Analyzing the Acoustics of Violins With FAST: Utilizing Graphical Analysis To Determine the Correlation Between Price and Quality

Shu, Hannah (School: Carmel High School)

Stepping into a violin shop is quite daunting–the wide selection of these wooden instruments all have a different character awaiting to be unleashed by a player. Unfortunately, it is quite difficult for the human ear to comprehend the unique timbre to individual violins; the bias of price and the manufacturer also plays a huge role in determining the “best” instrument. Previous experiments have attempted to measure the acoustics of the violin using unaffordable lab equipment; however, there is a failure to create an easy/cheap way to test violins for an average buyer. Thus, I developed FAST, a method to easily analyze the acoustics of the violin, showing similar attributes to its more expensive counterparts. The four components of FAST are frequency domain, amplitude, spectrogram, and time-domain–all regularly used tools to analyze sound. Using the phone app VisualAudio, one can record and collect data from a sample of violins, and use FAST to determine the characteristics. VisualAudio provides an image of the spectrogram and sound level–which is analyzed as an ADSR envelope. In addition, the data from the digital signal can be turned into the time and frequency domain with FFT. Results showcase the efficiency and accuracy of this method since it is able to allow players to scientifically analyze their instrument with a phone app.

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