Multimedia Program "Tatar Musical Folklore"

Gyzel Yunusova, Ramil Valitov,
E-mail: ramilbox@mail.ru

Musical folklore is a complex varied and interesting field of culture that includes vocal and instrumental, choreographic and literary components. Multimedia technologies give an opportunity to make as an exact and reach presentation of it as possible. Any book or textbook of musical folklore doesn't have such potential, because reader can't listen to melodies, can't see national dancing, performance of devotions, real look of instruments and their sound, etc. This software program is the first and then only one in Tatarstan Republic devoted to Tatar musical folklore. First of all it was created as essential manual for students and teachers of educational institutions for studying Tatar musical folklore. It is also intended for wide categories of people that are interested in national culture. Contingent of students in Tatarstan Republic is multinational and so it must be taken into consideration when teaching this course and creating the program. Owing to this one of the authors, teacher of Kazan Musical College aimed to make the acquaintance with Tatar musical folklore being interesting for everybody and every nation. It achieves by variety of introduced musical materials, photographs, reproductions and demonstration style. The program includes samples of authentic folklore (generally tape records of our own research expeditions), different adaptations of national music by manner of playing and style, fragments of professional music. Besides, we tried to present Tatar musical folklore as a part of world culture making comparison and analysis, especially because Tatar national music and Tatar culture itself is closely connected with folklore and professional music of other nations in different countries: Russian Federation, Western European countries and the Orient, e.g. Italy, Austria, Hungary, Ukraine, Azerbaijan, Uzbekistan, Afghanistan, Iran. These connections mainly exist because of Tatarstan Republic's location in the center of Russian Federation. Since antiquity Kazan, the capital of Tatarstan Republic has been considered to play a role of a bridge between the West and the East. Besides, close contacts with people of different nationalities, settling in different parts of the world for any of several reasons caused Tatar people and probably other inhabitants of Tatarstan Republic to feel themselves being a part of Eastern and European world equally. This feeling of complicity to the whole world sometimes peculiarly appears in creative work of composers and even in names of their composing that use samples of Tatar folklore, e.g. «4 Krulov's fables» by R.Enikeev, musical joke «If Mozart lived in Kazan» by A. Lupov.

The CD introduces the history of the origin of the Tatar nation and it's ancient culture briefly, genres of musical folklore, national instruments and performers. Vocal genres predominate in Tatar musial folklore, e.g. epic genres like bait, mynadjat, bookish melodies. Narration is the main component of such genres. Lyric genres consist of drawling songs and short songs that present varied human's world of senses. Dramatic genres consist of playing songs, singing and dancing in a ring, samples of ritual folklore. Vocal performance of them is accompanied by some actions. Every chapter devoted to some genres introduces the following: interpretation of genre's name, history of its origin, process of creating the compositions and conditions of their occurrence and performance. Attention is paid on subjects of songs, their poetical and musical peculiarities, use of definite national melodies and stylistic characteristics of individual genres in composer's practice. Raises a question about succession of performing traditions, e.g. the famous virtuosos of the past and the modern ones in comparison. Besides, different connections with folklore and compositions of other nations are traced.

This computer program has two authors. One of them is a teacher and methodologist of Kazan Musical College. She took part in different research expeditions concerning folklore. She used in this CD theoretical and illustrative material of her lectures and her own program on Tatar musical folklore published by Ministry of Culture of Tatarstan Republic. Another author is a student of Kazan State University who during several years has been a laureate, winner and

awardee of republic and regional computer software programming competitions and contests. He is designer, programmer of the software product and translated it into English. This program awarded II place in The 3rd Scientific Conference of the Volga Region, Kazan, March 2002. It was demonstrated in Republican Conference of Directors and Teachers of Educational Institutions of Culture and Art, Kazan, September 2002. We created multimedia computer test program on Tatar musical folklore before making this project.

System requirements:
Operation system Microsoft® Windows® 95/98/Me/2000/XP, using other versions is unsupported. Use of compression format MPEG-4 requires the following minimal system configuration: Pentium® II-compatible processor 300 Mhz, 32 Mb RAM. Installation requires CD-ROM.

Hence, *minimal system requirements* (satisfactory quality isn't guaranteed):
Pentium® II-compatible processor 300 Mhz, 32 Mb RAM, 10 Mb free space on HDD while running the program, Sound Blaster.

Requirements for *good quality*:
Pentium® II-compatible processor 400 Mhz, 64 Mb RAM, 10 Mb free space on HDD while running the program, Sound Blaster.

