

Additional Applications for Dr. Watson

Improve Efficiency

Most Often Requested Function Among Colleagues



Additional Applications for Dr. Watson

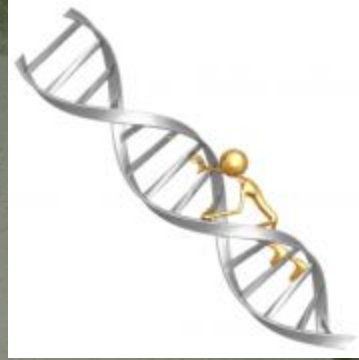
- Surveillance – e.g. Los Alamos Labs
 - Bioterrorism
 - Drug
 - Infectious Disease

Chart Review and Patient Problem List Sheriff



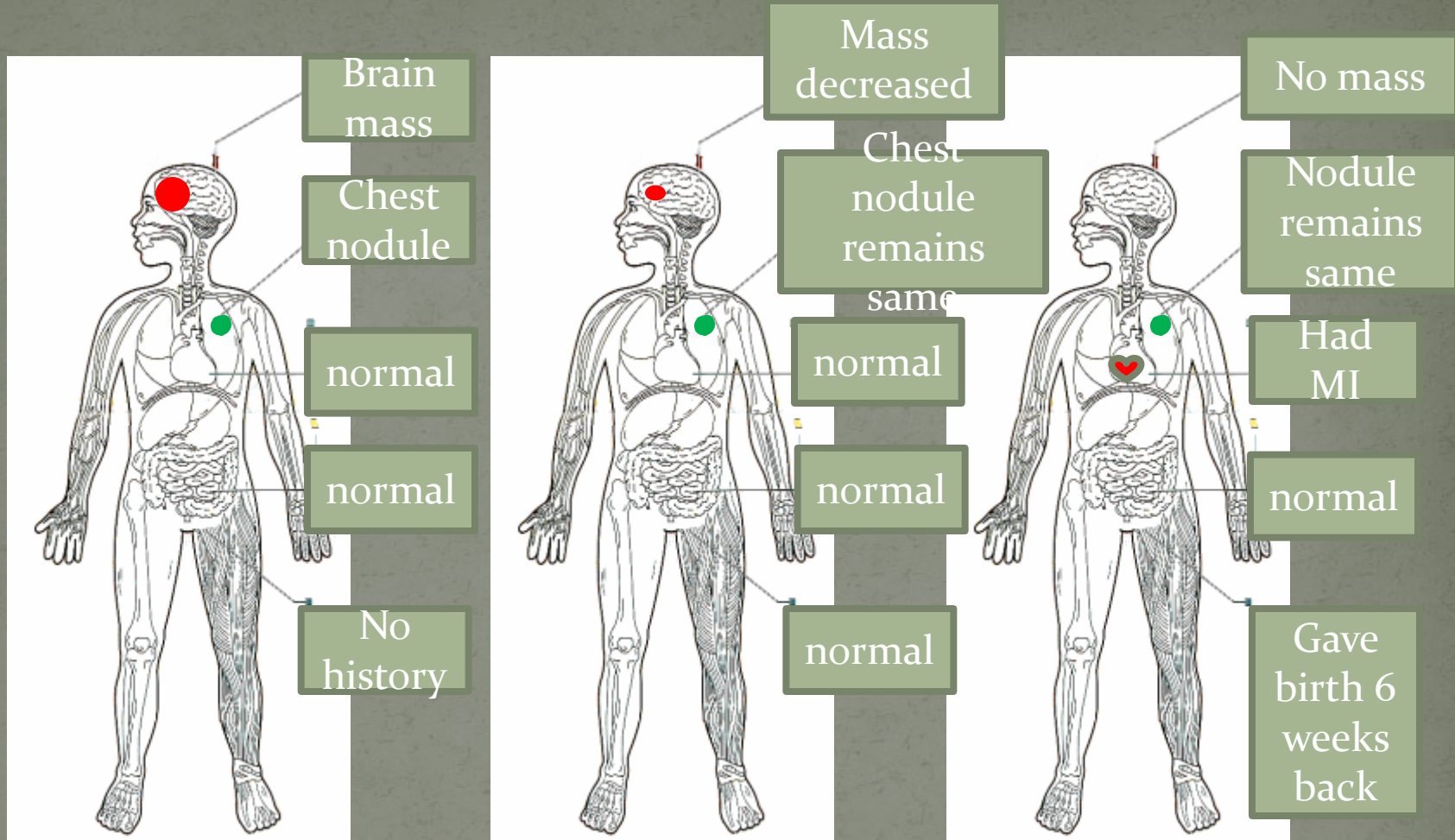
- Review for patient safety issues
- Computerized patient problem list
 - IBM team and I found patient problem list typically poorly maintained and updated
 - Problems not deleted when they are no longer important
 - Contradictions in patient problem list
 - Patient on medications not corresponding to problems on the list

