B8 – 3

Development of Software for Automatic Generation of Conversion/Linkage Softwares to Integrate Existed Plural Number of Radiotherapy Database

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PURPOSE

To improve quality and reliability of a multi-institutuonal radiation oncology database and to enhance the results of radiotherapy, we developed software which can generate another software automatically for converting an existed database to an integrated multi-institutional database ROGAD (Radiation Oncology Greater Area Database).

METHOD

A. Conventional methods of ROGAD data collection

There are three methods of ROGAD data collection which has items of 13 and fields of 55 per patient.:

1) When an institute has an existing database in operation, the clinical data are converted to the ROGAD protocol and written into the ROGAD floppy disk. This can be done automatically by interpretation software developed by the authors (Data-link). This method is the most convenient for both the institute and the ROGAD office. Data for more than 24,000 cases have been collected by this method.

2) Alternatively, radiotherapists enter clinical data into personal computers by operating the data collection software of the ROGAD protocol.

3) Hand-written worksheets were also sent to the ROGAD office, and until 1994 the office staff had to key in them into ROGAD floppy disks. In 1995, an optical character reader (OCR) was introduced and it is now in operation.

As described in **1)** and **2)**, radiotherapy records in floppy disks are mailed to ROGAD office from each hospital. There are two types of data collection floppies, one is according to ROGAD protocol which is already converted from each institute's database, and the other is in accordance with the protocol of existed old database in each hospital. Data conversion/linkage software for

such local database and data link software to integrate those databases were developed and were operated at ROGAD office.

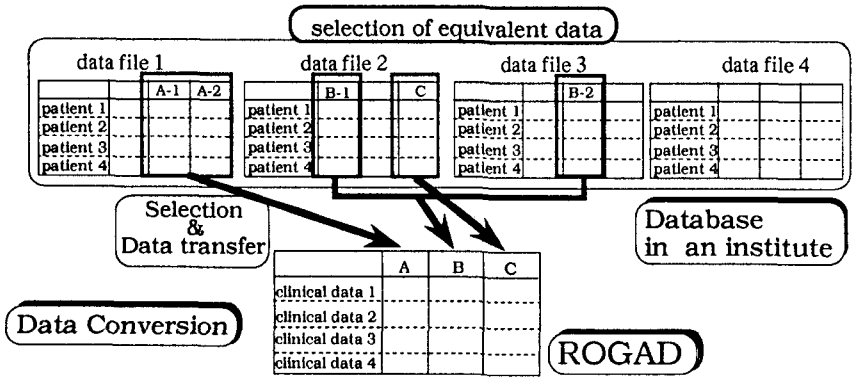
B. Method of this study

In stead of developing conversion/linkage software for each existed database, we developed a new general usage software which can automatically generate another software for such conversion and linkage. By means of operating this new software, we can get conversion/linkage software for the institute automatically. Hence we have only to make the conversion table for institutes by operating the automatic generation software.

B-1. Making the conversion table

In the beginning stage we compare the data at each institute with ROGAD protocol. And we make conversion table by operating the new software. In order to make conversion table of each institute, data in a field of each institute are compared to data in the corresponding field of ROGAD protocol. In the conversion table we write the comparison results between the each institute fields data and the ROGAD fields data as shown Fig.1 (a) and (b).

In case only data display method is different but data form is the same with that of ROGAD, the institute's data can be converted to ROGAD data form



(a) Illustration of Data Conversion

Data Conversion Table

Institute "A"			ROGAD	
File & Field Name		Contents	Field Name	Contents
File 1	A-1	Non Double Cancer; 0	A	Double Cancer; Non; DC0, 1; Write ICD-O Code for Primary Tumor,Triple Cancer; DC3, Unknown; *
File 1	A-2	Double Cancer; 1(Existed), 2 (Doubted) and 3(Unknown)		
⋮		⋮	⋮	⋮
File 2	C	Mail; M, Femail; F	C	Mail; 1, Femail; 2
⋮		⋮	⋮	⋮

(b) An Example of Data Conversion Table

Fig.1. An Example of a Conversion Table Between the Institute Protocol and the ROGAD Protocol

easily. For example, in case of sex, we pick up "M" in the institute's database and set up "1" in ROGAD. And we assign a asterisk to the character which could not be converted because of false entry by an operator in the institute. In case semantic difference in the institute's database is found compared with ROGAD protocol, careful interpretation of the institution's data is conducted, and the conversion table is made with careful examination of semantics.

B-2. Data conversion software

When the conversion table is completed we can get the automatic conversion/linkage software automatically as shown Fig.2(b) (Fig.2(a) shows conventional conversion method.). The conversion table is entered to the automatic conversion/linkage software, and converted data are linked to ROGAD. The development of software was based on ACCESS (Microsoft Corp.).

