses. The literary theory – more sensitive than the folkloristics on this topic – uses the opposition *text–work*, to indicate these two aspects: the art work as a system of signs and as act of utterance. The folklore song is not only a text, but a work, an utterance and we must always remember, that it is an utterance of concrete person/persons toward others (or in the presence of others), whose goal is the performance of some social function.

What makes the utterance richer than the text? We can answer this question, using the description of Roman Jakobson (1975). According to his model, the utterance contains 6 components: sender, receiver, context (time and space), message (text), channel (i.e. type of the utterance) and code (the language on which the utterance has been made).



As we can see, the text is just one of the six components of the utterance (precisely the *Message*), while the others must be reconstructed on the basis of the included explanatory notes and the theoretical knowledge of the folklorist. What data should be reconstructed? – The answer to this question gives the following list:

D.1. Characteristics of the sender and the receiver of the utterance. For their description a plurality of classifiers, applied to both subjects of the utterance, are needed: 1) quantity (single person, group of people, irrelevant); 2) gender (man, woman, irrelevant); 3) age (young, old, irrelevant); 4) marital status (single, married, widowed, irrelevant); 5) social status (rich, non-rich, irrelevant).

D.2. Specificity of the context of the utterance, mainly with regard to the utterance's time and space. Here we need classifiers, which indicate if a concrete song is performed: 1) at specific holiday; 2) during concrete work; 3) at specific ritual; 4) at fixed time in the day; 5) in concrete place (with plenty of possibilities: from *on the road to the village* to *in the drawing room in the house*), etc.

D.3. Specificity of the Contact

D.3.1. Individual classifier must observe if the sender of the song is the receiver of the utterance too (this is the situation of collective singing, when there is not a differentiation of roles – all the people sing and enjoy collectively) or, if a group of people address a song to a concrete group (or this is a role game; in this case the song consist utterance in the first grammatical person by the forms *I* and *We*, e.g.: “I am burning for you” or “We came good guests”, etc).

D.3.2. Another classifier must describe if the song represent unidirectional utterance of a person/group to other person/peoples or it is exchange of replicas between two subjects (e.g. the boy is singing: “Will you make me coffee?” and the girl is replying: “Sure, I will make you coffee!”).

D.3.3. A third classifier must indicate if during the performance of the song observers are present¹.

These three components can be summarized with the dichotomies: 1. monologic – dialogic communicative situation; 2. unidirectional – two-directional dialogue; 3. presence – absence of public.

D4. Specification of the Code (it means of the language in the broadest sense). As for the songs, it is clear by default that the language is: 1. artistic, 2. poetic language (not prosaic²). However, classifiers are needed to establish whether verbal language is interfaced with another: 1) musical language (a cappella singing – singing with the accompaniment of an instrument); 2) dance language (the song accompanies certain dance or not); 3) body language (song accompanies or not certain types of activity – work, ritual, etc.).

This detailed list is important. In many cases, the traditional folk culture poses severe requirements for all these features of the context. Some examples: the *peperudarski* songs are sung by children, led by a widow; Christmas songs are sung only by single men; specific songs are performed only on the road after the harvest, etc. The context is important, because it ignorance destroys the understanding.

Assessment: From this systematization it is clear that the description of the performance context itself is a serious challenge. It has to face obstacles as: incomplete registration of the necessary data and the need to fill large number of different classifiers – it is doubtful that the benefits, which the software product would bring, will cover this immense work. What can be done? The best solution seems to be the following: to introduce in the software product the classifier *time-space* (traditionally named not very successfully in folkloristics “by function”), which has to conserve the information about the time and space of song performance – by the way these data are most consistently collected. This classifier will be filled with information grouped by different criteria – here will be placed for example Christmas, *horovodni* (which accompany the dance) and harvest songs; nothing to do – the criteria choice is already made by the recorder and the folkloristics’ tradition. Second classifier must include any additional data (it is not very common) – here will be the place of variety information (with unified lexical formulas!) as: “performed on the road back from the field”, “performed only by girls”, “addressed to the head of the family”, etc. From theoretical standpoint this decision is very bad, but picked in the absence of better. However these two classifiers will give some basic picture of the performance context, because the large part of information fields could be guessed (e.g. the formula “performed on the road back from the field” refers obligatory *harvest song*; the formula “addressed to the head of the family” means that this is a *Christmas song*, performed by unmarried men in a house, etc.). Of course, such data should always be inserted as information notes in the text; where possible, indexes can be created.

¹ This is very important too. Gofman (1999) proves that the message depends largely on the fact if the sender and the recipient know that they are observed. In other words, the type of the dialogue depends on the knowledge of the subjects that they are observed.

² Even this is not a strict rule, because variants with mixture of poetic and prosaic parts exist too.

