The Second Rencon:
Performance Contest, Panel Discussion, and the Future

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At the second Rencon at FIT, we will have a contest judged by a music professional in three categories, a panel discussion of the potentialities and problems of computer music, and show our plan of Rencon basis toward the future Rencon.

1 What is Rencon

Rencon is a continuous international event that pursues evaluation methods for performance rendering systems that generate expressive musical performance automatically and just started in 2002. While it is possible to see to some extent the ideas behind systems or how they are implemented by only reading the technical papers, this fails to serve us a clear understanding of the relationship between the scientific contribution and the output of the system. This is because the output (music performance) involves the subjective nature of the matter as well as the auditory information.

Rencon will offer opportunities for researchers to evaluate their systems both subjectively and objectively through a contest in which evaluation items and their criteria are clarified. It will also deepen our understandings of each system providing a forum for us to listen to the system rendered performances.

1.1 How to cook

Music is with us everyday in some way, because music is everywhere. Thus once you have some questions or an interest in music or musical activities, you find that there are various ways to approach music and its related activities.

The situation is the same for the performance rendering systems at Rencon and researchers who work the systems. We have several ways to approach performance rendering. You might have had a piano teacher who ambiguously instructed you “to play more elegantly”, then you could reply to it in your performance. If you were a pop music enthusiast, a new song piece by your favorite singer might make you recall another piece. You can jump into performance rendering research from anywhere, depending on your interest or experience on music or research.

It is said that computer music is an interdisciplinary research. That is, there are various ways to approach performance rendering. From perception point of view, learning mechanisms, data mining, and several others. It is quite possible to start performance rendering not from music point of view. For example, if you are into neural networks or genetic algorithms, you might want to test your ideas through performance rendering. Then you will confront thousands of research issues. Performance rendering research is never closed research but evolves along with new technologies such as information distribution on Internet as will be described in Section 5.

1.2 How to taste

As mentioned, we are always with music whether in a highly artistic sense or not. If you have more interest in pursuing the music of your liking on your personal music creation environment, say in creating your own impressive arrival melody on your handy phone, Rencon’s clear judgement of musical performances will help you improve your music. Since Rencon enables us to take the variety of rendered performances on computers into consideration, reviving music according to your own taste may lead to a new business.

If you have little interest in the music aesthetics, you will still be able to apply some of the research results at Rencon to other areas where subjectivity and Kansei are important. For example, the evaluation method that Rencon is going to establish will be usable in areas such as design where each target or concept has its own terminology, which is hard for people outside the area to interpret.

Though there will be more and more music copyright problems as computer music technology advances, Rencon will prognosticate possible copyright problems in the future with broad coverage of research areas in technology and music.

2 Rencon’s Activities

2.1 The first Rencon

The first Rencon was held July 6 as a satellite workshop of the International Conference on Auditory Display at ATR, Kyoto. We had nine technical paper presentations, voted automatically system rendered performances, and held a discussion based on the position paper disclosed prior to the workshop [5].

Six performances (one manually rendered and five system-rendered automatically) were played on an acoustic grand piano with MIDI controller (called MIDI Bar—Figure 1). The vote was based simply on whether a list-
Figure 1: MIDI Bar at the first Rencon

ner liked/didn’t care for a performance. The first prize went to Hashida’s manually rendered piece “Nina” – a piano solo in a soundtrack of a Japanese animation movie. Among the system-rendered performances, Bresin’s “Letter48” by Bellman got the first prize. A problem caused by an idiosyncrasy in an acoustic piano made many performances distorted. For more details, please visit Rencon HP.

2.2 Rencon: now and the future

We are now at the place for holding the second Rencon at FIT (Forum on Information Technology, which is an annual convention co-organized by Information Processing Society of Japan and the Institute of Electronics, Information and Communication Engineers). We will describe the second Rencon in the next section in more detail. Then, we plan to have the third Rencon in 2003 as a workshop at a big international conference. The third Rencon will have several firsts: It will be the first Rencon outside Japan, and we will propose a compulsory music, disclose the evaluation items and their criteria, and introduce an entry kit (described in Section 5). In 2004, Rencon will be in Japan again, then it will move around the world from 2005.