RESULTS

We have gotten test data from Keio University Hospital. When we finished investigation on the conversion table between Keio Univ. Hospital data and the ROGAD data, we applied the test data to the automatic conversion/linkage software. The results of operation of the automatic conversion/linkage software generation indicated the same results with that of conventional conversion/linkage software made by previous research[1].

DISCUSSION

In case of conventional method, we had to make conversion/linkage software for each institute after making conversion table peculiar to the institute. If an institute's data items were changed, the conventional software of the institute had to be changed in accordance with the new data items. On the other hand, in case of newly developed conversion/linkage software generation software, automatic conversion/linkage software is automatically generated immediately sfter conversion table is entered to the software generation software. If an institute's data items were changed, we can update the present conversion table automatically. Then conversion/linkage software of the institute can be made automatically.

CONCLUSIONS

Our method is contributing to increase number of clinical cases in the database and to increase reliability of radiotherapy database, and to improve the results of radiotherapy.

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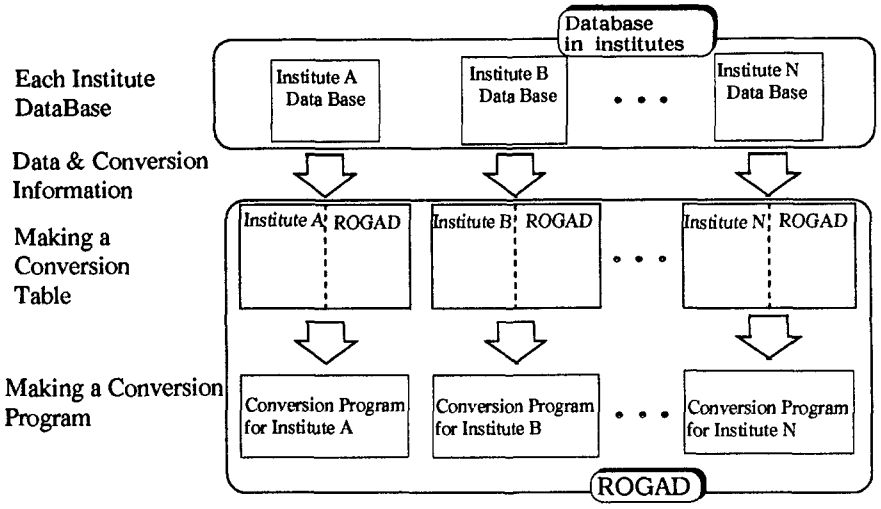
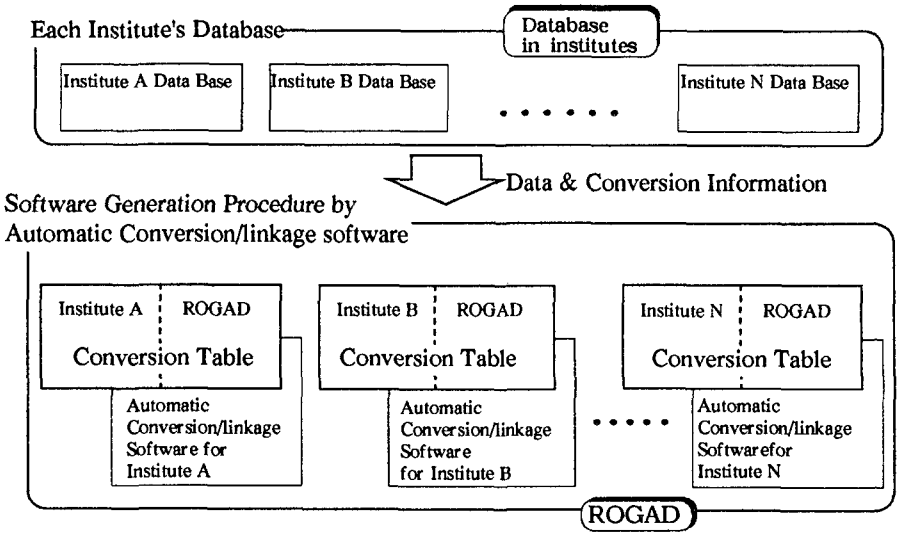


(a) Conventional Data Conversion Method

After the ROGAD office received each institute database and its conversion information, the ROGAD office made conversion table and conversion/linkage software for the institute.



(b) Data Conversion Method of This Study

Data and conversion information are sent to ROGAD from each institute. According to the instistute's information we make a conversion table by operation of the new software. When software the conversion table is completed and entered to the automatic conversion/linkage software, the conversion/linkage software is complete and linked to the ROGAD.

Fig.2 Software Generation Procedure