E. Characteristics of the Song Text

Now we must propose classifiers for the description of the message – the text of the song. In this case *insufficient data* is not a problem anymore, because the text is under our eyes. However, the formal description of a text is an impossible task. Here we propose what can be done.

E.1. Formal Features. In this group the classifiers of data, close to the formal, are cooperated. Here is their list: 1) number of verses; 2) availability of refrain; 3) availability of antiphonal singing (one singer sings a melody and another singer repeats it in answer); 4) availability of chorus (in the more modern layers); 5) structure of the verse in terms of versification; 6) initial verse.

Comment: The traditional folk songs are in syllabic versification – major rhythm features are the number of syllables in verse (or row) and the caesura (i.e. intonation break). Correlation of metro-rhythmic music structures with the number of syllables per line is included in Bartok's classification of Romanian folk songs and in Dzhudzhev's classifications and analysis of Bulgarian folk songs [Dzhudzhev, 1980: 392-394]. The versification of folk song tradition is marked by formulas such as "4 + 4", "6 + 4", "6 + 6", etc., where the numbers indicate the number of syllables in the both hemstitches, their sum – the number of syllables in verse, while "+" is the place of the caesura. The situation is complicated when there is a refrain – in this case the description should be of the form: "4 (+ 3) + 4" "6 + 6 (+ 2)": in parentheses are indicated the number of syllables and the place of the refrain within the verse. Some newer folk songs are in syllabo-tonic versification and are structured on the base of the repetition of metric feet (iamb, choree, dactyl, amphibrach, anapest, etc.), but their number is negligible. The initial verse plays the role of song title. Mostly it is a largely resistant formula, which contains valuable guidance for the song theme.

Assessment: Among all these classifiers only the structure of the verse can be implemented in the software product. Other information should be summarized in indexes.

E.2. Implicit Communicative Situation. The literary work generally includes three elements: *narrative* (story action), *description* (description of persons involved in it, of the situation, etc.) and *expression* (citation of utterance or dialogue) – a hypothesis of Gerard Genette (2001). It is possible that one or two of the three elements can be omitted – either as unnecessary, or because this information is scrutible. Therefore a good description of the song text could be enhanced on this partition.

More convenient, however, seems another approach that starts from the recognition of one main characteristic of the folk songs: large part of them present dialogue between different characters, while very small part (if existing) consist only of narrative and description. In other words, the utterance is the center of the events in the folk song and we can simply describe the utterance with the model, used for the context. What data can be extracted?

E.2.1. Characteristics of sender and receiver. In the situation of singing maximum three types of participants are involved: sender – receiver – public. However, the number of subjects of the dialogue in the song is unlimited – it is possible (and similar cases are available) that multiple characters lead different dialogues. Therefore, each individual subject of the dialogue should be described according to the following classifiers: 1) quantity (single person, group of people, irrelevant); 2) gender (man, woman, irrelevant); 3) age (young, old, irrelevant); 4) marital status (single, married, widowed, irrelevant); 5) social status (rich, non-rich, irrelevant).

To this moment we repeated the well-known classifiers, formulated in connection to the song context. But we must add more. Why? In contrast to the situation of singing, executed within a human community, in the content of the song we have the divisions Own-Other (in ethnic, ancestral, religious, social context, etc.); the characters of the song may be not only humans, but also various objects, saints, animals, demons, etc. Hence, additional classifiers are needed to determine if the characters are: 6) ethnically foreign (e.g., Turk, Jew, etc.); 7) religiously foreign (e.g. Muslim, Jew, etc.); 8) representative of the authority (e.g. king, sultan, *aga*, etc.); 9) outlaws (e.g. rebel, robber, etc.); 10) relatives (e.g. parent, brother, sister, father in law, etc.); 11) daemons (e.g. dragon, lamia, gale, kestrel, etc.); 12) gods and saints (e.g., god, holy Elijah, angels, etc.); 13) diseases (e.g. plague, measles, diseases, etc.); 14) domestic animals (e.g. lamb, ram, goat, etc.); 15) wild animals (e.g. deer, wolf, bear, etc.); 16) plants (e.g. basil, gentian, *komuniga*, forest, etc.); 17) astronomic objects (e.g. Sun, Moon, Hesperus, etc.); 18) miscellaneous objects (e.g., mouth, hair, flute, etc.).

E.2.2. Specificity of the context in which the action takes place, again mainly with focus on time and space. Therefore, the well-known classifiers from point D.2. are needed (this time however attributed to the content of the song). They have to describe that action takes place: 1) at specific holiday; 2) during concrete work; 3) at specific ritual; 4) at fixed time in the day; 5) in concrete place. Here we must add a supplementary classifier: 6) in the presence of specific meteorological conditions: sun, rain, fog, etc.