Our future plan to make Rencon a world-class championship [4] [5] is described also in Section 5. Yes! Rencon will achieve equal footing with other world-famous musical contests including Chopin contest and Tchaikovsky contest.

3 Music Contest at the second Rencon

Performance rendering systems can be divided into autonomous types and assistance types. The former includes machine-learning and case-based reasoning approaches. The latter, in contrast, assists to render the users’ own ideas on interpretation into the performances. At the second Rencon, in addition to systems classified into the above two categories, rendered music pieces using commercial sequencers, which implies human thought to the performance, have been collected.

We have to regulate the various environments in order to evaluate performances rationally. A set piece, one by either Chopin or Mozart, will be assigned. The sound source that will be used at this event is a common MIDI/PCM synthesizer.

3.1 Music Entries

At the second Rencon, we have eight groups for music entries. Five autonomous types, two assistance types, and one in a third category (manual rendering).

3.1.1 Manual rendering

- Case studies of manual rendering [3]
  Hashida has programmed MIDI sequences on computer by her “hand craft”. Her ”craft” is based on music scores and software for MIDI sequencing or musical notation.

In this introduction, four methods will be discussed from three points–“xpressions of pedaling”, “emphasizing accents”, and “editing tempo” for making MIDI data and real performance closely. The methods are arranged from her invention and empirical approach for MIDI programming with MIDI notation software.

3.1.2 Assistance type

- CiP [8]
  “Coloring-in Piano (CiP)” is a new musical instrument that allows performers to directly concentrate on representing their musical expression by freeing them from accurate reproduction of melody lines. Even if the performer operates any (wrong) key of the CiP, the CiP replaces the pitch of each note to always output correct notes of a piece by referring to a music database, whereas the CiP outputs all of the expressive elements (e.g., striking velocity of a key) as the performer plays.

- MUSE [11]
  MUSE (short for MUsic in Structured Expression) is a structural language of typed music for the performance of piano and piano-like musical instruments with the aid of computer.

It provides a high-level, quantitative description of musical expression in terms of dynamics, agogics, articulation, asynchronous attack, and pedaling. These elements of expression can be specified hierarchically to any depths in the user-defined score structure.

WinMuse is a software system which is a current implementation of MUSE on Windows.
3.1.3 Autonomous type

- DM [2]
  Director Musices (DM) is a program that transforms notated scores into musical performances. It implements the performance rules emerging from research projects at the Royal Institute of Technology (KTH). Rules in the program model performance aspects such as phrasing, articulation, and intonation, and they operate on performance variables such as tone, inter-onset duration, amplitude, and pitch. By manipulating rule parameters, the user can act as a metaperformer, controlling different features of the performance and leaving the technical execution to the computer. Different interpretations of the same piece can easily be obtained.

- HHH [6]
  A new framework called two-stage performance rendering was proposed in order to make it realize incremental, interactive, and local rendering through direct instructions issued by a user. The first stage translates a user’s instruction into the deviations of the onset time, duration, and amplitude of structurally important notes. The second stage spreads the deviations over surrounding notes. Ha-Hi-Hun (HHH) is a prototype performance rendering system having the framework.

- Kagurame [10]
  Kagurame Phase–I is a musical expression generation system. The goal of Kagurame is a system which can generate various performances for a single piece, depending on parameters of musical expression characteristics like style, mood, performer, and so forth. To achieve the goal, Kagurame uses a case-based method for generation of musical expression. This method uses a number of human performance data as a knowledge base for musical expression generation, and it does not require any rules for musical expression.

- MIS [7]
  “MIS (Music Interpretation System)” was designed to realize complicated human thinking toward music performance with computational algorithms. It consists of the modules for score input, structure understanding, and performance rendering. Competence acquisition was especially considered for the architecture design. For performance rule extraction, a modified algorithm based on multiple regression analysis is used.

