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