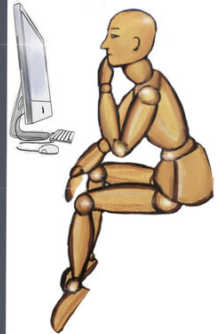




QANTA Competition

Natural Language Processing: Jordan
Boyd-Graber
University of Maryland
QUIZ BOWL

Material adapted from Chen Zhao, Pedro Rodriguez, and Shi Feng



Turing Test: Definition of AI (Image from Wall Street International)



IBM Watson: QA Solved?

Natural Language Processing:
Assignment 5: Qu' bopbe' paqvam

Jordan Boyd-Graber

Out: 16. September 2014

Due: 10. October 2014

Not just an academic question for me ...

Is Jeopardy! the right venue?

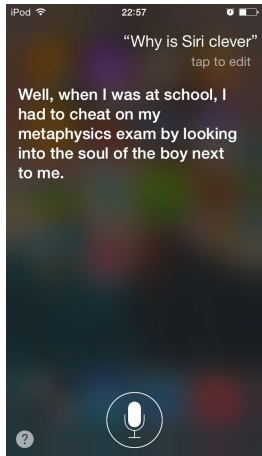
ghoBE'!





Quiz Bowl as Question Answering “Gold Standard”

What is a good question?



- Reason across sentences
- Written by experts
- Compare/compete with humans
- Test uncertainty
- Advance science

Passage Segment

...The European Parliament and the Council of the European Union have powers of amendment and veto during the legislative process...

Question

Which governing bodies have veto power?

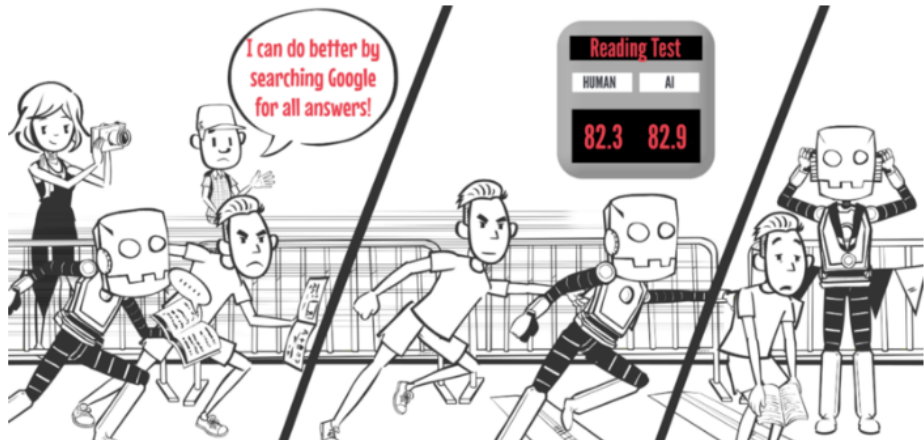
Dataset	Large scale	Freeform Answer	Well formed	Independent of Evidence	Varied Evidence
TriviaQA	✓	✓	✓	✓	✓
SQuAD (Rajpurkar et al., 2016)	✓	✓	✓	✗	✗
MS Marco (Nguyen et al., 2016)	✓	✓	✗	✓	✓
NewsQA (Trischler et al., 2016)	✓	✓	✓	✗*	✗
WikiQA (Yang et al., 2016)	✗	✗	✗	✓	✗
TREC (Voorhees and Tice, 2000)	✗	✓	✓	✓	✓

Table 1: Comparison of TriviaQA with existing QA datasets. Our dataset is unique in that it is naturally occurring, well-formed questions collected independent of the evidences. *NewsQA uses evidence articles indirectly by using only article summaries.

TriviaQA: Joshi et al., 2017 (Experts)

AI Outperforms Humans in Question Answering

Review of three winning SQuAD systems



Article: Endangered Species Act

Paragraph: “... Other legislation followed, including the Migratory Bird Conservation Act of 1929, a *1937 treaty* prohibiting the hunting of right and gray whales, and the *Bald Eagle Protection Act of 1940*. These *later laws* had a low cost to society—the species were relatively rare—and little *opposition* was raised.”

Question 1: “Which laws faced significant *opposition*?”

