

A Community Question- Answering Refinement System

Sole @ ACM HT 2011

Community Question Answering (CQA)

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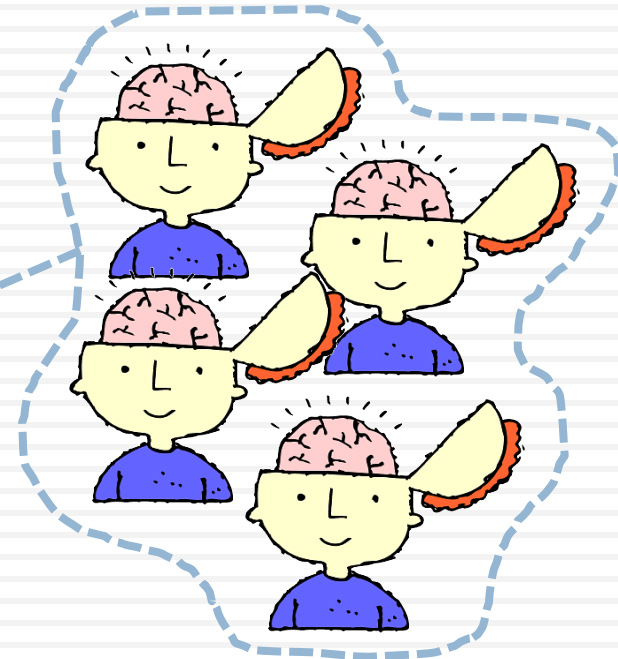
- Existing popular CQA sites

- ▣ Yahoo! Answers, WikiAnswers, and Naver

- Goal



Community Question
Answering System



Community Question Answering (CQA)

Yahoo! Answers

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The screenshot shows the Yahoo! Answers homepage. At the top left is the "YAHOO! ANSWERS" logo with a "Japan Relief" banner. To the right is a search bar with the text "Search" and a "Web Search" button. Below the logo are navigation tabs: "HOME", "BROWSE CATEGORIES", "MY ACTIVITY", and "ABOUT". The main green banner features three sections: "Ask" with a question mark icon and a text input field containing "What would you like to ask?", "Answer" with a smiley face icon and the text "Share your knowledge, Help others and be an Expert", and "Discover" with an exclamation mark icon and the text "The Best Answers chosen by the Community". Each section has a corresponding button: "Continue" for Ask, "Browse Open Questions" for Answer, and "Browse Resolved Questions" for Discover. Below the green banner is a search bar with the text "What are you looking for?" and buttons for "Search Y! Answers" and "Advanced Search".

The screenshot shows a "Best of Answers" window. At the top is the title "Best of Answers" and a window control bar with four buttons. Below the title is a question: "What is the difference between a tsunami and a tidal wave?" asked by "Gregorio Tirso - Earth Sciences & Geology". The answer is from a user with a smiley face icon, stating: "Most people assume that there is no difference between a tidal wave and a tsunami, and often use the words interchangeably. This is... More >". The answer has 57 thumbs up and 10 thumbs down, and is attributed to "titacabreros". At the bottom is a "Send to a friend" button.

Existing Problems with CQA

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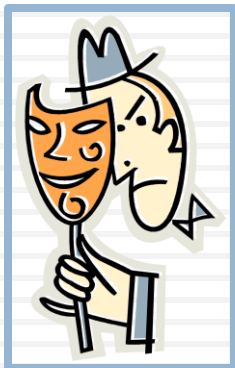
- When posting a new user's question Q



No Immediate Answers



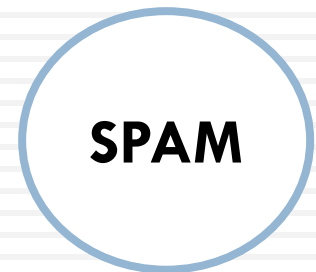
No Answers



Misleading Answers



Incorrect Answers



Spam Answers

Existing Problems with CQA

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Exact-Match Constraint

Search

Do I need to apply for a canadian visa if I am taking a cruise

Search Y! Answers



We did not find results for: **Do I need to apply for a canadian visa if I am taking a cruise to Alaska.**
Try the suggestions below or type a new query above.



