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## BEHIND ROCKOVNIK – MULTIMEDIA DATABASE

**Abstract.** This paper shows implementation of storage and information retrieval used in digitization project Behind Rockovnik [1] dedicated to the history of rock and roll culture in former Yugoslavia from 1958-2000. This project was motivated by previous work of Dušan Vesić and Sandra Rančić, such as the 40 episode TV show “*Rockovnik*” (Radio Television of Serbia) and their published books, articles and movies.

**Keywords.** Digitization, popular culture, multimedia database.

### 1. Introduction

During Cold War, the most profoundly influential music in Eastern Europe and the Soviet Union has been rock 'n' roll. [2]. Rock music in Yugoslavia has reflected rock trends worldwide. All the major styles witnessed in the West were also replicated in Yugoslavia [3]. Yet president Tito personally considered early on what stance to take regarding rock music, and in contrast to other East European chairmen, chose tolerance for and limited acceptance of rock music's rebellious form of expression [4].

Rock and roll cultural heritage in former Yugoslavia consists of tangible objects of value, but also intangible entities such as music, dance, skills, fashion, practices, associated cultural spaces that groups and some individuals recognize as part of their cultural heritage. Lack of care and oblivion of those objects and entities would be a huge loss for people, future audience and science. Our multimedia database is one way to protect that heritage against loss and to provide public access with straightforward user interface.

The *BehindRockovnik* is an ongoing, internet-based project, and further editions will be amended to include subsequent additions online. The project offers an opportunity for the necessary public discussions about: specific Yugoslav popular culture, what former Yugoslav citizens wish to keep from that period of their history, what they may need to remember in post-Yugoslav time.

### 2. Development and basic structure

**2.1 Rockovnik.** *Rockovnik* is a documentary TV show dedicated to the history of rock music in former Yugoslavia. It was broadcast on Radio Television of Serbia from April 2010 till March 2011. It starts with the first appearance of that sort of music by the mid 1950s (Mile Lojpur, Karlo Metikos) and beginning of the 1960s (Siluete, Bijeke strijele, Crveni koralji) and follows its development until the end of the last millennium. The *Rockovnik* series was shot on location with the active participation of a number of musicians and witnesses, from Mile Lojpur and Bijeke Strele to the bands that appeared on stage during the 1990s. *Rockovnik* pinpoints all essential road marks and contains pictures and stories from important

rock centers: Beograd, Zagreb, Sarajevo, Kragujevac, Pula, Rijeka, Opatija, Ljubljana, Novi Sad, Skoplje, Zrenjanin, Šabac. Using comparative analysis, the pages of this diary contain stories about historical events influence in former Yugoslavia and abroad (1958-2000). The causes and effects of all these happenings are projected against a backdrop of cultural events of that time both in Yugoslavia and abroad. More than 300 authors, stage performers and chroniclers told their stories of love and life, hard-working, successes and failures, addictions (starting with the addiction to decibels), friendships and betrayals. They explained the genesis of some of their favorite tunes, and disclosed why and to whom they were dedicated.

**2.2 Behind Rockovnik - huge material and main activities.** *Behind Rockovnik* is digitization project based on Rockovnik. Multimedia database is created. It contains the most popular rock hits of former Yugoslavia, number of unpublished audio and video recordings from the archives of Radio Television Serbia, Croatia Records and from private collections, discography and biography material. The most complex steps were gathering huge material. For example, Yugoslavia's record companies were set up as state-owned but market-oriented enterprises, leading to arguably, the strongest popular music market in Eastern Europe [5]. By 1982, according to a survey done by *Rock* magazine, 2874 amateur and professional groups were in existence. By 1987, an international label manager for RTB PGP Records estimated there were 30–50 professional bands and as many as 5000 amateur in a state of 20 million people. By the end of the 1980s, rock culture was firmly planted in the mainstream.

Other important steps in our project include providing sponsors, processing digitized content and database design. Let us say something about challenges and difficulties. It was expensive project, particularly because lot of material is located all round the world. (i.e. private archive from abroad: Sydney, Paris, Amsterdam,...). Some important contributors like Momo Kapor, Nikola Karaklajic, Zoran Mišćević died since 1993. We must conclude that we catch last train to start our project. This archive contains not only their songs, but also last interviews and precious footage and testimony of some of the top former Yugoslav artists. On the other side, scarce material was another challenge. Album covers, tickets, posters, entertainment and youth magazines were highly deteriorated by threading. Color change with lost of darkness made some text material almost unreadable. So, we took multi step digitization by shooting at first with low quality digital photo cammer. Later we used high quality digital photo camera. Optical character recognition (OCR) was widely used to convert typewritten or printed text into electronic files. Many different OCR software packages were tested. Generally, the result of OCR was inaccurate and plain texts had to be manually corrected. Also, articles were manually corrected to provide enough data for other analyses, like searching based on articles content.

