

## Construction And Verification Of Distributed Medical Database Using Resource Description Framework

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**Purpose:** - Purpose: Electric medical chart (carte) is now commonly used in hospitals not only in Japan but also in the world. But it does not become common in small-sized hospitals in Japan. To improve the validity of the electric medical and dental charts to be put to work in many hospitals and dental offices, we propose the concept of the resource description framework (RDF) for information collecting and sharing.

**Methods:** - Methods: The resource description framework enable to exchange and share the electric medical and dental records. This framework describes web-based resources using the set of subject-predicate-object. Individual resource is described by each uniform resource identifier (URI). The resource description framework assures the consistency, but simultaneously shows the flexibility to enable inverse data search and retrieval, to add the meta data, and to carry out the semantic interpretation analysis. For the simulation study, system components installed were a central database server (keeping up hospital and individual patient information) and the output API (Application Programming Interface) server, an electric medical chart database (keeping up individual patient's examination and treatment information) and the output API server, and the external database (Linked Open Data of diseases and medical drugs) designed for the resource description framework.

Using the system, individual patient record was tried to manage in an integrated fashion and to share the outputted medical report by medical chart API between hospitals. Since hospital names which each patient has visited were kept up in addition to meta data (name, DOB, etc.), the search loading was dramatically reduced.

In addition, output functions of medical examination and treatment histories was installed in the medical chart API. Such medical record can be displayed on web browsers. The method of a hospital-specific medical chart collection was described by Javascript, each coding was outputted by the central database API along the resource description framework specification.

**Results:** - Results: The system performance was examined under the setting of one central database, one hundred medical chart database and one thousand patients (agents). At the random examination, the network occupation, data collection duration, the CPU loading and memory occupation in each client terminal for data collection and display. The resource occupations were CPU loading 10% and memory occupation 0.2 GB. At the situation that three hundred record of a single patient was stored in several hospitals and a single client collected all of them, the network occupation, CPU loading and memory occupation were 20 kB/s, 5 % and 0.05 GB, respectively. It needed only 2.6 sec from the query to all-data displaying on an examined local network.

**Conclusions:** - Conclusion: This is a proposal of electric chart system for sharing and collecting the medical and dental charts using the resource description framework concept. This is a low-cost system due to the installed method for reducing the search loading and distributed calculation resources on individual clients. Since the system also has the reference system to the external database (Linked Open Data of diseases and medical drugs), the consistency and the facility of renewal/update/operation was assured. The system enables the reusability of electric medical and dental charts.

**References:** [1] Kawakami Y, et al. (2006) Application of resource description framework in reporting system. Japan Journal of Medical Informatics 25(6):421-429.

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