Rencon: toward a common basis for performance rendering concours

Rumi Hiraga[1)], Mitsuyo Hashida[2)], Keiji Hirata[3)], Haruhiro Katayose[4)5)], Kenzi Noike[5)]
1) Bunkyo University, 2) Wakayama University, 3) NTT CS Lab., 4) Kwansei Gakuin University, 5) PRESTO, JST

Abstract

This paper discusses some important issues to be that must be addressed in the near future if Rencon, contests for system-rendered performances, is to become a continuous world-wide landmark project with a majestic target of winning the Chopin piano competition in half a century.

1 Introduction

A year after the start of the century and two years after the millennium, 2002 is memorable as the birth-year of Rencon. Rencon started with the purpose of establishing a method of evaluating computer music systems. Because such a method should handle not easily quantifiable and subjective attributes, we don't have a common understanding of how performance rendering systems should be evaluated currently. We need a suitable evaluation method in order to enlighten people about computer music research, encourage them to participate in it, and enpower the research itself.

This year we are going to have two Rencons (a satellite workshop in ICAD and a special session in FIT[1]), though they are not contests in the real sense[2]. Their purposes are to look back at past research on performance rendering, musical expression, musical analysis, and related areas, and establish a common basis for making Rencon from the next year a contest style event[3]. To make Rencon successful –and create a system rendered performance that will one day win the Chopin competition in half a century, we have to establish a common basis for the contests. Concretely, we must establish evaluation items, set up a criteria to evaluate those items, provide data for participating in Rencon, and select appropriate set music[4].

This paper proposes items to discuss at the first Rencon. Besides researchers of computer science, psychologists and musicians can also make contributions. After discussions by researchers, concrete solution will be drawn up by the Rencon steering group[5].

In what follows, we briefly describe the current status of performance rendering systems, a possible approach to Rencon contest, premises for a discussion, and items to discuss.

2 Performance Rendering Systems and Rencon Style

2.1 Performance Rendering Systems: Current

Figure 1 shows a typical performance rendering process. The first stage is the preparation stage: musical scores and real performances are fed to the system as input, and information for rendering, such as musical structure, analyzed information of performance, and rendering rules are obtained. At the second stage, a rendering engine is given the information derived in the first stage and set music as input. The engine then generates performance as output. In the first and the second stages, in some cases, analysis and rendering are not completely automated. "Intervene manually" in these stages means that human may correct or supplement the system's result. "Sequencer programming", inputting score data to sequencing software and then modifying the properties of each note with its MIDI values, corresponds to the manual intervention in the third stage.

Quantitative evaluation is desirable to describe the performance of rendering systems as computer systems. As music systems, we believe evaluation by human introspection is indispensable. Through a series of Rencons, we expect to find a point of agreement between objective and subjective evaluations. From the system point of view, the idea, the materialization, the presentation, the usefulness, and the effect of the methodology should be assessed. From the musical point of view, evaluating subjectively and introspectively by humans is indispensable. Currently, these points are independent, though we hope to find an effective way of quantifying and integrating them.

[1] Forum of Information Technology. A big domestic conference in cooperation with a society and an association in Japan.

[2] These are called *petit Rencons.*

[3] The contest-style Rencon is called *gros Rencon*, in contrast to petit Rencon.

[4] A set of unified musical pieces for comparison.

[5] Currently the authors of this paper are the members of the Rencon steering group. We welcome new members for a work ranging from clerical jobs to innovative research.

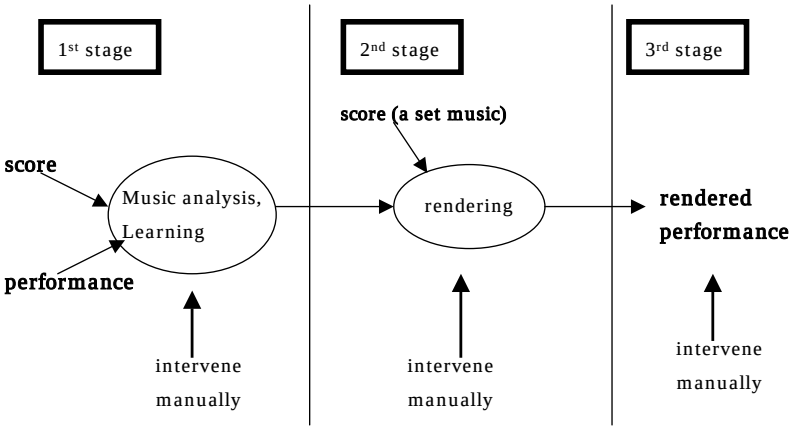

Figure 1: A typical process of performance rendering

2.2 Rencon Style: From next year to the future

For the present, as the incipient stage, there will be a considerable differences in what individual performance rendering systems can accomplish. Some system may be able to generate a complete piece, some a part of a melody. Though many performance rendering systems in use today can generate musical pieces of their own choice, most of them generate classic piano pieces where pedal work is necessary, in spite of the fact that pedal work has not been well investigated so far. Roughly speaking, at next year's Rencon, set music consisting of a group of piano pieces will be proposed. Participants will then present their systems and performances in the context of the items to be evaluated (say, articulation in a specified eight measures).

