



A Framework of Query Based Solution System in Distributed Health Care Sector

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Abstract: A Distributed dataset is having its importance to provide the data from various sources. Such kind of data can be location dependent and having information for various stake holders. Such kind of datasets are generally have large attribute set as well as records. They have various challenges associated with them and Such kind of data specific work requires some application area. The presented work will be defined specific to health sector. Health sector is involved with various stakeholder including the patients, doctors, hospitals, health organizations etc. The presented work will provide the solution for various issues for distributed dataset to improve health sector. This work will be able to provide the complete solution to the query deficiencies faced by an end user especially in medical field and will improve the query results as well as effectiveness.

Keywords: Health Information System, Natural Language Processing, Distributed Dataset System

I. INTRODUCTION

In last few years of the nineteenth century and early few years of the twentieth century, medical benefits were quickly utilized by the means of the progress made in the field of analogue telephony. Individuals, through this advancement, were able to call the doctor when in need. Hospitals also utilized it by transmitting electrocardiograms over telephone lines. These were the early days of “tele”-medicine, or medical care delivered remotely

With every advantage comes the disadvantage. Limited bandwidth, low rate of data transfer over copper wires which were used, coupled with interference and various noises put a brake on the centralized expansion of these techniques. Since then, data digitization, computerization and digital networks have moved beyond telemedicine to a multiplicity of e-health applications.

A. Health Information Technology

Health information technology provides the umbrella framework to describe the comprehensive management of health information across computerized systems and its secure exchange between consumers, providers, government and quality entities, and insurers. Health information technology (HIT) is in general increasingly viewed as the most promising tool for improving the overall quality, safety and efficiency of the health delivery system (Chaudhry et al., 2006). Broad and consistent utilization of HIT will Improve health care quality, prevent medical errors ,reduce health care costs etc

Interoperability in Healthcare System

Interoperability is the ability of two or more components, applications or systems to exchange and use information. There is currently a major challenge for the healthcare industry in achieving interoperability among applications provided by different vendors each hospital department or medical clinic may use multiple applications to share clinical and administrative information among applications.

For health professionals, it improves access to health record data and health information anytime, anywhere. For patients, quality and safety of care is improved by improving data exchange, quality of data flow and access of patients' information by health professionals. For health managers, data collection is improved and statistical and economic analysis is facilitated. For health researchers, availability of medical data is increased.

B. Natural Language Processing

Human understanding of language requires background or common sense knowledge of the world. Human consciousness is tightly coupled with both language and our internal models of the outer world. Indeed, many argue that it is our consciousness that creates our own world (i.e., we create the worlds that we live in). It makes little sense to assume that the real world is static and is not affected by conscious entities living in that world. So, in trying to understand life and consciousness, it is important to understand the context of experiences in the

world. Children playing often make up new words spontaneously that for the children involved has real meaning in the context of their lives. There are two basic approaches depending on whether we want to write an effective “natural language front end” to a software system or if we are motivated to do fundamental research on minds and consciousness by building a system that acquire structure and intelligence through its interaction with its environment. Parsers are defined with finite state machines that recognize word sequences as specific words, noun phrases, verb phrases, etc. The context free programming for NLP includes the following. Difficulty in dealing with different sentences structures that has the same meaning. Handling number agreement between subjects and verbs. Determining the deep structure of input texts.

IE/IR is of the highest importance, in the art of detection, to be able to recognize out of a number of facts, which are, incidental and which are vital. This system is to extract & retrieve the data related to medical field, according to the query. In short we are going to develop a technology that will solve the medical related issues of the user using authenticated data source. This will proceed in the following manner:

The system receives a query from the user, which is analyzed & parsed by the Query Analyzer, then forwarded to Information Seeker and put into the Knowledge Database and bucketed (categorized) according to the keywords obtained. Some of these buckets contain the solutions of the query according to rules, which is presented to the user. If the information is not found in the Knowledge Database, system takes information from External Search Engine. But this information that system is going to retrieve may contain relevant as well as irrelevant data. So the main task of the system is to extract only the relevant information, categorize it and present the solution to the user. In order to supply this information, we need to write some algorithms that will help to pick up just the necessary part out of retrieved one.

C. Objectives

The objectives of the presented work are listed here under

- The main objective of work is to provide the query based solution for distributed health care system.
- The objective of work is to provide a distributed management system with integrated query operations and dataset management operations
- The objective of work is to provide an intelligent user sensitive data transportation to improve query effectiveness.
- The objective of work is to provide intelligent transformation of textual and graphical queries to SQL queries using natural language processing.
- The objective of work is to provide the intelligent recommender system to suggest the related queries to a new user and to improve the effectiveness of query system for dump as well as intelligent users.

