

Sheet Music Reader

Prateek Verma prateekv@stanford.edu

Sevy Harris sharris5@stanford.edu

Goals

The goal of this project is to synthesize accurate audio from sheet music. The user will take a picture of traditional sheet music, the program will analyze the image and then generate an audio signal of the music represented on the paper. We will not use the Android platform for this application.

Steps

We will follow a similar processing pipeline as [1] to analyze the image. First, we will take pictures with a camera and pre-process them. This will include aligning the image such that the staff lines are perfectly horizontal, and thresholding the image to remove noise and account for uneven illumination.

The next step will be to segment the image into different parts. First, we will divide the image into separate lines, then we will divide it by bars, and finally we segment it by symbols. The notes have vertical lines, which makes it easy to segment, possibly using the projection based segmentation described in [2].

Once the image is segmented, we will classify the symbols as notes, rests, accents, clefs, etc... We will use a classifier such as LDA or SVM to classify the symbol and calculate the note duration, and then we will use the location of the note relative to the staff to calculate the pitch.

The audio output will be generated using additive synthesis described in [3]. We will specify the weights for each harmonic to simulate different instruments.

References

- [1] Bellini, Pierfrancesco, Ivan Bruno, and Paolo Nesi. "Optical music sheet segmentation." *Web Delivering of Music, 2001. Proceedings. First International Conference on*. IEEE, 2001.
- [2] Marinai, Simone, and Paolo Nesi. "Projection based segmentation of musical sheets." *Document Analysis and Recognition, 1999. ICDAR'99. Proceedings of the Fifth International Conference on*. IEEE, 1999.
- [3] Horner, Andrew, and James Beauchamp. "Piecewise-linear approximation of additive synthesis envelopes: a comparison of various methods." *Computer Music Journal* (1996): 72-95.