Search

Do I need a visa if I am taking a cruise to Alaska

Search Y! Answers

Sort by: Relevance | Newest | Most Answers



Do I need Transit Visa or Tourist Visa for Canada if I am taking a cruise to Alaska from Seattle?

I am taking an Alaskan cruise from Seattle and this cruise... in Victoria (Canada). I am an Indian Citizen on H1B visa in USA. Do I need to apply for a tourist visa for...

☆ In Other - Canada - Asked by Imran Moin - 2 answers - 2 years ago

Browsing

Search

Good places to visit in Alaska?

Search Y! Answers

Sort by: Relevance | Newest | Most Answers



What are some good places to visit in Alaska?

... about moving to Alaska but want to go and visit for a few weeks before I move there...

☆ In Other - United States - Asked by jp_vo - 4 answers - 1 years ago



Are Alaska and Russia good places to visit on a Round the World trip?

I want to go on a big trip in the summer, preferably around the world. I really want to see India, China and Japan which are...but I'd really love to go to Russia and Alaska. So my question is this, have you ever...

2 ☆ In Other - Destinations - Asked by Snecko - 5 answers - 1 year ago



where is a good place to visit in Alaska?

i m going to visit alaska in spring break but i dnt know where since its such a big place...i wanna see moose,bears...

☆ In Other - United States - Asked by isaac z - 3 answers - 2 years ago



What are some good places to see in Alaska?

... planning a trip to Alaska in August. I would like to know of some good places to visit. We will be flying in to...

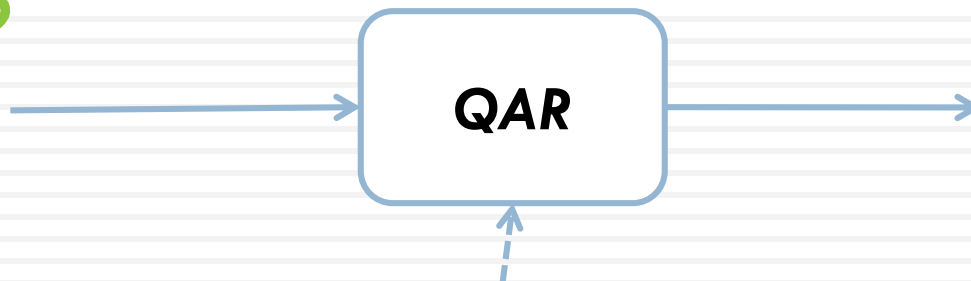
☆ In Other - United States - Asked by Kate - 4 answers - 1 years ago

Proposed Solution

CQA

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- We propose a Community Question Answering Refinement System, **QAR**, to solve existing CQA problems
- Design goals of QAR



YAHOO!
ANSWERS



- Question-matching Strategies:
 - ▣ Machine translation models (Jeon et al., CIKM '05; Xue et al., SIGIR '08)
 - ▣ Syntactic trees (K. Wang et al., SIGIR '09)
- Ranking Strategies:
 - ▣ Answer-features (Suryanto et al., WSDM '09)
 - ▣ User/Community features (Bian et al., WWW '08)
- Best Answer Strategies:
 - ▣ Bayesian Logistic regression (Wang et al., SIGIR '09)
 - ▣ Weighted Voting Scheme (Lee et al., WI-AIT '09)

Community Question Answering Refinement System (QAR)

Blocking

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- Given a new user's question Q , QAR enhances the *efficiency* of QA by
 - ▣ Performing **blocking** to
 - Identify *representative keywords* in Q
 - Keywords that best “capture” the information needs in Q
 - Example. “What can you do to remove a soda stain from the carpet?”
 - Select a subset of *candidate* archived questions *similar* to Q to a certain degree for retrieving relevant answers