By making use of the distinction between the system and the human player in rendering performance, Rencon will become a contest with a unique style. Since automated performance does not need any physical practice, set music will be proposed to participating systems the day of the Rencon. The systems are expected to generate performance at the site. To prevent a system generating a performance that is exactly the same as the case performance, participants will be given newly composed music. At Rencon, systems generate and compete performances of the world premier [6] This way of contest is available if API to rendering systems is enacted and disclosed.

3 General Discussion: Toward a Common Basis of Piano Concours

Based on the understanding of the current research situation of performance rendering research, we will list items to discuss at ICAD_Rencon in order to succeed gros Rencon from next year.

3.1 A data set for participants

Before the listing, we describe what the Rencon steering group will prepare for participants. We will provide a data set and evaluation criteria. The data set includes performance data, score data, and musical structures of the set music. Currently, a few standards and XML are proposed for performance data and notation (eg. MIDI, NIFF, Recordare's MusicXML, and WEDELMUSIC's proposal). Although the newly designed XMLs will include both the notation and performance information, they will not express information of musical structures like the widely used GTTM or IR do. We will decide a data format for them. Since we believe a data set should represent a musician's interpretation of a musical piece and its reflection on his/her performance, the triplets of a musical score specified with an edition, their interpretation (musical structures), and performance have to be consistent [7].

Because the data set should be available on the Internet, we will prepare data that will not cause copyright infringement.

3.2 Discussion items

We will be able to prepare the data set described above only after discussions. Rencon participants will

[6] This unique approach has at the same time keeps the fairness of the concours. In order to avoid of leaking set music, the concour of the world premier plays the role of system doping.

[7] We know there can be several editions for a music piece and several interpretations on each edition. The information provided will be an example.

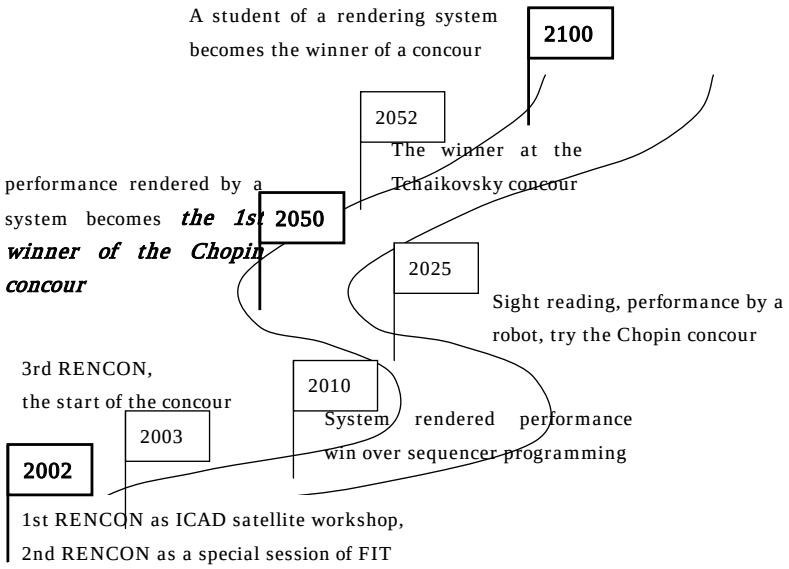

Figure 2: Roadmap of Rencon

be able to make much use of the set in their research. We hope the items listed below will be discussed concretely and in depth so that we can set a clear idea of what should be employed at gros Rencon from next year.

The data format There is a room to discuss which format to choose for preparing the data set. Do you have any recommendations or good ideas?

Select an appropriate set music We plan to select the set music by considering capabilities of systems. What are suitable piano pieces to be included in set music for Rencon over the next few years[8]?

Evaluation items The reasons for selecting particular set music will affect evaluation items. What can or should be evaluated with the set music; accent, legato, agogics, something else? Will items range from each note to a certain measures?

Evaluation criteria Disclosing a clear evaluation criteria is Rencon's mission. How should the items be evaluated? By comparison with a specified human performance? By voting by participants? Judged by music experts?

What other evaluation criteria are there, other than the specified evaluation items? Do we score on the idea of system design, system philosophy, its materialization, or the possibility to make it business use? How do we score?

Other items There may be other items worth sharing among researchers. For example: Do we need a performance database for analysis and synthesis? Do we need common tools such as to derive expression deviations [9]?

4 Rencon's Future

When we establish a common basis and evaluation method for Rencon, we will be able to extend the area to which Rencon's result can be applied. Though Rencon's set music starts from piano pieces, we are going to extend it to many types of instruments where expressions are controlled by various information mostly in the form of continuous values. We will do research on humanoid robots and try to integrate discrete and continuous musical information. In order to play a concerto as a soloist, a robot must have eyes to follow and understand a conductor's move and ears to do orchestra performance. Figure 2 shows the roadmap of Rencon. As a landmark project, we strongly hope many young researchers will participate in Rencon.

Acknowledgement

Thanks to Dr. Bresin of KTH (Sweden,) who gave us valuable comments on Rencon activities. This Rencon is supported by the Kayamori Foundation and JST (Japan Science and Technology Corporation).

[8] A list of system rendered pieces will be shown at the Rencon HP.

[9] By expression deviations, we mean the difference between a performance and the indication on a score in terms of, for example, onset time, duration, and sound volume.