Interactive Measurement Visualization for the Windows Media Player

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ACS Technology Fellowship: Final Report

The purpose of this ACS Technology Fellowship was to support the creation of a visualization for the popular Microsoft Media Player (MS Windows operating systems) that would allow the user to measure aspects of recorded sound waves in the time and frequency domains. In addition, a set of exercises was to be designed to familiarize the students with the use of their computer to record and analyze an interesting set of sounds. Each of these goals has been achieved and I have used the products of this work in several venues. The visualization and exercises may be found at the following website:

http://webphysics.davidson.edu/faculty/dmb/wmpviz/wmpviz.htm

The website contains instructions and links so that anyone may easily download the visualization for free use. A link to this page may be found on my homepage as well (http://webphysics.davidson.edu/faculty/dmb/welcome.html).

The visualization and curricular material were featured in an invited talk I presented at a curriculum development workshop for approximately 30 arts education faculty in higher education. The Pittsburgh Opera and the Appalachian Colleges Association sponsored the workshop. In addition, the visualization and curricular material were featured in an invited talk in the Musical Technology session of a national meeting of the Acoustical Society of America. Throughout the past year, I have made presentations that use the visualization at a national meeting of the American Association for the Advancement of Science, and in seminars at the Sandia National Laboratories, Montana State University, University of New Mexico, Emory and Henry College and Davidson College.

Most recently and perhaps most critically, I have used the visualization and exercises in my Musical Technology (Physics 115) class for non-science majors this Spring semester. Throughout the semester I used Media Player and the visualization whenever I played sound clips during lectures. When it came time for the students to investigate more analytically the aspects of sound waves, I merely gave them the above link to the website and asked that they follow the directions to add the visualization and complete the exercises. Only 4 students out of the 26 initially had problems with the directions on the website. I have made changes in the wording to help eliminate their pitfalls. This homework assignment took, on the average, 1.5 hours to complete including the Media Player and visualization installation. Feedback from students has been very positive and many now use Media Player and the visualization as the default for all of their listening.

Originally, I wrote the software for the visualization to be used in Version 7 of the Media Player. Earlier this year, Version 9 became available and I am happy to say that all features of the visualization work in the new version.

The one feature in the visualization that I have not addressed is the ability of the visualization to autoscale for different sampling rates of the recorded media. Currently, the calibration is fixed for files recorded with the standard stereo CD rate of 44.1kHz. It should be possible to include autoscaling but reading the sampling rate, converting that information and placing it on the graph is a time consuming task. In the future I hope to make these changes. For now, if a user records at another rate, the numbers will be off by some power of 2. The instructor and students may easily account for this multiplicative factor.

The outcomes of the project that this Fellowship has supported have proven to be valuable teaching resources for me. I have and will continue to distribute them to as wide an audience as possible. The fascination of musical technology is not limited to college students; it spreads to the general public. It is hoped that through my presentations and the easy availability of the materials, science literacy may be increased in a general way.

Thank you.

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