Optimal configuration:
Pentium® III (Pentium® IV) -compatible processor 600 Mhz, 128 Mb RAM, 10 Mb free space on HDD while running the program, Sound Blaster.

Program contents:
1. History of the origin of the Tatar nation. Information of its ancient culture till the XVI century.
2. The "folklore" definition. Peculiarities of Tatar musical folklore, classification of genres.
3. Bait.
4. Mynadjat.
5. Bookish melodies.
6. Drawling song.
7. Short song and its sorts (takmak, village song and city song).
8. Playing songs, singing and dancing in a ring.
9. Family ritual folklore.
10. Calendar ritual folklore.
11. Tatar musical instruments.

We analyzed different existing modern multimedia programs before creating our. We examined their design, multimedia capabilities, use of resources and software development tools. Our analysis also included games that use newest programming conceptions, 3D design and latest technologies of software development. We decided to make a program with the following features:
- user-friendly completely 3D intuitively understandable graphic interface differing from existing and developed ones for today
- supporting any number of languages, fonts and different styles of text output.
- program's ability to cooperate with images, audio and video using the latest compression and storage formats like MPEG-4, MP3 (MPEG Audio Layer-3).
- program's total control of multimedia resources
- 100-percent usage of all available multimedia capabilities (rewind, pause, zooming, etc.)

- usage of all available system resources like audio and video accelerators, technologies of processors Intel Pentium II MMX, Intel Pentium III SECC 2, Intel Pentium IV.
- update and extension abilities
- program's execution on the most popular and widespread operating systems Microsoft Windows 95/98/Me/2000/XP with appropriate optimization for each of them
- the least requirements for installed hardware and software
- program's stability and simplicity of installation and removal processes.

Existing ready programs-shells don't have the capabilities mentioned above and so we decided to make our own program. We chose several ways of its creation: using OpenGL or Microsoft® DirectX® SDK. We settled on the last tool because it's more flexible and requires less hardware resources. Microsoft Visual C++ 6.0 was chosen as a programming language. It is optimized for creating Win32-applications and recommended for using Microsoft® DirectX® SDK.

Microsoft® has several versions of DirectX® (DirectX® 8.0 was the lastest at the time of programming the 1st version of the program). Developers generally choose the latest version, but usually it's not a reasoned decision. Each version gives new capabilities to the programmer. We examined capabilities of all versions and chose the latest one mainly owing to its new component called DirectShow® (earlier called Microsoft® ActiveMovie®). It appeared as a part of DirectX® for the first time and has considerable modifications.

The main value of DirectShow® is that it allows the developer to use different multimedia formats with the help of installed software filters. So, it's possible to use formats like MPEG, MP3, MOV, GIF, JPEG, BMP, WAV, MID, AVI, etc.

DirectShow® also uses many advantages of DirectX® like usage of hardware acceleration of many multimedia devices and ability to cooperate with other components, e.g. with DirectDraw® or DirectGraphics®. Exactly these features presented this version of the library being the most interesting for our project. DirectShow® gives a great potential for the programmer, however its base functions allow to use only a small part of its supported capabilities.

We decided to create our own large special library based on Microsoft® DirectX® 8.0 that extends the boundaries of common functions of DirectShow® and takes them to the required level in order to correspond with our demands. Our library supports using all multimedia capabilities with almost complete integration with other components of DirectX®. We consider it to be the most valuable and difficult part of our project in software development area. Basic improvements of our product in comparison with other programs that use DirectShow® technology:
- random rewind operation is supported in all video formats
- absence of buffering numbers in windowed and full-screen modes
- zooming ability during playback or displaying static images
- ability to render and playback several multimedia streams at a time
- memory rendering and rendering into memory
- multimedia capabilities standardization that doesn't depend on multimedia format

We also examined the way of DirectX® programming easing. The method is using wrappers – special libraries that are usually made by some other software development corporation. Wrappers make the programming under the original library easier by modifying names, parameters of original functions and mixing them. But they don't extend basic capabilities of the original library. Such tools really make using rather complex functions of DirectX® SDK easier, but they are released much later that the release of a new version of DirectX® and they don't always use new supported features. So, we refused using them and

wrote our own code of the program, ensuring its general security, stability and total control of its actions.

Each chapter of the program is devoted to a definite section of Tatar musical folklore and consists of virtual pages that present text information that can be read by computer.