As a theoretic axiom we may hypothesise that the action time-space of the song (when such data are available) should correspond in a high percentage to the time-space of the performance of the song. Or with other words: mostly, the time-space of the song performance will probably coincide with the time-space in the song (in this case we compare the time-space of the act of singing with the time-space of the song).³

Some examples will make this hypothesis more obvious: if a song action takes place on a working-bee, it probably is performed on a working-bee; if the song indicates that the action takes place towards evening (“The Sun is flickering, declining”), almost certainly the song is sung in the evening, etc. It will be good if this theoretical axiom can be statistically proved; then the rare significant cases where such dependence is not present will provoke a big interest.

E.2.3. Specificity of the Contact. We arrive again to the known from D.3. classifiers, addressed this time to the content of the song: 1) monologic/dialogic communicative situation (i.e. is the song addressed to a specific character – these are songs like “Stay, wait a minute, dear sweetheart, it is early yet”; or song which narrates a story); 2) unidirectional/two-directional dialogue (i.e. the song consist only the utterance of single character or a real dialogue is available); 3) presence/absence of public (i.e. there is witness of the dialogue, which do participate in it, or not).

The description of the *specificity of the code* in the song dialogue looks ultra-pedantic and unusual task, and that is why we abandon it.

Assessment: The introduction of such a large amount of data is extremely expensive, while the benefits of the opportunities that the software will provide in concordance with the invested work are doubtful. Therefore, none of these classifiers should be used in the software implementation; where possible, indexes must be created.

E.2.4. Names, numbers, colors. For convenience we will introduce a separate group of differentiation persistent data such as names, numbers and colors. For their description we

³ In humanities is used the term "hronotop", proposed by M. Bakhtin (1975). It names the time-space in the artistic work.

need four classifiers: 1) anthroponyms (proper names of people); 2) toponyms (proper names of places); 3) symbolic numbers; 4) symbolic colors.

Proper names are the main basis of the individuality of a particular song and are an important weapon in the reconstructive theories. Among them more common are the anthroponyms (names of people, saints, deities, etc.) – we must not forget that the names of deities are an almost indispensable element of refrains⁴. Toponyms are rare – by preliminary expectations they will be more frequent in the epic songs. Description of numbers and colors must support the interpretations of their symbolism.

Assessment: There is no need to introduce these data (names, numbers, colors) as specific meta-data, because a good index will satisfy enough the need of the users.

E.2.5. Thematic focuses. It is impossible to describe the themes of a song with formal criteria. Still, stable thematic cores can be fixed, when they appear to be the backbone of the plot and the engine of the action. Here are the most important ones: 1) praise (y/n); 2) sickness (y/n); 3) death (y/n); 4) murder (y/n); 5) flirting/wooing (in the broadest sense of the word) (y/n); 6) betrothal (y/n); 7) marriage (y/n); 8) birth/pregnancy (y/n); 9) gift (y/n); 10) song (y/n); 11) crying (y/n); 12) oath (y/n); 13) blessing (y/n); 14) laughter (y/n); 15) dream/dreaming (y/n); 16) forbiddance (y/n); 17) sin according to traditional ethics (y/n); 18) plead (y/n).

That list was derived on the base of more than 1000 songs, while some thematic cores have been added by analogy. What is the meaning of such a procedure? Well, a particular song will be positively marked in five criteria (e.g.: song, flirting, marriage, murder, death) and this will provide a basic overview of the content of the song. Another will not be positively marked at all and that is again information about its content.

Assessment: It is good if all these classifiers find a place as metadata in the designed software. Why? Because on the basis of cross-searches and the statistical results which they make available it will be possible to establish the fundamental relationships between the song's theme and: 1) musical features of the melody; 2) the verse organization; 3) the attitude between theme and song's cycle, etc.

Conclusion

The proposed classifiers' list is not – and can not be – full and exhaustive. But it has at least two advantages: it is systematic and covers many aspects (which is good for ethnomusicological analysis, because much can be learned when a repertory is classified in several different ways [Blum, 1992: 187]) and it shows some specific features of the Balkan folklore which have excited interpretations in Bulgaria in the fields of ethnomusicology. Hoping that the brief motivation of the interpretative potential of the made choices is enough, we will be happy if this list can be used as a model, criticized, revised, fulfilled, etc. for the theoretical needs of the process of digitization.

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⁴ Such as *Koleda* 'Christmas' in Christmas songs, *Lada* in songs of *Laduwane*, *Peperuda* 'Butterfly' and *Dodola* in the songs of *peperuda*. There is a presumption that even the interjection *lele* is a heritage from the Old Slavic name of the deity *Lel* (Barbolova 2006).

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APPENDIX

A. Technical information

- A1. signature (a unique number of the song);
- A2. informant (person who conveyed the song to the folklorist);
- A3. birth date of the informant;
- A4. recorder (name of the folklorist who gathered the song);
- A5. time of record (date when the song was gathered);
- A6. settlement (village in which the song was gathered);
- A7. municipality (governing the village);
- A8. administrative region (in which the village was located);
- A9. region of folk dialect;
- A10. song genre according to the informant/recorder.

