The Future of Clinical Data Capture

Healthcare Market Overview

INTRODUCTION

For healthcare organizations that require instantaneous availability of accurate information, mTuitive extends the value of legacy investments with capture and delivery of structured data and knowledge distribution. mTuitive provides the ability to rapidly add functionality and build applications without changing the underlying architecture of legacy systems.

Currently $900 billion is spent annually to process forms in the United States; this includes the processes of data entry, routing, approving, error correcting, and analyzing. American businesses alone spend upward of $15 billion transferring data from paper-based forms to their computer systems, according to analyst estimates.[1]

mTuitive's solutions capture, analyze, correct and approve data and ensure accuracy. Once approved, data is routed to existing databases and systems for additional analysis and reporting. The goal is to eliminate the paper trail by capturing all of this data electronically, without adding any time or difficultly to the physicians' current workflow.

PRODUCT SET FEATURES AND BENEFITS

The mTuitive xPert™ System enables subject matter experts to rapidly develop solutions for decision support and structured data capture without requiring programmers. The product set uniquely combines decision support and electronic capture of discrete data elements as a coherent process for decision makers. The process yields more informed decisions, eliminates wasted resources, and makes information instantly sharable.

SYNOPTIC REPORTING

Synoptic reporting ensures quick, complete, and concise documentation of clinical findings. In Pathology, we have found synoptic reporting decreases questions from clinicians and cancer registrars. It allows for accurate collection and comparison of cancer data which directly impacts cancer screening and treatment protocols. Any report that can consistently offer an interpreting clinician the same data information in the same format using medically consistent terminology has intangible benefits. These benefits can be seen in areas outside of pathology as well.

STRUCTURED DATA CAPTURE

Structured data capture is an extension of synoptic reporting. Data contained in synoptic reports is captured and stored as a set of discrete data elements. This allows for rapid and powerful queries, data aggregation and analysis through predefined and ad hoc reports. This approach provides high quality, fast analysis, compared to the rudimentary capabilities of text

[1] CNet News.com, http://news.com.com/2100-1012-5089536.html?part=dht&tag=ntop

search on narrative text. Additionally, this process is all done electronically which reduces errors and redundancy inherent in paper-based data collection.

KNOWLEDGE DISTRUBUTION

It is impossible to keep up-to-date with all of the new research and information available to healthcare specialists. mTuitive applications assist critical decision makers by providing them with relevant knowledge and recommendations at the point of decision. Relevant knowledge is established by domain experts and can be delivered from any source (i.e. web sites, reference texts, internal or external databases). mTuitive provides a standard set of publicly available knowledge sources but these can be modified per user or institution.

COMPLIANCE WITH BEST PRACTICES

Keeping physicians up to date on the latest guidelines is also a challenge. In a large practice, mTuitive can help to standardize the way physicians working together practice medicine.

The process also enables compliance with existing guidelines, best practices, or protocols. Protocols may be established by governing bodies, overseeing organizations, or specific institutions for virtually any task in healthcare. The system can enforce compliance, recommend solutions, provide for second opinions and provide an audit trail.

BUSINESS MODEL

The company identifies potential Domain (subject matter) Experts in areas where knowledge distribution and compliance with established protocols or best practices is important. Domain Experts are the authorities in their respective fields. Typically they are located in academic centers, think tanks or government agencies. Their knowledge, expertise and guidance is generally available in the public domain or can be licensed. Generally the knowledge is either already structured in the form of a protocol, guideline, procedure or checklist or can be readily converted into a formal decision tree structure. Domain Experts see their expertise delivered to the end users at the point of job performance, where it is most needed.

mTuitive also aligns itself with Knowledge Engineers who typically are business or scientific consultants. They are challenged with delivering demonstrable results to their clients to generate incremental consulting fees. Knowledge Engineers are mTuitive product development partners who are teamed with Domain Experts to create specific industry solutions using the mTuitive *Authoring Environment*.

mTuitive has Domain Experts (in the field of anatomic pathology) and Knowledge Engineers working in-house at the company as well.

