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3.43 Development of a Utility System for Charged Particle Nuclear Reaction Data by using IntelligentPad

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Abstract

We have developed a utility system, WinNRDF2, for a nuclear charged particle reaction data of NRDF (Nuclear Reaction Data File) on the IntelligentPad architecture. By using the system, we can search the experimental data of a charged particle reaction of NRDF. Furthermore, we also see the experimental data by using graphic pads which was made through the CONTIP project.

1. Introduction

NRDF (Nuclear Reaction Data File) has been accumulated by JCPRG (Japan Charged Particle Reaction Group). NRDF contains the experimental data of the nuclear charged particle reaction in Japan. The number of accumulated data files is several ten thousands, which may be almost all data in Japan. However, the utility system for searching data is very poor, which was made more than ten years ago on the main frame of the computer center in Hokkaido University [1]. Furthermore, it is almost impossible to modify the old system to accept new applications because of the old architecture. On the other hand, recently, PC (Personal Computer) has been widely spread all over the world. The EXFOR (EXchange FORmat) database which is an international standard is determined to support it on the PC (Windows) interface and WWW (World Wide Web). Then, it is meaningful to develop the utility system of NRDF on the Windows interface and WWW.

On such a situation, we have three projects of the development of new data searching and utility systems for NRDF; i) A data search and utility system with Windows interface on the local PC. ii) A data search system on the network circumstance such as WWW. iii) A data search and utility system by Intelligent Pad (IP) architecture [2] (see a paper by Ohbayasi *et al.* in this proceeding). As far as

i) and iii) are concerned, we reported two systems i) WinNRDF [3] and iii) CONTIP [4] on the 1998 symposium on nuclear data. However, WinNRDF for the local PC circumstance is made by using a programming language (c++) on the normal Windows95/NT architecture. Then, we mentioned that WinNRDF would be made on the IP architecture in the future. The purpose of the present paper is to show such the development of WinNRDF as WinNRDF2 on the IntelligentPad architecture.

In this paper, first, we explain the IP in brief, because the details and the advantages of using it for the nuclear reaction database is discussed by Ohbayasi [4]. Next, we describe an overview of the present system, WinNRDF2, for the local PC and explain the practical system of WinNRDF2. Finally, summary and future problems are given.

2. IntelligentPad

In this section, we describe the IP architecture. This architecture is proposed in 1989 by Yuzuru Tanaka at Hokkaido University[2]. In the IP system, every object is represented as a media object called a "pad". The "pad" can be treated as an object of the graphical user interface, like a sheet of paper or a card on the computer display (Fig. 1). By using this pad, users, even if he is a beginner, can record, store, distribute, share, edit, etc, various kinds of information in an integrated manner on computers. The "pad" also represents varieties of intellectual resources such as multimedia documents, system utilities and applications. We can easily compose tools or software (editor, database, graphic representation tool, etc.) by directly pasting some pads on another pads. In Fig.1, we display a text pad and a command pad on a mount pad.

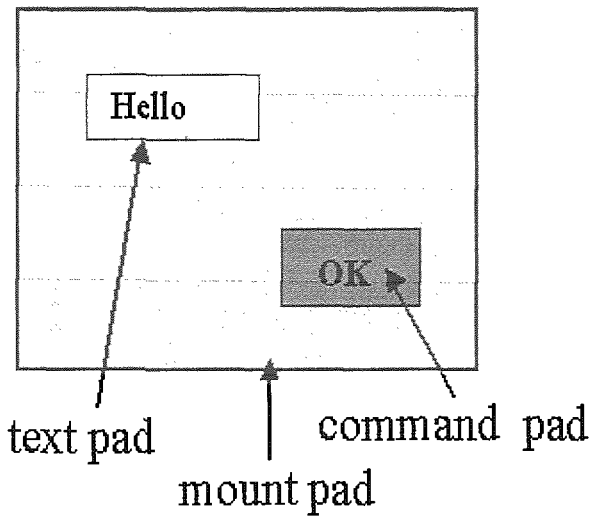

Fig.1 text pad and command pad on mount pad

In the IP, each pad has several connection jacks called slots. One of them is called a primary slot. Each pad has a single pin-plug to connect itself to one of the slots of another pad. The pad architecture and the standard linkage facility are provided by a kernel of the IP system. However, in practical uses, we do not have to worry about them because it is handled by the system. The application linkage interface of a pad is defined by a list of slots. Each slot is accessed either by a 'set' message: 'set *<slot_name> value*' or by 'gimme' message: 'gimme *<slot_name>*'. Each of these two messages invokes the respective procedure attached to the slot. Slots and attached procedures of each pad define the internal mechanism of the pad. The slots and the procedures are defined by a developer of the pad.