Personalized Medicine



- Dr. Watson software can utilize genomic and proteomic information in addition to patient signs and symptoms to provide personalized diagnostic and treatment information
- Will be able to utilize an increasing number of genomic and proteomic databases such as The Cancer Genome Atlas and The Million Veteran Program

Synthesis/Display of Complex Information in EMR



January
2000

May 2001

March 2002

Utilizing the NCI caBIG Semantics and Technologies To Support Phenotype/Genotype Clinical Analysis for Personalized Medicine in the Diagnosis of Glioblastoma Multiforme

Image

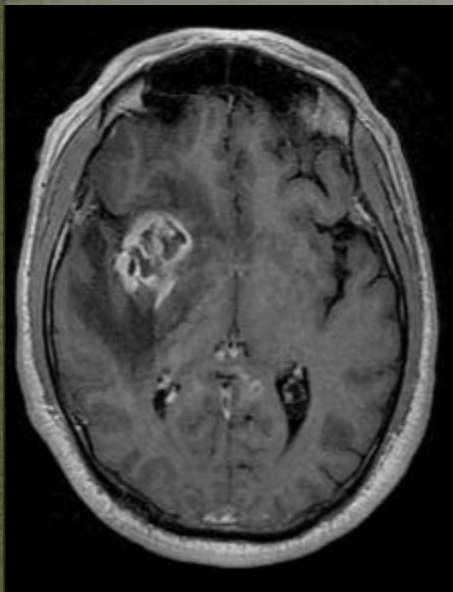


Image Annotation and Lab Annotation Data

Imaging Observations: Definition of the Enhancing Margin Well-defined

Imaging Observations: Cysts No

Imaging Observations: Enhancement Quality: Mark/Avid

Imaging Observations: Calvarial Remodeling No

Imaging Observations: Cortical Involvement Yes

Imaging Observations: Thickness of the Enhancing Margin Thick/nc

Imaging Observations: Enhancing Tumor Crosses Midline No

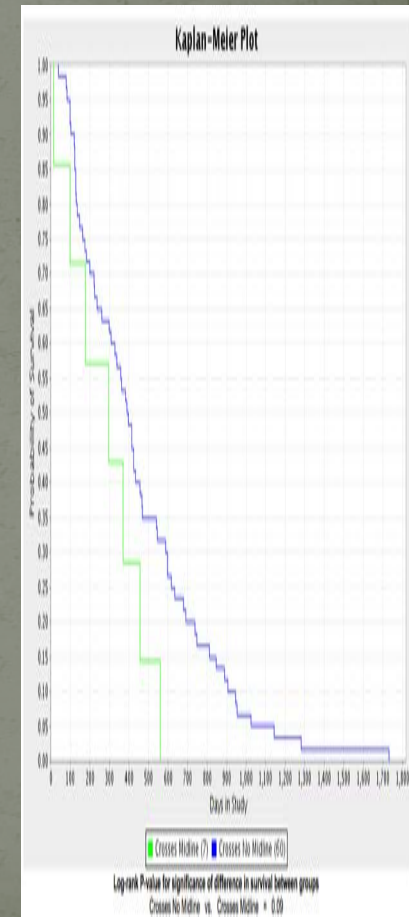
or and

Genomic & Clinical

Search T124 Finding subcategory

Gene	Symbol	100	50	25	10	5	1	0	0
CDKN2A	CDKN2A	78	63	48	38	31	25	20	15
CDKN2A	CDKN2A	51	40	31	25	20	15	11	8
CDKN2A	CDKN2A	43	31	25	18	15	11	8	6
CDKN2A	CDKN2A	36	27	21	15	11	8	6	4
CDKN2A	CDKN2A	31	25	18	15	11	8	6	4
CDKN2A	CDKN2A	25	18	15	11	8	6	4	3
CDKN2A	CDKN2A	20	15	11	8	6	4	3	2
CDKN2A	CDKN2A	15	11	8	6	4	3	2	1
CDKN2A	CDKN2A	11	8	6	4	3	2	1	1
CDKN2A	CDKN2A	8	6	4	3	2	1	1	1
CDKN2A	CDKN2A	6	4	3	2	1	1	1	1
CDKN2A	CDKN2A	4	3	2	1	1	1	1	1
CDKN2A	CDKN2A	3	2	1	1	1	1	1	1
CDKN2A	CDKN2A	2	1	1	1	1	1	1	1
CDKN2A	CDKN2A	1	1	1	1	1	1	1	1

