Developing Automatic Music Transcription Software

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Transcribing music is a difficult and time consuming task. Currently, no commercial software has been released to transcribe music automatically. The goal of this continuation project was to design and code a program which would automate the process of music transcription. The major goals for the continuation are as follows: utilization of the Fast Fourier Transform, single and multiple note recognition, and a user friendly graphical interface. The project was coded in C++ using the Visual Studio 2010 Express compiler and utilizes the utility libraries Libsndfile and SFML (Simple and Fast Media Library). The program also uses a recursive implementation of the Cooley-Tukey FFT for faster processing. The single and multiple note detection algorithms are based on spectral complexity and overtone patterns. Whereas alternative note detection algorithms have been based on amplitude content and overtone subtraction, this algorithm focuses on peak detection and overtone positioning to allow for highly amplitude independent processing. In addition, a post-detection self-correction algorithm has also been designed to revise potential anomalies. The graphics interface was designed using the basic event loop structure provided in SFML. Evaluation showed drastic improvements in quality. The software achieved a 3000 percent speed up over the previous version which used a normal Fourier Transform. The note detection algorithms obtained much greater accuracy than the previous amplitude based implementation. Monophonic processing accuracy averaged 98.8 percent, and polyphonic accuracy averaged 82.8 percent. Furthermore, the graphics interface greatly increases the ease with which a user can interact with the program

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