3. System design of WinNRDF2

We describe the system design of WinNRDF2 for a local PC in brief. In Fig. 2, we show the overview of the system design. CONTIP is designd for the nuclear database on the internet circumstance with the IP architecture, whose details are given by Ohbayasi [4,5]. Present WinNRDF2 is a package of CONTIP for the local PC. The using interface of WinNRDF2 is IP one and the database of NRDF is constructed on the Microsoft Access 97. We can search the charged particle nuclear reaction data when we query the data to the database on the pad. If we have other databases on the local PC, we can also easily use it by the IP system with simple procedure such as a pasting or a slot connection.

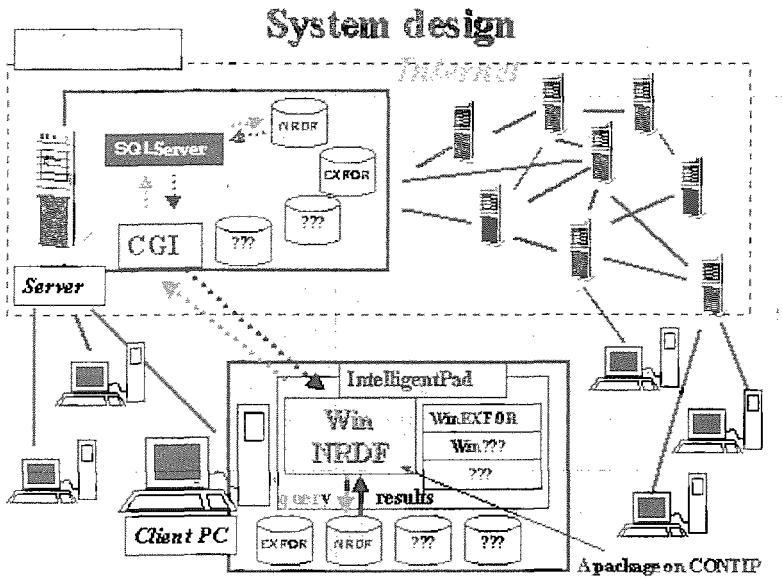

Fig. 2 System design

4. Pads in WinNRDF2

In this section, we explain pads in WinNRDF2. We input some codes (keywords) to the input boxes in the main query pad in WinNRDF2 (Fig. 3). In the case of pushing the "Search" button, we can see the list of the so called D-number, which is an identification number of the data file basically corresponding to an article, and several information in NRDF (Fig. 4). If we select one of the D-numbers and push the "Open File" button in the list window, then we get the data file with the D-numbers.