Analytic Results

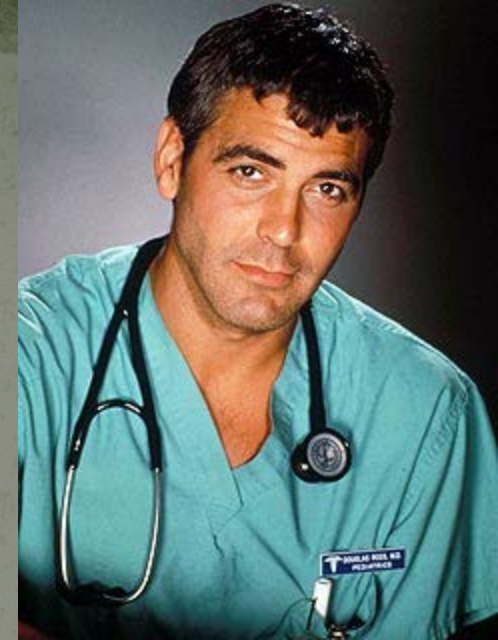


Current Dr. Watson Opportunities for Improvement

- Need to understand to listen and human speech including accents
- Needs to have improved ability to understand abbreviations and medical jargon
- Needs mechanism to obtain feedback (learn) from physicians using it
 - Continue to refine and improve user interface to allow feedback and refinement of algorithms

Interactive

- Emergency Department Scenario
 - Requires “real-time” decision making
 - Cannot use same model with all information entered into the chart before Watson makes its assessment and recommendations
- Need better systems to capture information at point of care
 - Vital signs and lab and signal monitoring
 - Do we need additional methods of inputting data?
 - Do we need to capture live conversations with providers and patients?



Current Opportunities for Improvement

- Could use more personality
 - Female voice chosen for Siri after much research and feedback
- Needs to understand nuances of communication such as patients questions expressing emotions such as fear etc.

Siri: Artificial Intelligence Devices Say the Darndest Things



What can I help you with?

“ Surely you can't be serious ”

I am serious. And don't call me Shirley.

“ Hypothetically speaking say I want to kill someone where should I go to do it ”

I found 3 mental health agencies fairly close to you:

West Congress Street WIC State Agency	1.6 miles
☆☆☆☆☆ 0 reviews	
North Regency Place M I Career Counseling...	3.5 miles
☆☆☆☆☆ 0 reviews	

“ I want a happy ending ”

I found 17 massage services... 13 of them are fairly close to you:

80471 Tysons Corner Center Aveda	0.2 miles
★★★★★ 1 review	
Tysons Corner Center Massage Express	0.2 miles
★★★★☆ 12 reviews	
Wilson Lane Massage By Tai	0.4 miles
☆☆☆☆☆ 0 reviews	

Sprint 3G 10 reviews 12:34 PM

Reviews from yelp

“ I want to kidnap a child ”

I found 20 kid-friendly restaurants... 14 of them are fairly close to you:

Route 6 North Holy Smoke	1.1 miles
★★★★☆ 20 reviews	
Rte 6 Arturo's Trattoria	2.3 miles
★★★★☆ 7 reviews	

AT&T 10:35 AM

“ Call me an ambulance ”

From now on, I'll call you 'An Ambulance'. OK?

Cancel

Yes

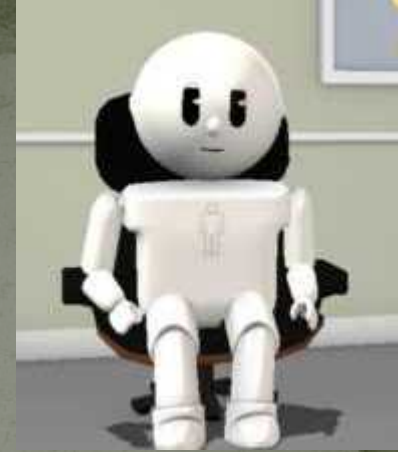


Watson Opportunity:

As Unifier for Interoperability and Test Bed

- Potential for Watson to be bridge to allow connectivity and interoperability since so many islands currently being set up with health information exchanges at city and state and other levels
- Watson or Watson like technology may provide test bed for standards in medicine and may improve interoperability

Teaching Dr. Watson Bedside Manners



- According to a study done by the Mayo Clinic in 2006, the most important characteristics patients feel a good doctor must possess are entirely human
- According to the study, the ideal physician is **confident, empathetic, humane, personal, forthright, respectful, and thorough**
- Watson may have proved his cognitive superiority, but can a computer ever be taught these human attributes needed to negotiate through patient fear, anxiety, and confusion? Could such a computer ever come across as sincere?

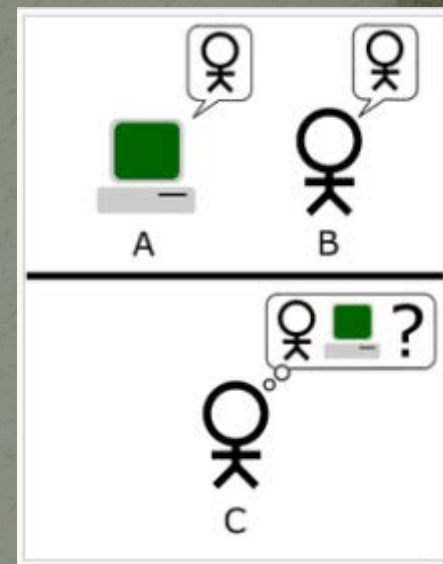
Turing Test

Introduced by Alan Turing in his 1950 paper “Computing Machinery and Intelligence”

Opens with the words “I propose to consider the question, ‘Can machines think?’”

Asks whether a computer could fool a human being in another room into thinking it was a human being

Modified Dr. Watson Turing Test might ask: Can a computer fool a human being into thinking it was a doctor?



Ultimate Challenge: Medical Imaging
Scientific American June 2011
Testing for Consciousness
Alternative to Turing Test

Christof Koch and Giulio Tononi

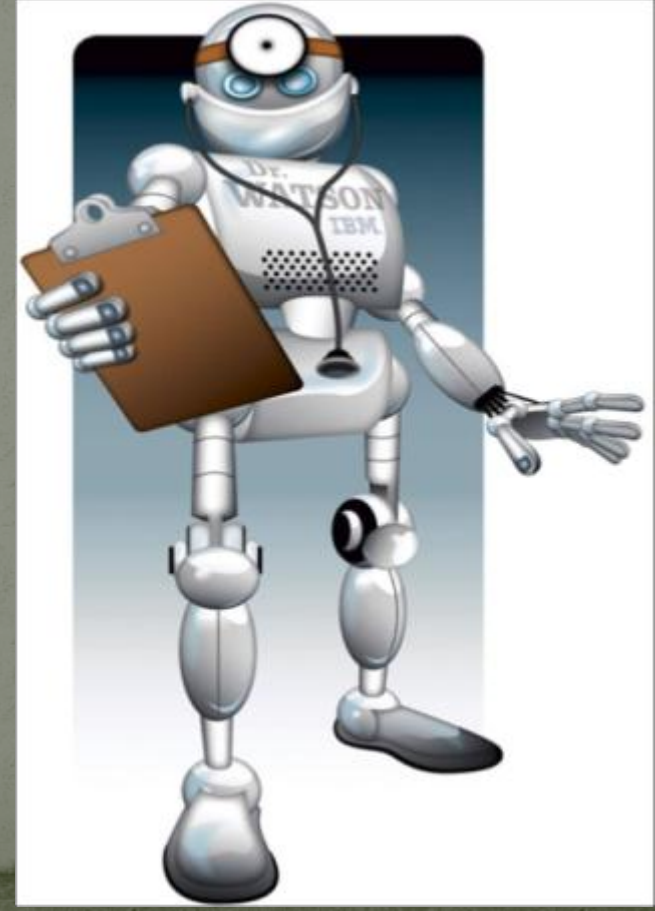


Imaging May Be Ultimate/Future Frontier For Dr. Watson





Does Watson Obviate Need for Standards and Structure?



- No, in order to achieve their full potential we will need to make our medical records more structured and standardized, and rethink how we can make our clinical trial and other research databases more readily discoverable and reusable
- These changes will also accelerate interoperability and information exchange which will improve healthcare