**2.3 User interface, availability and feedback.** We provided web-based user interface. Our collection has public legal status and it is freely available. There is English web site version, but non-English-speaking audience access the web site via Serbian, Macedonian and Slovenian language. Using a website analytics application, we notice that our followers are mostly from Serbia and Slovenia.

The reduced availability of former Yugoslav rock through the usual forms of distribution created conditions for alternative distribution channels. There are lot of forums, blogs about *Rockovnik*. Also, 18 h of video material downloaded from Rockovnik are uploaded to well-known video-sharing website *YouTube* with numerous views and comments. Many commentators on the phenomenon of Yugo rock on the internet noticed that the websites and forums were rarely divided along ethnic lines or newly established borders Professor Eric Gordy notes: *Although the demise of SFRY physically isolated the urban*

audiences of Yugoslavia’s republics from one another, music continued to make its way through borders. A brisk bootleg trade assured that recordings remained available, if only to a limited public.[6]

### 3. Database design and quantity

We have followed instructions from the well known guide for describing and retrieving information about cultural objects (art, architecture, and material culture) and their photo representatives [7]. That’s why web based interface for data insertion is created. It also means that we need to protect our database and web site from SQL injection, cross-site scripting (XSS), cross-site request forgeries (CSRF), spoof forms and raw HTTP requests [8].