CURRENT HEALTHCARE SOLUTIONS

MICROSCOPIC TUMORS - ANATOMIC PATHOLOGY

The original end user product for pathology was developed as a proof of concept to confirm the value of a rapid application development tool based on existing best practices. The product focused on clinician (pathologist) ease and speed of use to enable a synoptic reporting application that would comply with reporting requirements of cancer accreditation programs and capture discrete data elements and pass them along to disparate data systems. The ultimate goal is to facilitate data reporting requirements of cancer registries, research projects and analytical tools. mTuitive's products "electronified" decision checklists licensed from the College of American Pathologists and surrounds the decision process with relevant knowledge and provides the ability to eliminate transcription and data abstraction.

MACROSCOPIC TUMORS - ANATOMIC PATHOLOGY

The College of American Pathologists protocols developed into the mTuitive anatomic pathology software included macroscopic (gross) checklists as well. Templates are complete for tumor specimens and being used to guide development of a complete macroscopic examination product which will include non-tumors as well.

CLINICAL STAGING

When a specimen is diagnosed as malignant, the pathologist determines the pathologic stage of the tumor with all the information available at that point in time, Information to calculate the pathologic stage (T, N, and M codes), and often the pathologic stage itself, is paired with the structured data elements that make up the pathology synoptic report. A cancer patient's managing physician collects this data from the pathologists as well as data from other members of the cancer care team to calculate what is known as the clinical stage. The clinical stage is then used by the cancer care team to base treatment protocols, prognosis and progress of the patient. The mTuitive xPert™ for Clinical Staging application integrates with the mTuitive xPert™ for Pathology and helps the managing physician to capture the remainder of necessary data elements and calculate the clinical stage.

PRODUCT DEVELOPMENT PLAN

The next release of the mTuitive xPert™ System and Authoring Environment™ will be made available for general release in April 2005. The products are in the final stages of beta testing. At this time, mTuitive will "freeze" development of our core technologies and focus on development of new mTuitive healthcare solutions. Our product service and development teams will be partnering with Knowledge Engineers and Subject Matter Experts to rapidly expand the mTuitive suite of product applications. These team members will often play the role of Knowledge Engineer themselves.

A number of these solutions are listed in the "Application Pricing" worksheet in the mTuitive financial model. The next solutions we plan to build will focus on other areas of the Anatomic Pathology Lab, collaborative staging of malignant tumors, and subsequent reporting of this data to tumor registries. The natural extension of synoptic reporting and structured data capture of pathology cases is to extend the solution into other clinical specialties involved in the cancer diagnosis and treatment process. The ultimate objective is to eliminate the redundancy, error potential, cost and time involved in cancer registry data mining and abstracting. The synoptic data capture process is being extended to the other cancer treatment team members to facilitate treatment planning, case management and staging by the managing physician and cancer registrar.

Based on the experience with pathology synoptic reporting for tumors, one to four new "xPert" end user applications can be released per month, depending on the sophistication and knowledge resources required.

APPROACH TO APPLICATIONS

The mTuitive approach to application development is straightforward in theory, challenging to design but elegant in simplicity of execution. The process:

1. Start with an existing source of knowledge, expertise or standard of practice, many of which are available in the public domain or from recognized experts in any field.
2. If not currently available, organize the source into decision tree structure,
3. Train and work with knowledge engineers (non-technical consultants or analysts) who will visually apply logic rules to guide the decision making process, surround that process with relevant knowledge, force compliance with the established best practice and capture structured data elements.

This simplifies the process of transforming subjective, essay answers into objective multiple-choice, fill-in-the blank responses. The process results in the capture of structured data. The data is captured once but can be transferred to an unlimited number of disparate systems or databases. This could include but is not be limited to an electronic health record, existing application, an external system (like government or billing) or a research database. Integration is simplified because the data capture process was developed with integration intended. The quality of data entered is radically improved while reducing the costly and error prone practices of transcription and abstraction. The hospital embraces the efficiency improvement because it supplies the transcription service.