II. LITERATURE REVIEW

In this section, the contribution of different authors in the area of Nature language processing for query generation is discussed. The section discussed the structured query generation from unstructured text query. Some of the work of earlier authors in this area is listed here under-

In Year 1997, Vesper Owei has defined a work conceptual query filtration using natural language processing. Author presented the on natural language processing for the generation of structured query. Author presented the work as an interface to process the query statement under the predicate analysis. Author defined the conceptual search using NL parsing for fill fledged NL parsing[1].

A work on the spatial database processing using the natural language processing was defined by Fangju Wang in year 2001. Author defined the work on information processing and categorization. Author presented the work to categorize the diversified users based on the imprecise concept analysis. This work include the formal query language processing to perform the geographic information processing and the accessibility. The paper also include the uncertainty analysis using probabilistic analysis using fuzzy logic[2].

In Year 2004, Alberto Trombetta has presented a XML processing work and information interchange for the XML data processing. Author presented the work on unstructured documents for the query processing and defined a trivial processing for the XML document generation. Author defined the fragment isolation along with query processing with defined equivalence rule generation. Author defined the query processing under the statistical effect so that the process derivation will be performed effectively[3].

In Year 2005, Alok Parlikar has defined a work on natural language processing on relation database. Author defined the text to query processing under the SQL query analysis and processing. This work is the improvement work on XML processing for the structural analysis so that the database support will be done. Author defined the work on question answering system where the questions are performed in text form and query mapping was proposed to derive the database results[4].

Another work on the query optimization based on natural language processing was defined by William Leigh in year 2006. Author presented the work on the technical aspect analysis for the database query processing by using the AI approach. Author defined the structural analysis based work for the possibility estimation. Author performed the semantic analysis and knowledge extraction based work to interpret the nature query processing. Author defined the potential analysis on query processing[5].

Another work on natural language processing for the SQL query generation and analysis was defined by F. Siasar in year 2008. Author defined the database analysis using the natural language based interface. Author presented the work for synonym word analysis using prolog language based on expert system. Author presented the work on sentence analysis with expression analysis to generate the SQL query[6].

A work on the question analysis system based pattern optimization was presented by Yongping Du. Author perform the natural natural language processing based information extraction work on question analysis. This analysis include the concept of named entity recognition with answer pattern identification. Author defined the ability processing along with pattern analysis. This extraction process also improved the ability to identify the relative answer. The pattern based match is performed between the question and the answer[7].

A work on structural analysis was presented for SQL query processing in year 2009. Author defined the ontology analysis based work for the query processing and performed the domain specific analysis for search system processing. This work includes the query optimization along with query processing to improve the query processing effectiveness. This work also includes the information search optimization with precision and recall improvement[8].

A fuzzy rule analysis on the query transformation was proposed by Liguog Deng in year 2009. Author defined the temporal processing system using time dependent analysis. This work also includes the relation database processing with the integration of fuzzy reasoning. This work also include the database processing model under the fuzzy rule to process on concrete queries. The work includes the transformation and optimization of query under semantic rule. The work include the NLP with noun-phrase based model for the dataset processing[9].

A work on negation based query processing and the structural analysis based on natural language processing was defined by Rizwan Iqbal in year 2012. Author defined the query engine to understand the query processing complexities and defined the evaluation mechanism under the transformation rules to improve the algorithmic concept. In this paper Author also defined the query engine processing under the natural language interface[10].

III. PROPOSED METHODOLOGY

In this present work an intelligent distributed system will be presented that will be able to provide the query solution for different kind of users. The work will be defined specific for health sector. This health sector having different kind of associated stakeholders such as patients, doctors, health organizations etc. These stakeholders includes the new dump users as well as intelligent users. Medical processing is one of the criticality in terms of lack of information about technical terms. The presented work will provide the solution to all these problems by defining an intelligent query architecture. This query model will based on intelligent prediction. The work model is here given in the form of stages in figure 1:

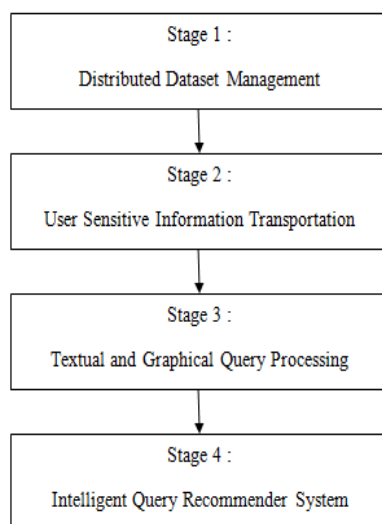


Figure 1: Proposed Work Model

Stage 1 : Distributed Dataset Management

The first work of this research is to manage the dataset from various distributed sources. This dataset will contains the information about the patients, doctors, hospitals and medicine. The dataset will be able provide the generic information mapping. The dataset will be able to handle the queries of different stakeholder. It will be able to provide the information about any doctor related to patient history in the form of complete record file. The dataset will be capable for

- Provide hospital data Mapping
- Provide Stakeholder specific information

Stage 2: User Sensitive Information Transportation

The work will provide the cached information transportation for specific user types such as hospitals, health organization can maintain the information set at their own end. This shared data will be identified based on the intelligent query requirements.

Stage 3: Textual and Graphical Query Processing

In this stage, the unstructured query processing will be done. This query processing will be defined in two ways. In first way, the common queries will be provided in the form of graphical interface. To handle the queries for dump users, the natural language processing based intelligent textual query processing will be provided. An intelligent query transformation system will be defined to handle these textual queries.

Stage 4: Intelligent Query Recommender System

The recommender system will be defined to generate the auto queries by understanding the user requirement. The system will store the user queries and as a new user will enter to the system, it will identify the user requirement and based on it queries will be generated.

IV. SIGNIFICANCE AND DISCUSSION

The significance of the presented work is given below-

- In this work, the graphical and textual query system will help an end user to pass real time queries in an easy way so that more utilization of health resources and information can be done.
- The user sensitive transportation of information will improve the efficiency of system where large query processing is required.
- The automatic query recommender will improve the user effectiveness who is not able to generate the queries.
- The presented work will improve the query system robustness and the accuracy.

The centralized system will reduce the information redundancy and information management in health sector. The system will be able to collect the information about a patient or doctor at one instance by analyzing the records worldwide and will help in improving the effectiveness and security.

REFERENCES

- [1] Vesper Owei, "Natural Language Query Filtration in the Conceptual Query Language", 1060-3425/197, 1997 IEEE
- [2] Wang Fangju, "Parsing 'Grammatically Incomplete' Natural Language Queries to Spatial Databases", 0-7803-7078-3/01, 2001 IEEE.
- [3] Alberto Trombetta, "Equivalences and optimizations in an expressive XSLT fragment", Proceedings of the International Database Engineering and Applications Symposium (IDEAS'04) 1098-8068/04, 2004 IEEE
- [4] Parlikar Alok, "NQML: NATURAL QUERY MARKUP LANGUAGE", NLP - KE '05, 0-7803-9361-9/05, 2005 IEEE
- [5] WILLIAM LEIGH, "Interpretation of Natural Language Database Queries Using Optimization Methods", IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS, 0018-9472/86/0100-0040, D1986 IEEE
- [6] F.Siasar djahantighi, "Using Natural Language Processing in Order to Create SQL Queries", Proceedings of the International Conference on Computer and Communication Engineering 2008 978-1-4244-1692-9/08, 2008 IEEE
- [7] Yongping Du, "Pattern Optimization and the Application in Question Answering", Eighth International Conference on Intelligent Systems Design and Applications 978-0-7695-3382-7/08, 2008 IEEE
- [8] Senthilkumar Radha, "Nested XPath Query Optimization for XML Structured Document Database", ADCOM 2008, 978-1-4244-2963-9/08, 2008 IEEE
- [9] Liguang DENG, "Query Processing for Fuzzy Temporal Queries Transformation", 978-1-4244-4507-3/09, 2009 IEEE
- [10] Iqbal Rizwan, "Negation Query Handling Engine for Natural Language Interfaces to Ontologies", 978-1-4673-1090-1/12, 2012 IEEE
- [11] Cuiying Yan, "Processing Natural Language Based Query and Context Sensitive Spelling Suggestion in Information Retrieval", U2013 Proceedings of International Conference on Modelling, Identification & Control (ICMIC)
- [12] XU Jian-liang, "A Query Optimization Strategy Based on Domain Ontology", 2009 International Joint Conference on Artificial Intelligence 978-0-7695-3615-6/09, 2009 IEEE