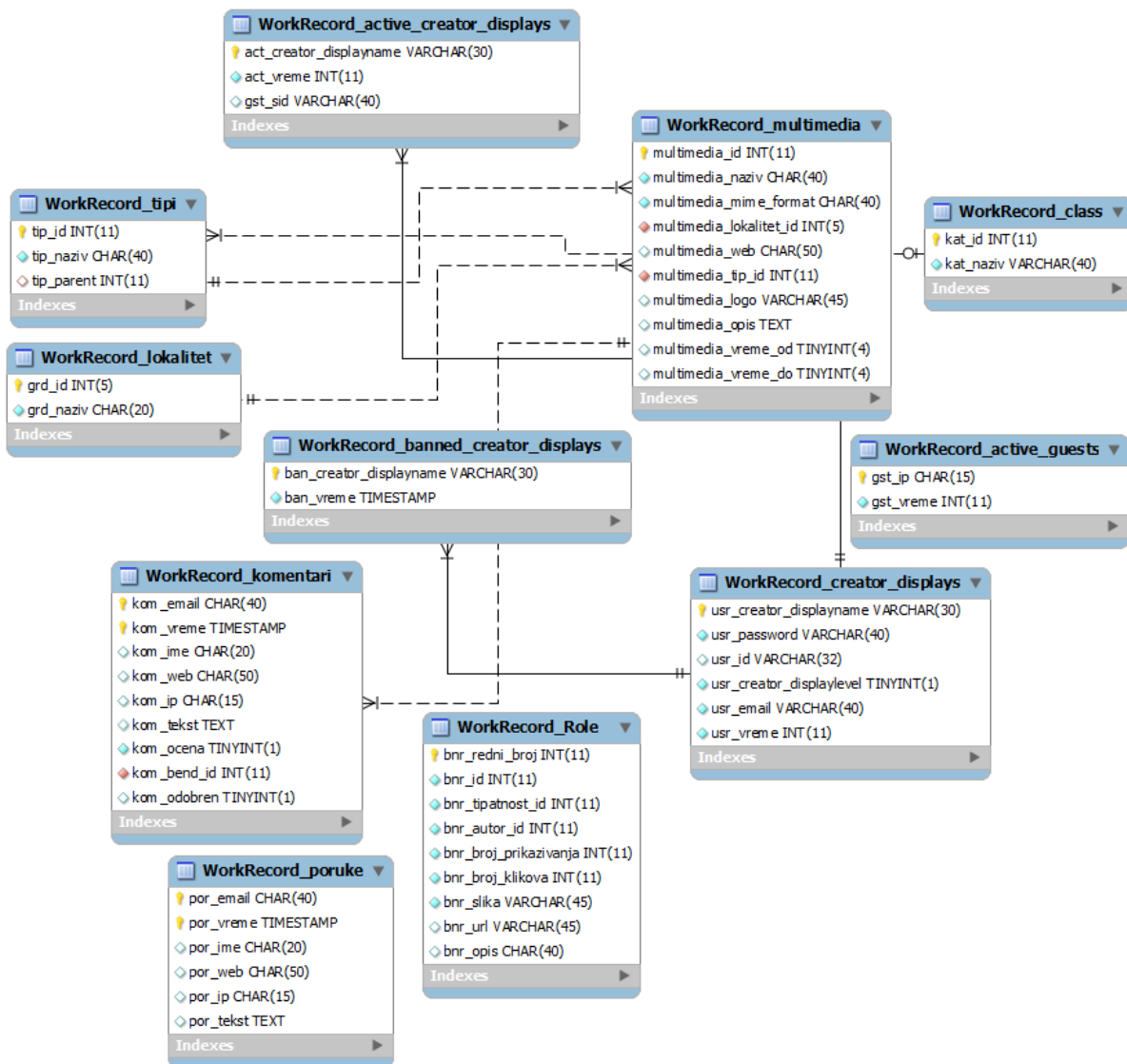


Figure 1: database fragment

The database scheme is presented in Entity Relationship (ER) diagram in Figure 1. Entities on the diagram correspond to database tables. Each table row represents an instance of the appropriate entity. Relationship lines represent the foreign keys. The central entity is *WorkRecord\_multimedia* that represents multimedia item (static, dynamic or dimensional

media). Among other attributes, digital content is described by location, time, MIME type (*multimedia\_mime\_format*), canonical representation (*multimedia\_logo*) and description (*multimedia\_opis*) that is important for searching. Digital collections can contain resources from different sources. Contents can have more than one author (*WorkRecord\_creator\_displays*). Our database supports the most common types of multimedia content (text, image, sound, video), but database can be extended to support new types without significant changes in database structure.

Database triggers are defined on tables. We have trigger activation before each row insertion into a table or after each row updated. So, exact time of operation in the database is stored and entities have extra attributes for creation time and last modification.

There are 5084 (text, image, sound, video) items. Although, rock and roll is story about fun and entertainment, during database design we have tried to avoid that point of view. So our project is not *unofficial fan page*. Instead, we present multimedia data using scientific notations [9] considering rock and roll as a serious social phenomenon that has changed global society. We believe that our project BehindRockovnik opens the door for other research in science, art and education (history, ethnology, sociology, psychology, music, video art, computer science...).

Our database retrieves information from sources by importing metadata using XML documents. The structure of XML documents is validated by CDWA-Lite XML Schema [9]. An example of result received from the database is presented below.

### Work Record

**Class** [*controlled*]: • prints and drawings • art

**\*Work Type** [*link*]: • design drawing • album cover

**\*Title**: [http://www.rockovnik.com/materijal/slike/Strana%20XXXII/00\\_02\\_48.jpg](http://www.rockovnik.com/materijal/slike/Strana%20XXXII/00_02_48.jpg)

**\*Creator Display**: RimTuTuTuki

**\*Role** [*link*]: draftsman [*link*]: Srđan Gojković Gile

**\*Creation Date**: 1991 [*controlled*]: • **Earliest**: 1991 • **Latest**: 1991

**\* Location** [*link*]: Beograd

**Description**: RimtutiTuki, Slušaj 'vamo, Beograd, antiratna kampanja, Milan Mladenovic, Srđan Gojković Gile, Zoran Kostić Cane.

### Related Work:

**Relationship Type** [*controlled*]:

[*link to Work Record*]: <http://www.rockovnik.com/Strana32.html>

...

## 4. Search techniques

It was shown that a text-based retrieval technique was good enough to locate desired multimedia information (song, album cover, TV interview...). But, words are not sufficient to describe what is sometimes in a human's mind. It is much more appropriate if a user can search non-textual information (song, album cover, TV interview...) by styles and features, particularly if digitized collection is dedicate to music, literacy and painting. We experienced that web based digital collection have a lot of (concurrent) users. That requires fast and precise searching methods. Our database is searchable by:

1. multimedia types (e.g. text, audio, video, picture)
2. content subtypes (e.g. song, biography, album cover)
3. locations (e.g. Zagreb, Pula, Rijeka, Beograd, Kragujevac,...)
4. period (1957-1958, 1961-1963, 1991,...)
5. authors and performers (e.g. Kornelije Kovač)
6. chroniclers (e.g. Momo Kapor)

7. keywords

As search must be effective, search enhancement is provided : when user type keywords, even when he doesn't know exactly what he is looking for, predictions help him to guide his search. The top prediction is shown in grey text under the search box. It is possible to stop typing as soon as user see what he needs. Also, it is possible to reject search prediction. Of course, our search algorithm use common simple search that finds digital resources by entered keywords or phrases, using the full-text search technique. Also, our search interface applies a query expansion to search queries through timeline and interactive map in order to increase the likelihood of providing relevant set of items.