B. Musical Data. Rhythm

- B1. **Measure** (expresses the times of the metrum with number of beats in a single rhythmical entity).
- B2. **Bars** (the single rhythmical entity of which a melody is consisted – melodies with consecutive times of the same length are called measured and melodies without time are called non-measured).
- B3. **Non-measured melodies.**
- B4. **Rhythmical cores.**
- B5. **Rhythmical schemes.**
- B6. **Rhythmical stereotypes.**
- B7. **Rhythmical genealogy.**

C. Musical Data. Melody

C1. Tone volume (ambitus).

C2. Sound order (scale).

C2.1. Series according to the used tones: 1. diatonic, 2. pentatonic, 3. chromatic, 4. enharmonic.

C2.2. Series according to the type of the sound orders: 1. completed (all the diatonic intervals in the tone series are presented); 2. uncompleted (some of the diatonic intervals in the tone series are not presented) sound orders.

C2.3. Series according to the number of tones in the tone series: 1. dichords, 2. thrichords, 3. tetrachords, 4. pentachords, 5. hexachords, 6. heptachords, 7. octohords.

C3. Melody schemes. Melody schemes depending on the direction of the tone-melody movement in the dynamics of the melody-linear processes. Variants: 1. straight one-tone lines; 2. line-ascending; 3. line-descending; 4. wave-like melody schemes.

C4. Components of the melody line.

C5. Melodic cores.

C6. Music formulas and thematics.

C7. Melodic stereotypes.

C7.1. cadence stereotypes;

C7.2. ornaments;

C7.3. introductions and endings.

D. Verbal Data. Context of Song Performance

D1. Characteristics of Sender and Receiver of the Utterance

D1.1. quantity;

D1.2. sex;

D1.3. age;

D1.4. family status;

D1.5. social status.

D2. Time-and-Space of the Performance

D2.1. at specific holiday;

D2.2. during concrete work;

D2.3. at specific ritual;

D2.4. at fixed time in the day;

D2.5. in concrete place.

D3. Specific features of the Contact

D3.1. monologic – dialogic communicative situation;

D3.2. unidirectional – two-directional dialogue;

D3.3. presence – absence of public.

D4. Specific features of the Code

D4.1. music;

D4.2. dance;

D4.3. work.

E. Verbal Data. Characteristics of the Song Text

E1. Formal Features of the Text

E1.1. number of verses;

E1.2. availability of refrain;

E1.3. availability of *otpyavane* ‘catch up’ (one singer sings a melody and another singer repeats it in answer);

E1.4. availability of chorus (in the more modern layers);

E1.5. structure of the verse;

E1.6. initial verse.

E.2.1. Characteristics of sender and receiver

E.2.1. quantity;

E.2.2. sex;

E.2.3. age;

E.2.4. family status;

- E.2.5. social status;
- E.2.6. foreign ethnic;
- E.2.7. foreign religious;
- E.2.8. representative of the authority;
- E.2.9. outlaws;
- E.2.10. relatives;
- E.2.11. daemons;
- E.2.12. gods and saints;
- E.2.13. diseases;
- E.2.14. domestic animals;
- E.2.15. wild animals;
- E.2.16. plants;
- E.2.17. astronomic objects;
- E.2.18. inanimate objects.

E.2.2. Specificity of the context

- E.2.1. at specific holiday;
- E.2.2. during concrete work;
- E.2.3. at specific ritual;
- E.2.4. at fixed time in the day;
- E.2.5. in concrete place;
- E.2.6. in the presence of specific meteorological conditions.

E.2.3. Specificity of the Contact

- E.2.3.1. monologic / dialogic communicative situation;
- E.2.3.2. unidirectional / two-directional dialogue;
- E.2.3.3. presence / absence of public.

E.2.4. Names, Numbers, Colors.

- E.2.4.1. anthroponyms (personal names of peoples);
- E.2.4.2. toponyms (personal names of places);
- E.2.4.3. symbolic numbers;
- E.2.4.4. symbolic colors.

E.2.5. Thematic focuses

- E.2.5.1. praise;
- E.2.5.2. sickness;
- E.2.5.3. death;
- E.2.5.4. murder;
- E.2.5.5. flirting/wooing;
- E.2.5.6. betrothal;
- E.2.5.7. marriage;
- E.2.5.8. birth / pregnancy;
- E.2.5.9. gift;
- E.2.5.10. song;
- E.2.5.11. crying;
- E.2.5.12. oath;
- E.2.5.13. blessing;
- E.2.5.14. laughter;
- E.2.5.15. dream / dreaming;
- E.2.5.16. forbiddance;
- E.2.5.17. sin according to traditional ethics;
- E.2.5.18. plead.