We developed our own technology of storing, displaying and compressing the text, that allows:

- use of fonts of any type, size and way of imposition on the background: common imposition or imposition with modification of the background. In this case character has its own background color
- loading fonts that don't present in the system by the program at start up, e.g. our optimized in Fontographer Tatar font
- extended text positioning: line can have independent coordinates on the display with lines imposition feature. Line can be clipped horizontally, text in line's border can be left or right aligned, centered or justified
- text storing format requires little space owing to our developed double rendering system and compression. It's approximately twice smaller than the corresponding Word file format

Our technology depends on analysis of each character, including international language information, metrics, etc. Windows doesn't support automatic output of text with several fonts. So the program does the required mathematical calculations and outputs characters one by one. Then the text is divided on virtual pages. Each page occupies one "screen". Realistic background that presents an image of a book was created for each page. Analyzed text is imposed on it. The pages are held in the memory and displayed when needed.

The features concerning the text listed above allow *using* in program *any language* in text output.

There is *a system of links* in the text. Pushing the link leads to the following actions: transfer to another page, viewing images (illustrations, photographs, reproductions), video or audio playback. This is similar to links on WWW pages in some degree. Each link includes information about the file type that should be opened: video, audio, text or static image. Pushing the link causes loading one of the following components developed by us depending on the link style:

- *Audio player* (Nullsoft Winamp was taken as a prototype) is used for playback of audio files. It's made by Microsoft® DirectX® service. Audio player has the following features: rewind forward and backward, to the beginning and the end of the file; pause; stop; graphic progress indicator. The indicator presents a line that is gradually filled as the playback is going on. The indicator can also be used for rewind operation.
- *Static images viewer* (ACD Systems ACDSee was taken as a prototype) is used for viewing and working with images. It supports: zooming with fast 10% coefficient (less is useless in this case) with automatic transformation of view, transference in zoomed area, automatic transformation of the image to the viewport's size and to the original native size, full-screen viewing mode. This component has a more flexible zooming unlike ACDSee.
- *Video player* (Windows Media Player – a part of Windows software was taken as a prototype) organizes video playback using Microsoft® DirectX® service. It has audio player and static images viewer features.

The program uses a large quantity of multimedia data, so we had a problem of choosing the file compression and storing format. Multimedia data can be divided into 3 groups:
1. images
2. audio information
3. video and audio-video information.

We developed our own storing file format with "rmf" extension, that allows:
- data encoding
- optimization, based on choosing and transformation to the best existing format for each case. The selection considers productivity of playback using Microsoft® DirectX®, analysis of format's structure and methods of its playback by DirectShow®. Analysis pays attention to the methods of presenting the data on the HDD, because it affects on selecting the filters that will be used for rendering the multimedia information
- use of any known compression method

We mainly used MPEG-4 for video compression and MP3 (MPEG Audio Layer-3) for audio.

Many musical materials that have been into program's database were recorded on low-quality outmoded mediums sometimes in difficult conditions of research expeditions. So we had to make numeralization with audio data adaptation and quality improvements. We generally used Sonic Foundry Sound Forge 6.0 with special filters support, e.g. Noise Reduction. For graphics: Ulead Photo Express, Adobe Photo Shop, etc.

This software program designed for a full-screen 800x600 pixels16 bit mode. This mode is supported by VESA specification, so it must be supported by all OS Windows with Microsoft® DirectX® 8.0 installed.

We paid great attention to graphics design development of the interface by creating 3D scenes in 3D Studio MAX for every element of the interface. We tried to make imitation of complete three-dimension of the interface by setting different 3D animations that connect its components. This of course affected on the conception of the whole interface's structure. We didn't use Windows service for creating interface elements in the programming area. So, the interaction with the user is completely processed by the program. The interface specially designed to be intuitively understandable to the user. Owing to this there is no need in text menus, because the menus represent graphic objects. So each button has its unique geometric shape. The program uses *logic apportionment:* when mouse is on button's area the menu changes depending on the button's properties. This helps to orientate in the menu that represents realistic image without text and comments, so menu can stay unchanged after installation of new languages to the program that can be added like add-ons or packs. Currently Tatar, English and Russian languages are supported by default.

In options menu language can be selected, volume level can be set according to the global volume of the system, interface animations can be turned on/of that make beautiful realistic transforms between scenes of the program. Turning it off affects on decreasing number of resources that are used by the program, so it may result in system's performance.

Now we are updating our program. New, 2nd version uses the latest version Microsoft® DirectX® 8.1 for today, that gives new powerful capabilities in multimedia area, has some fixed bugs, different optimizations and complete integrations with Microsoft Windows XP.

We used the most popular and modern tool for creating installation program that is based on Windows 2000/Windows XP technologies – Microsoft InstallShield Professional Windows

Installer Edition 2.0. It has safe recommended by Microsoft installation method for Microsoft Windows operating systems.