

PluralSoft has built a team of professionals with a cross section of relevant experiences who are qualified to deliver unparalleled end-to-end solutions for our customers.

Extraction of intelligence from unstructured clinical documentation for a large IDN

Business Problem

A large IDN serving over 3 million patients wanted a mechanism to extract clinical intelligence from terabytes of clinical documentation available as text. Specifically, the IDN was interested in looking for clinical protocol patterns for a set of medical conditions and diagnoses. One of the patterns of interest for example were to find out how patients diagnosed with Type I or Type II Diabetes had their Hemoglobin A1C levels checked regularly. Further, for patients under Diabetes care, the IDN wanted to find out the various medications ordered or being administered, lab tests ordered or reported and any procedures that may have been conducted.

The IDN's objective was to analyze variation in its internal quality-of-care ratings and wanted to enhance its standard-of-care practices. The IDN was looking to gain funding via a research grant to conceptualize, design and implement a clinically aware information retrieval engine.

The IDN had terabytes of textual clinical documentation stored in an ORACLE database but was not gaining the required results either in functionality required or in performance provided by ORACLE. The IDN was already using Teradata, an MPP architecture based Data warehouse appliance which was capable of analyzing terabytes of data in a highly performant manner but lacked the database functionality for intelligent information retrieval out of unstructured content.

The IDN wanted the following feature-functionality in the Information retrieval solution:

- Provide a Clinical Vocabulary Server capable of addressing various clinical concepts to build a Clinical Taxonomy and Ontology.
- Provide a clinical vocabulary driven search engine
- Extract and report quality metrics of relevance

PluralSoft delivery methods include:

Onsite

Offsite

Offshore

Combination of All

PluralSoft

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Engagement

PluralSoft's team of domain and technology experts performed the following tasks:

- Analyzed the current and future business and technology requirements of the IDN to help gain a better understanding of the prototype demonstration and its subsequent representation to aid research grant funding application
- Designed and developed a Clinical Research Engine with following functionality:

Patient-Centric Clinical Data Repository: Patient-centric clinical data model with Patient Demographics, Past Medical-Family-Social History including Allergies, Medications & Immunizations; Clinical Encounter Data, Drug Database, Medication-Lab-Diagnostic Test order catalog, and reference data as governed by HL7, ICD-9-CM & CPT coding, and more.

Controlled Medical Vocabulary: A linguistic and semantic framework representing a consistent framework to support exchange of information between human and automation systems. This framework leverages NIH's Meta-Thesaurus and allows integrated full text search on structured (RDBMS schema) and unstructured data (Text, PDF, HTML, XML, Text, Microsoft Word, Microsoft Excel or Public Domain content).

Taxonomy/Ontology Builder: A customizable framework to establish an information model (a set of data models and knowledge maps), to relate concepts to form a taxonomy of concepts and then an ontology that could be used to power text mining.

Information Retrieval Engine: A text search engine framework powered by an indexing strategy, a text search engine powered by the Controlled Medical Vocabulary and a metrics analyzer facility to support appropriate logging, visualizing and reporting of required metrics.

Privacy & Confidentiality: Framework extends security and confidentiality requirements as mandated by HIPAA regulations.

Document Management Framework: That helps take in electronic (faxes, email or image based textual content) and other forms of paper-based content that can be digitized and converting into a string-based textual representation for required manipulation and mining.

Result

The architected solution addressed all the business and technical requirements of the research grant application. In addition, the solution helped demonstrate how the IDN could use a phased approach to building a robust custom solution in partnership with Teradata and PluralSoft..

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