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TEACH YOURSELF GEORGIAN SONGS ON THE WEB

Abstract

We have developed an open source web site for learning Georgian folk songs. The site plays a song and displays a visual representation of the audio, as an alternative to reading sheet music. The site allows user interaction with the musical material to promote collaboration among learners of Georgian music. Currently students can share the lyrics of songs with other students by submitting them to the site. The framework can be extended to let users submit new songs, interact with other users, adjust musical notes, and submit improvements to the web site.

Introduction

It is generally accepted that the best way to learn Georgian folk songs is in person, with a Georgian teacher, preferably also surrounded by other Georgian singers.[1] When the first author is in such a setting for an extended period, the only supplement he needs to support private study is a notebook for jotting down lyrics and a simple personal system of neumes in imitation of the Georgian teacher's hand gestures to indicate the motion of each voice part. Some people who might want to learn Georgian folk songs may not have access to a Georgian teacher, or indeed may not have heard them performed by masters. In the 1980's and 1990's many of us excited newcomers to Georgian music survived on Melodiya records and sharedhandwritten musical transcriptions (with our best guesses at the words), between brief trips to Georgia.

In 2004 the International Centre for Georgian Folk Song led by Anzor Erkomaishvili published two collections of multimedia learning materials, one for Gurian songs and one for Megrelian songs.[2, 3] The collections were intended both to teach and to expose new people to the music, and the student experience approached in-person learning. Each collection contained recordings by master musicians, sheet music in Western notation, and a booklet on Georgian folk music. There were four recordings of each song, a mix recording plus one recording for each voice part in which that voice was amplified, in a teaching system that might be called "music plus one" (in contrast to the old Music Minus One records). The International Research Center for Traditional Polyphony and Georgian Chanting Foundation have followed up more recently with similar collections of Svan and Acharan songs.[4, 5]

The original recordings are hard to come by today in the West, and we were unable to find the sheet music. How should Georgian folk music be presented visually to a stu-

dent on the Web? It is common on YouTube to see music audio accompanied by scrolling sheet music. Western musical notation has served as a powerful and economical way to disseminate

Georgian music, but it is a barrier for some students and it tends to mediate the student's first encounter with Georgian folk music through Western assumptions about scale and harmony. There are new notation systems and other ways to teach Georgian tuning and help students learn to attune to other voices and engage in "vertical thinking" to produce correct intervals and harmonics.[1, 6, 7, 8] One method is to show a plot of the singers' pitches over time.[9]

This work presents a web site for learning songs from the 2004 collections. The site plays the audio of a song while the pitches scroll by. The student has the option of viewing pitches or "notes", flat pitch segments that approximate the duration and average pitch of a musical note. In previous work with students the first author used semi-automatic audio processing

methods to produce the fundamental pitches (f0) of the voice parts for the songs in these collections.[10] This work adds the display of notes and lyrics and a nicer user experience.

The site is interactive. The student can freely stop and rewind a song, zoom and pan, isolate voice parts, and choose notes and/or raw pitches.Since the song lyrics were not available to us we decided to enable student collaboration, which adds a social element. Students can submit lyrics to the site and make them available to everyone.

Previous Work

Scherbaum et. al. previously developed a similar web framework which streams audio and simultaneously shows lyrics, pitches, and notes.[9] It has nice additional features for the student, including highlighting of the current notes and a display of the native scale of the song. The data was also generated in a studio and includes video of the singers, which is streamed simultaneously. Our site allows the student more interactivity and collaboration. It limits the lyrics display to one voice at a time, a pedagogical choice that may be an advantage or disadvantage. It also scrolls the music continuously, which in the current implementation can introduce performance problems that manifest as jitter. Several papers have discussed differences between Georgian and Western scales, different notation systems, and the practice of vertical thinking in Georgian singers.[6, 7] Some also address pedagogy.[1, 8, 9] We believe that our site invites students into an immersive experience of Georgian folk music that approaches the immediacy of in-person learning, and that our interactive and collaborative features will nudge students toward active discovery.

Methods

The web site was built using PHP (with HTML and CSS), JavaScript, and Plotly. Plotly is a high-level JavaScript library for showing plots of data over time. It abstracts some of the functionality of the lower-level D3 JavaScript library, which is a general-purpose tool for visualizing data. The user interaction is controlled by JavaScript and Plotly, and the functionality for adding and manipulating lyrics is controlled by PHP, JavaScript, and Plotly.

The software places uploaded lyrics automatically at the starts of notes. Lyrics alignment is a topic of ongoing research.[11] Currently the software naively spreads syllables evenly throughout the song. We have entered a partnership with AudioShake to use their API for alignment. Currently the software requires the user to syllabify lyrics. It is straightforward to automate a reasonable system for syllabification, for example one that marks a new syllable after each vowel, but linguistically correct syllabification is subtler.[12]

We used our own algorithm to generate notes from pitches in our previous work.[10] It is reasonable to expect the note track to be imperfect and to let users manually correct notes. We do not have this functionality but we can implement it using the selection tools of Plotly, in much the same way as we have let users manipulate lyrics.

Further Work

We would like to add more collections of songs and enable others to add songs directly from audio. In our previous work we presented a semi-automatic process for converting audio from the Teach Yourself Georgian Songs collections to pitches.[10] A big step is to make this process more user friendly and less laborious.

We would like to add new features to the user interface, including a Georgian language interface, upload of non-syllabified lyrics, note modification, song upload, better automatic alignment of lyrics, scrolling musical notation for students who prefer it, and user interaction.

We would like to improve the performance of the visual playback, which currently

depends on the student's computer, the window size, and the size of the data. It should be possible to keep the same user experience but remove the dependency of performance on data size. It should also be possible to adjust the user experience to the student's computer.

Above all we would like users, so that we can respond to what they want.

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