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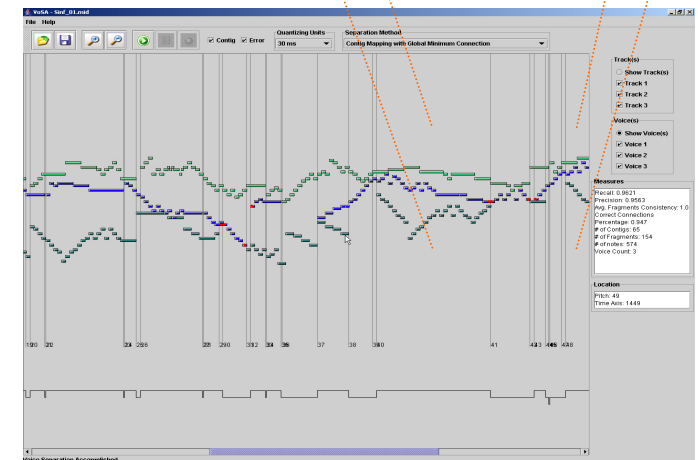
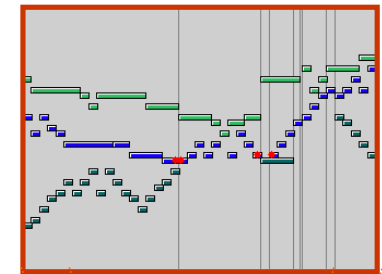
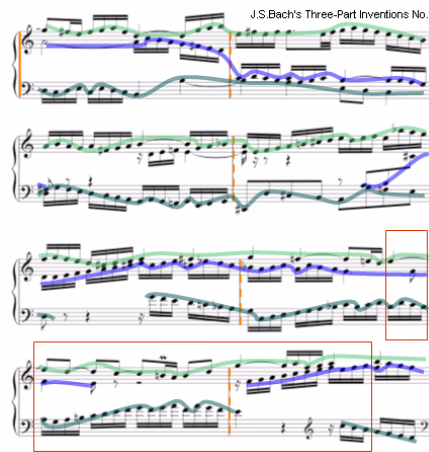
INTEGRATED MEDIA SYSTEMS CENTER
A National Science Foundation
Engineering Research Center at the
UNIVERSITY OF SOUTHERN CALIFORNIA

PRINCIPAL INVESTIGATOR
Elaine Chew

USC STUDENTS (EXPECTED DEGREES):

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MUSIC PROCESSING: VoSA – Voice Separation Analyzer



GUI Features:

- choose voice separation algorithm
- select quantization size
- show contig boundaries
- color code different tracks/voices
- show incorrect connections
- playback functions
- display voice count

BRIEF DESCRIPTION OF TECHNOLOGY DEMONSTRATION

VoSA, Voice Separation Analyzer, is a Java application that can separate musical voices (or parts) in MIDI files and evaluate the voice separation results. The application currently contains an implementation of the contig-mapping algorithm for voice separation described in Chew & Wu (2004). Algorithm outcomes are shown in the piano-roll view, and selected voices can be exported as MIDI files. Once the algorithm makes its voice assignments, the GUI will highlight any errors in the machine assignments, and display measures of the algorithm's performance. The application was implemented using Java2 SDK, Standard Edition.

UNIQUE OR DISTINGUISHING CHARACTERISTICS RELATIVE TO STATE-OF-THE-ART

- Contig-mapping algorithm was invented for voice separation.
- Adaptive quantizing technique was developed to pre-process MIDI.
- Universal measures were introduced to evaluate voice separation.
- Algorithm's result: 90% precision on Bach's pieces.

APPLICATIONS

- Music information retrieval
- Computer analysis of music
- Automatic transcription of music

RECENT HIGHLIGHTS, LEVEL OF DEVELOPMENT, UPCOMING MILESTONES

- Testing on more music pieces to evaluate and improve the algorithm.
- Studying the cases of voice-crossing.
- Testing if pattern matching technique can improve the precision.
- Integrating VoSA to music retrieval systems.

UNDERLYING TECHNOLOGIES

- Uniqueness: Contig Mapping Approach.
- Software: developed under Java SDK1.4.2 SE

LIST OF PUBLICATIONS, REFERENCES, URLs

- Chew, Elaine & Wu, Xiaodan (2004). "Separating Voices in Polyphonic Music: A Contig Mapping Approach." In proc. of Computer Music Modeling and Retrieval, Springer Verlag LNCS #2771, 2004.
- Invention & Software Disclosure (2004): A Contig Mapping Algorithm for Voice Separation (Filed: 5 April, 2004, USC).
- Huron, D. (2001) "Tone and Voice: A Derivation of the Rules of Voice-leading from Perceptual Principles", Music Perception, 19(1), 2001, pp.1-64.
- Kilian, J. & Hoos, H. (2002) "Voice Separation – A Local Optimization Approach." In Proceedings of the 3rd International Conference on Music Information Retrieval, 2002, p.39-46.
- Temperley, D. (2001) "The Cognition of Basic Musical Structures", MIT Press: 2001, pp. 85-114.

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