

# A Framework for a Secure Federated Patient Healthcare System

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**Abstract.** Medical records contain personal information like names, Social Security Number (SSN), Birth Date etc. The exposure of this information could cause considerable damage and lends itself to misuse in multiple ways. However, it is widely recognized that information from hospital information systems is needed for research and development. In this paper we propose a new framework to secure data from multiple sources.

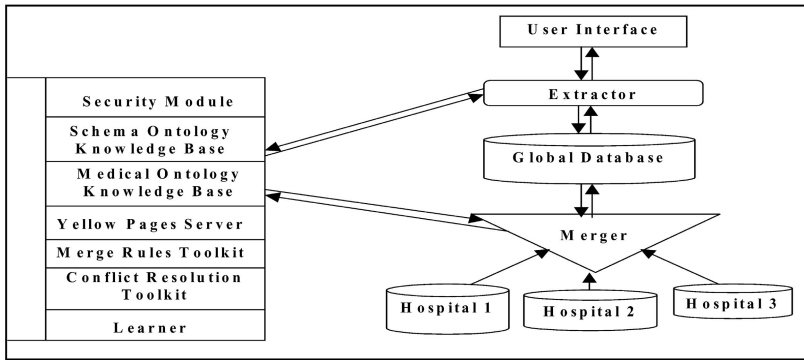
## 1 Introduction

Privacy in healthcare has become a growing concern since the massive theft of 500,000 Pentagon medical files at TriWest in December 2002. Medical records contain personal information. The exposure of this information could cause considerable damage and lends itself to misuse in multiple ways. Yet, information from hospital information systems is needed for research and development. However, there is no acceptable unified framework that can be used to provide data to researchers from existing data residing in hospital information systems.

In this paper we propose a new framework to secure data from multiple sources for research availability. The design includes security considerations based on metadata and data classification as well as categorizing the user in to security classes.

## 2 Architecture for a Federated Patient Healthcare System

Most of the projects discussed in prior literature deal with either global information sharing or the security problem. However, in this paper, we address both the problems. By integrating heterogeneous database sources of various hospitals into a centralized database system, we enable information sharing. The proposed architecture involves building a federated system through heterogeneous database integration as shown in Figure 1.



**Fig. 1.** Federated Patient Healthcare System Architecture

### 3 Experimental Results

For the purpose of testing the performance of the implementation three sets of data along with memo fields were constructed and stored in different formats such as MS Access, MS Excel and flat file. Further the three sets of data files included tables for the following entities: Administrator, Employees, Diagnosis, Patients, etc. Each Set was given a different source rating reflecting the reliability of the information from each hospital. Each piece of metadata was given a security classification. Researchers who posed queries were given security ratings.

An algorithm successfully merged the three heterogeneous databases semi-automatically. The tables (schemas objects) are identified using fuzzy logic which includes choosing the object which has maximum score (The scores are pre-assigned based on feature matching).

### 4 Conclusions

The main contribution of the paper is the framework for extracting medical data from several sources for research purposes. There is no such framework that we know of. More details including other contributions including scrub rules, merge rules and performance analyses will be presented at the conference.

**References Available on Request**