- Mozart by Machine Learning [12]
  The piece presented here is a by-product of a basic research project in which we develop and use machine learning methods to discover fundamental principles of music performance. Given examples of performances by human musicians (pianists), our learning algorithms learn to apply tempo and dynamics at different levels of the phrase structure hierarchy, and also how to play or modify individual notes. The learned rules can then be applied to new pieces, to test whether they are musically meaningful. The attached performance is the result of applying learned rules to a new piece that the computer has never seen before.

3.2 Judgement

These systems, research ideas, case studies will be briefly introduced orally, then we listen to performances. Since our musical experiences and knowledge varies, we, the second Rencon participants, are not able to sit in judgement over performances to choose a winner as judges of Chopin contest do. At the second Rencon, we will have two types of judgement: by a music professional and by popular vote.

The music professional will explain clearly the reason of a selection. The second Rencon participants will able to compare their choice by popular vote and the result of music-based judgement.

4 Panel Discussion

Our invited panelists are Mr. Takeuchi, and Mr. Hoshiai, who represent the music and electronic-music business, respectively. The other panelist is Dr. Katayose, who can describe performance rendering from the computer science point of view1.

At the panel discussion, each panelist will describe performance rendering from the view point of their profession in order to give attendances at the second Rencon several perspectives. Mr. Takeuchi will explain the interpretation of music and its deep effect on performance generation. Mr. Hoshiai will describe the potentials and limitations of using MIDI performance data and suggest way to set the best of performance on electronic instruments.

Then the panelists will take questions on technical and musical issues.

5 Rencon Data Format for Future Rencon

In our provisional plan, the milestones we want to reach are as follows [5]. By 2007, a system will that be able to naturally perform separate techniques for expression such as grace notes, crescendo, and ritardando. By 2010, a system that will be able to catch up to the level of manual rendering (MIDI sequencer programming). By 2025, a system that will be allowed to play piano on the stage of the Chopin concours and create a wonderful performance unlike nothing that has been heard before.

To make the contest in Rencon as fair as possible we first have to regulate what data are input to a performance rendering system and its data format as well as the names of set pieces.

One of the requirements for the music notation format for piano performance rendering is the capability to in-

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1 Each area of computer science research, music, and electronic music business is actually very broad to cover by a person.
dependently describe deviations of the pitch, timing, and dynamics of each note. Further, taking into account the availability, interoperability, and usability of music data, a XML-compliant format is appropriate, and thus possible candidates are WEDELMUSIC [1] and MusicXML [9] for the time being. These two formats both have a tag for representing a note; the note tag of MusicXML has elements for note information, such as pitch, duration, and lyrics, while that of WEDELMUSIC has attributes for the similar note information and an ID. The projects for these two formats are intensively developing complementary tools (an editor, a translator to other formats and so on) and utilities.

At present, we are looking at developments and disseminations in both formats, and we will probably choose one of the other. If readers have some proposals or comments, we would very much like to hear them. Please let us know!

6 Summary

At the second Rencon, we will listen and compare rendered performances generated by systems in three categories described in 3.1. Judging will be by popular vote and by a review by a music professional. Through the panel discussion, we will share guideposts and problems in Rencon.

For the third Rencon, to enrich it as a contest, to contribute to research areas of computer science, music, perception, and others, to give participants and listeners more satisfaction, and to create a system rendered performance that will win the Chopin contest in half a century, we provide the Rencon entry kit and propose the Rencon Data Format based on XML for delivering the music information necessary for Rencon entry.

Acknowledgement

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URLs

**Coloring in Piano**  http://www2.jaist.ac.jp/~cooshi/CiP.html

**Director Musices**  http://www.speech.kth.se/music/performance

**Ha-Hi-Hun**  http://www.brl.ntt.co.jp/people/hirata/ntt_musicmachines.html#hahihun

**Music Interpretation System**  http://media.sys.wakayama-u.ac.jp/~katayose/mis/

**Mozart by Machine Learning**  http://www.oefai.at/music

**Rencon**  http://shouchan.ei.tuat.ac.jp/~rencon/

References


