

Introduction to “This is Watson”

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What is Watson?

- Created by IBM Research
- On Jan. 14, 2011, Watson defeated the two best Jeopardy! champions

Unstructured Information

- Much of human communication is unstructured
- Often necessary to use background information and inference
- Unstructured Information Management Architecture (UIMA)
 - Software architecture and framework
 - Provides common platform for integrating diverse collections of text, speech and image analytics

Jeopardy!

- Watson would have to act like a Jeopardy! contestant
 - Self-contained
 - Average of 3 seconds to answer question
- On average, winning players attempt 40 – 50% of questions and get 85 – 95% right
 - Performance target: buzz in for 70% and get 85% right

DeepQA

- Architecture for building QA systems
- Many candidate answers are proposed
 - Uses hundreds of algorithms to analyze evidence
 - All features must be combined into a single score
- Final result is a list of ranked candidate answers

Understanding Questions

- Lexical answer type
 - Category can be useful in identifying the type
- English Slot Grammar (ESG) produces a grammatical parse of a sentence
 - Identifies parts of speech, syntactic roles, and modification relations
- Predicate-argument structure (PAS) generator produces a more abstract representation of the parse

Collecting and Scoring Evidence

- Confidence score
 - Number that indicates the degree to which evidence supports or refutes answer
- Multiple evidence scorers can work in parallel
- Grammar-based techniques
 - Look for how words and structure of language may predict similarities in meaning

Implicit Relationships

- Used to interpret language and answer questions
- Can be useful in relating symptoms to diseases or finding chemicals to treat the disease
- Jeopardy! ex: COMMON BONDS: feet, eyebrows, and McDonald's. (Answer: "arches")

Artificial Jeopardy! Contestant

- DeepQA provides a ranked list of candidate answers
 - Does not play Jeopardy!
- Embedded into a program to create Watson
- Two components
 - One to handle game strategy
 - Other to interface with game

Results

- Over 85% precision at 70% attempted
- Played against former Jeopardy! Tournament of Champions players
 - Played 55 games and won 71%

Future Directions

- Interactive decision support capability
 - Balance between search system and formal knowledge-based system
- Healthcare
 - Many problem-solving situations such as diagnosing a medical problem and treating it
 - Overwhelming amounts of unstructured data
- Analyzing problem scenarios
- Allow caregivers to explore justifications for answers

My Project

- Journal contains 17 papers total
- Introduction gives brief overview of each paper
- I will read and summarize each paper
 - Techniques, how they are used by the system
 - Evaluation setup and results