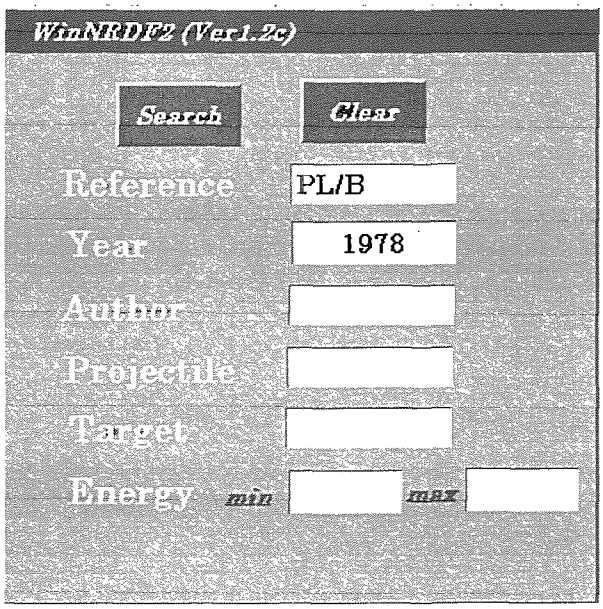

Fig. 3 Query pad

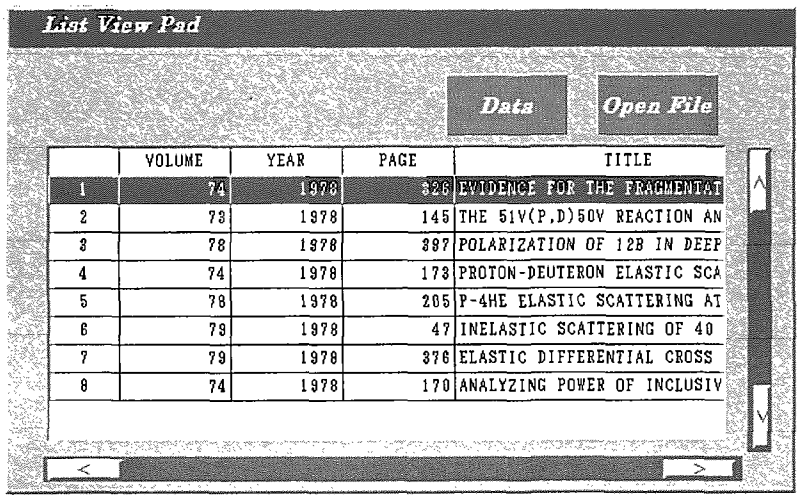

Fig. 4 List view pad

These pads are also constructed by using several basic pads. For example, query pad is decomposed to text pads, edit pads and so on as seen from Fig.5. As shown in Fig.5, these pads are connected to slots of a SQL generating pad. When the "Search" button is pushed, a query with generating SQL is performed to the database of NRDF.

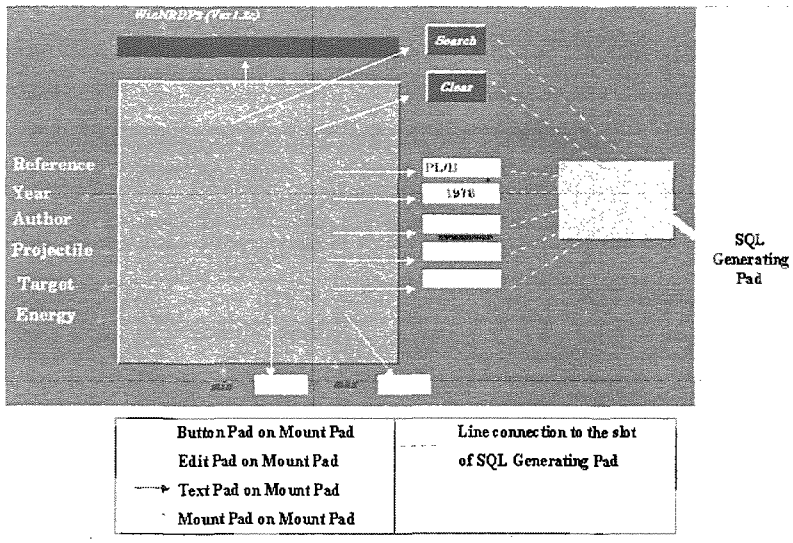

Fig. 5 Decomposition of the query

The obtained data is represented as a data pad which has experimental information. When the data pad is pasted on a graph pad, we can see graphically the experimental data. Graph pads correspond to other experimental data can be compared by using a graph base pad as seen form Fig.6. We will also compare the theoretical one, if we have the calculation code on the IntelligentPad system.

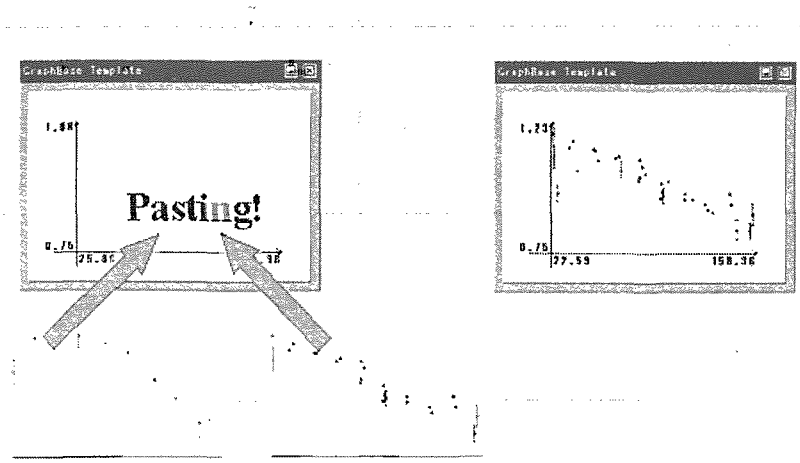

Fig. 6 Comparison between experimental data

5. Summary and future problem

In this paper, we have described a new utility system, WinNRDF2, for a nuclear charged particle reaction data of NRDF (Nuclear Reaction Data File) with the IP architecture. By using the system, we can search the experimental data of charged particle reactions in NRDF and see the graphic data on GUI. In the future, we will want to apply to the EXFOR database.

Acknowledgment

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