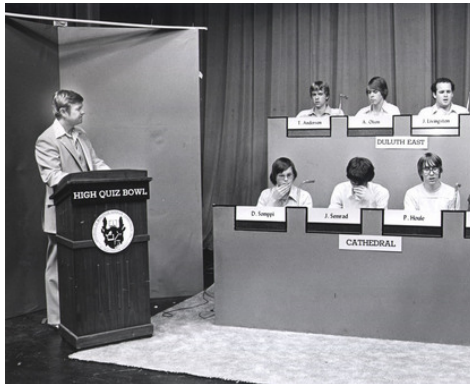
Plausible Answer: *later laws*

Question 2: “What was the name of the *1937 treaty*?”

Plausible Answer: *Bald Eagle Protection Act*

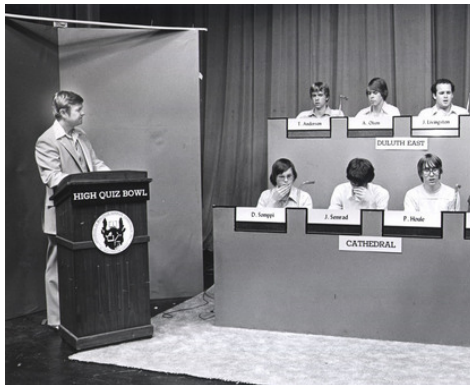
Humans want the same thing ...

- Game called “quiz bowl”
- Two teams play each other
 - Moderator reads a question
 - When a team knows the answer, they signal (“buzz” in)
 - If right, they get points; otherwise, rest of the question is read to the other team
- Hundreds of teams in the US alone



Humans want the same thing ...

- Game called “quiz bowl”
- Two teams play each other
 - Moderator reads a question
 - When a team knows the answer, they signal (“buzz” in)
 - If right, they get points; otherwise, rest of the question is read to the other team
- Hundreds of teams in the US alone
- Example ...



Sample Question

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir *Passages From the Life of a Philosopher* improved on

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir *Passages From the Life of a Philosopher* improved on Jacquard's invention of punched cards by proposing a device which incorporated an

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir *Passages From the Life of a Philosopher* improved on Jacquard's invention of punched cards by proposing a device which incorporated an input, storage system, processor, control unit, and output device. FTP, name this inventor of the

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir *Passages From the Life of a Philosopher* improved on Jacquard's invention of punched cards by proposing a device which incorporated an input, storage system, processor, control unit, and output device. FTP, name this inventor of the Analytic Engine and the Difference Engine.

Sample Question

This man wrote a ballet in which 60 white nymphs perform the Rainbow Dance, so named because different colored lights are focused on them—that ballet *Alethes and Iris* was never produced because the theater manager was convinced it would cause a fire. He invented the first cow catcher and campaigned for passage of an act against "street nuisances" like outdoor musicians, who he claimed wasted a quarter of his life. He responded to William Whewell's statement that no scientific explanation of the universe was possible in his "Ninth Bridgewater Treatise," which attacked the eight previous treatises funded by the Earl of Bridgewater. He also wrote about the influence of aristocrats on science in his *Reflections on the Decline of Science in England*. This author of the memoir *Passages From the Life of a Philosopher* improved on Jacquard's invention of punched cards by proposing a device which incorporated an input, storage system, processor, control unit, and output device. FTP, name this inventor of the Analytic Engine and the Difference Engine.

Charles Babbage

Checklist

- Reason across sentences
- Written by experts
- Compare/compete with humans
- Test uncertainty
- Advance science

Checklist

- Reason across sentences: question and source
- Written by experts
- Compare/compete with humans
- Test uncertainty
- Advance science

Checklist

- Reason across sentences: question and source
- Written by experts: trivia community
- Compare/compete with humans
- Test uncertainty
- Advance science

Checklist

- Reason across sentences: question and source
- Written by experts: trivia community
- Compare/compete with humans: by design
- Test uncertainty
- Advance science

Checklist

- Reason across sentences: question and source
- Written by experts: trivia community
- Compare/compete with humans: by design
- Test uncertainty: by design
- Advance science

Checklist

- Reason across sentences: question and source
- Written by experts: trivia community
- Compare/compete with humans: by design
- Test uncertainty: by design
- **Advance science** (More later)





23. October 2015, Seattle



300-160



Humans 345-145 (vs. OUSIA)



QANTA 260-215

Now it's your turn

<http://qanta.org>