

Advancing multi-site natural language processing: Web-launched NLP systems for secure local processing of clinical text

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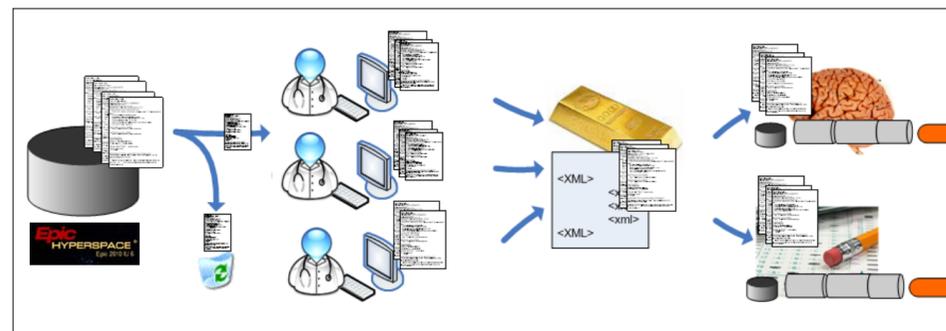


Opportunity

- Clinical text such as progress notes contains vast amounts of information for secondary use:
 - Research (including multi-site)
 - Quality assurance
 - Health care administration
- Natural language processing (NLP) can be used to:
 - Find patients with un-coded chronic conditions
 - Get colonoscopy quality metrics
 - Track depression scale scores
- >110,000,000 million clinical documents in Epic since 2000

Challenge

- Using NLP software requires special expertise
- Developing NLP systems requires special expertise



The NLP System Development Process

- HIPAA deters centralized processing outside local firewalls
- NLP solutions must:
 - Be used locally
 - Minimize need for local expertise

Solution

- NLP experts develop a task-specific NLP system
 - Ex: Carotid artery stenosis extractor
- NLP experts package the system as a self-installing Java application
 - As a self-installing file (JAR)
 - Over the Web (JAWS)
- The local user:
 - Manages local data/text
 - Reviews results for errors
 - Requests NLP refinements
- NLP experts implement requested refinements

CAROTID DOPPLER ULTRASOUND IMPRESSION:

- Right internal carotid artery at the mid-portion demonstrates **50-69% stenosis** range velocities.
- Mild, bilateral plaque left greater than right.

Signed by:
Jane A Doe, MD

ID	Date	Stenosis
100001	8/8/2013	0-49%
100002	10/21/2013	50-69%
...

eMERGE Application v0.3

File Settings Run Help

Process Text Clear Results Clear Documents

Application Loaded
Loaded Documents: 14
Total Documents: 14
Processing took 44ms.

Category	SourceName	CapturedData
stenosis_absent	CAAD_Test_Report_1001.bt	Normal carotid Doppler ultrasound
stenosis_percent	CAAD_Test_Report_1002.bt	greater than 70% stenosis within the i
stenosis_percent	CAAD_Test_Report_1003.bt	greater than 70% stenosis
stenosis_percent	CAAD_Test_Report_1003.bt	less than 49% diameter reduction
stenosis_absent	CAAD_Test_Report_1003.bt	no hemodynamically significant lesion
stenosis_absent	CAAD_Test_Report_1004.bt	No significant stenoses of the internal
stenosis_absent	CAAD_Test_Report_1004.bt	No significant stenoses
stenosis_absent	CAAD_Test_Report_1004.bt	No significant stenoses
stenosis_percent	CAAD_Test_Report_1005.bt	50-69% stenosis
stenosis_absent	CAAD_Test_Report_1007.bt	No significant carotid stenosis
stenosis_absent	CAAD_Test_Report_1008.bt	No significant stenosis
stenosis_absent	CAAD_Test_Report_1008.bt	No significant stenosis
stenosis_percent	CAAD_Test_Report_1009.bt	50-69% diameter reduction
stenosis_absent	CAAD_Test_Report_1010.bt	No significant plaque or stenosis
stenosis_absent	CAAD_Test_Report_1011.bt	No hemodynamically significant steno
stenosis_absent	CAAD_Test_Report_1012.bt	Normal carotid duplex ultrasound
stenosis_absent	CAAD_Test_Report_1013.bt	Unremarkable carotid ultrasound
stenosis_percent	CAAD_Test_Report_1014.bt	50-69% stenosis
stenosis_absent	CAAD_Test_Report_1014.bt	No hemodynamically significant steno