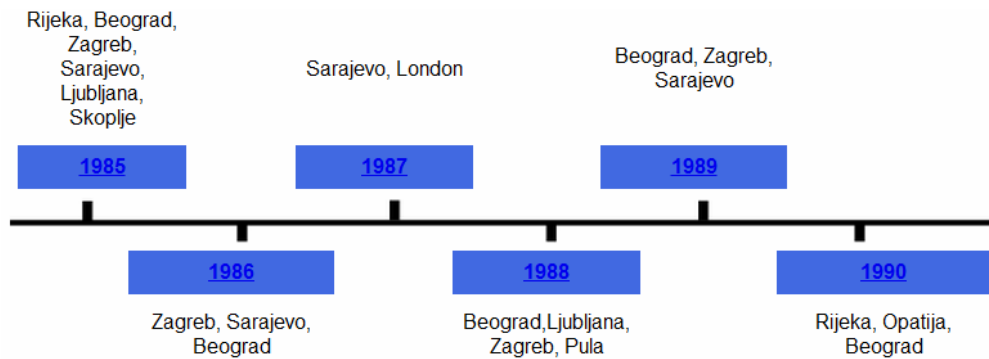


Figure 2: Simple timeline search

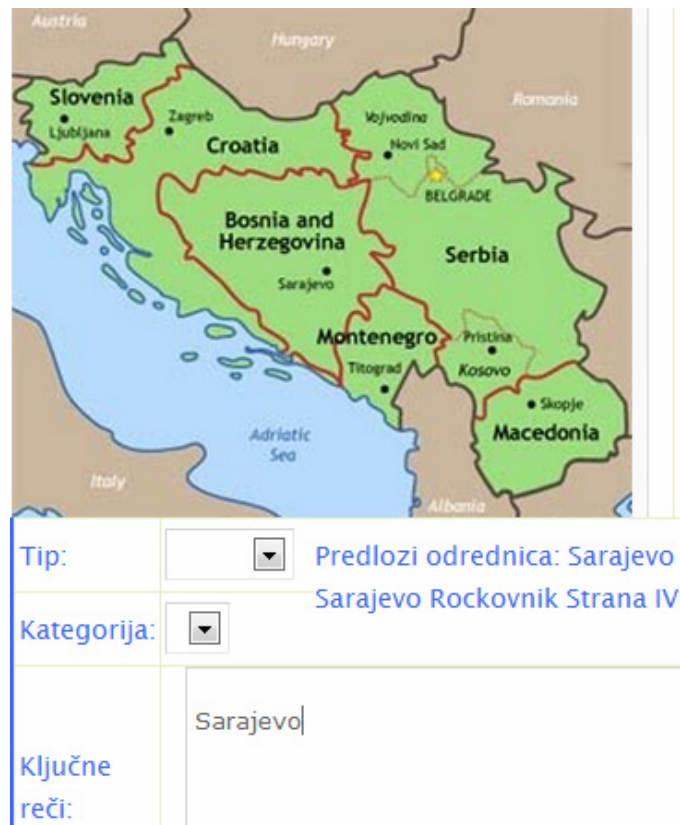


Figure 3: Search enhancement using interactive map

In order to provide better matching result for searching locations and list of events in chronological order, we have used interactive map and timeline. An example of such search is presented in Figure 2 and Figure 3.

## 5. Implementation tools

Data storage and manipulation are handled by the world's most popular open source relational database management system MySQL [10]. We have used PHP [8], HTML 5 [11] and jQuery [12] for development of dynamic web content.

## 6. Conclusion and future activities

Whereas other music has often been generational, rock 'n' roll is a sound that more than two generations now share and enjoy in common. And its impact has been revolutionary. Various ways and styles of rock and roll is still changing and mass increases [13]. We have designed database as a platform for preservation and publication of large amounts of audio and video archives. Our aim is to continue collecting material and implement more quantitative analysis of our data (data and text mining, advanced multimedia information retrieval). We hope that further development will bring us to the foundation of ex Yu rock virtual museum.

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