

Sheet music capturer

Project members

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Project description

The goal of this project is to develop a method for capturing the notes on a piece of sheet music and then allow a user to view, edit, and play them back. I will use a Android camera phone to develop the application.

The first major challenge of this project will be recognizing basic symbols in the sheet of music, which include the key signature, time signature, staff, treble and base clef, notes, note stems, breaks, accidentals, and repeat sign. To do this, I will start by doing some low-level image processing, including converting the image to binary and removing noise. I will then combine various features (template matching, histogram, orientation, etc) to identify staff lines, which I can use to deduce the size of notes and various other symbols. After identifying staff lines, I will use erosion to remove the staff lines, which will make identifying the rest of the symbols in the image easier. I will then employ image segmentation and template matching to identify the various symbols in the image. I may also consider using a neural network to do symbol recognition.

The next challenge is re-constructing the semantics of the song. This requires combining the symbol labels from the previous part with spatial relationships between them. For example, recognizing notes as being on the same line as the treble-clef. To do this, I will use an iterative algorithm where I make initial guesses about the relationship between symbols and then refine them successively based on known rules about music.

The final stage will be playing the music back. To achieve this, I will use the Android audio API to play tones corresponding to the notes.

References

- [1] Bellini, Pierfrancesco, Ivan Bruno, and Paolo Nesi. "An Off-Line Optical Music Sheet Recognition." *Visual Perception of Music Notation: On-Line and Off-Line Recognition*. Hershey, Pennsylvania: Idea Group (2004): 40-77.
- [2] Bellini, Pierfrancesco, Ivan Bruno, and Paolo Nesi. "Assessing optical music recognition tools." *Computer Music Journal* 31.1 (2007): 68-93.

[3] Bainbridge, David, and Tim Bell. "The challenge of optical music recognition." *Computers and the Humanities* 35.2 (2001): 95-121.