- ▣ *Ranking* each candidate question CQ, based on its *degree of resemblance* with respect to Q
 - *Resemblance* is computed using *word-correlation factors*

dinner = dinner
dinner \neq meal

vs.

dinner = dinner
dinner \cong meal

Exact-Matching

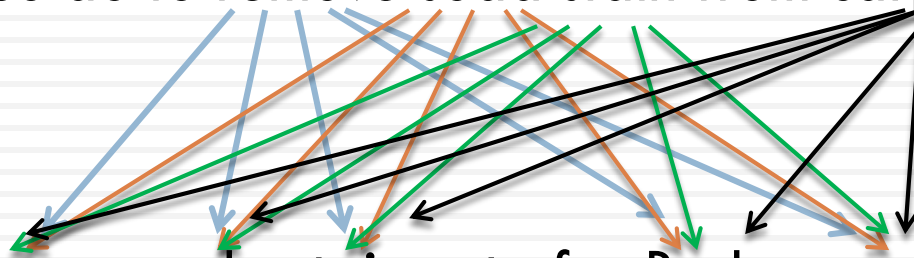
Similarity Matching

- ▣ *Selecting* the top-10 archived candidate questions with the *highest* resemblance score with respect to Q

□ Example

What can you do to remove soda stain from carpet?

How do I clear a soda stain out of a Berber carpet



Resemblance Score: 0.90

- Computing a *ranking* score for each archived answer A to each of the top-10 archived questions that *resemble* Q by considering
 - i. The *similarity* between A and Q
 - ii. The *similarity* between A and its corresponding question Q_A
 - iii. The *length* of A
- Top-10 answers with the *highest* combined scores, i.e., (i), (ii), and (iii), are presented to the user as answers to Q

Example. “How do you remove a soda stain from carpet”

QAR

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Yahoo! Answers

QAR

Matching Questions

How to remove old stains from the carpet?

My white **carpet** is a disaster **from** spilled drinks...there are still some spot stains **you** can see (red **soda**, some yellow **stain**, etc). **How do** I get these out?

☆ In Cleaning & Laundry - Asked by Asprin2Go - 3 answers - 3 months ago

How can you remove a yellow curry stain from gray carpet?

Are they any natural products around the house that I can use? does baking **soda** work?

☆ In Cleaning & Laundry - Asked by tobey - 3 answers - 2 years ago

How do you remove either orange popsicle or orange pop stained on carpet?

...on my mid-tan colored **carpet**. But, the truth is that...could stay down was orange **soda** pop (the kind with sugar) or orange...my little Bissell Green Machine to **remove** the **stain** to no avail. So I need to get...clever **stain** removal ideas - does anyone think Oxyclean liquid might...diameter area.

How do I get a clear soda stain out of a Berber carpet ?

How do I get a strawberry soda stain out of my light brown carpet?

What is the least expensive way to remove soda stains from carpet? I have this huge brown soda stain in the middle of my living room floor and I want to know if there is a very cheap way to get rid of it, without going out and buying all those expensive carpet cleaners

Retrieved Answers

My husband works for a carpet cleaning company. he says you can steam clean that stain. the sooner you do it the less of a stain your carpet will have...

Try and paste stuff called tide-to-go. Paste it on the carpet and add water on the stain but not much and take a coarse bristle brush and work it into the carpet and as the stain lifts damp it out with a dry cloth...

The best thing to use to clean spots without leaving a residue that actually attracts more dirt is plain old club soda. pour it on, let it sit a few minutes, and then soak up excess liquid with a clean dry cotton cloth...

□ Datasets

▣ *YA-Data*

- 4 millions questions and their corresponding answers provided by Yahoo! Answers
- Used by QAR as the *source* of questions and answers

▣ *QA-dataset*

- 300 (factoid and complex) questions, which are part of the TREC and TAC datasets
- Employed as users' *new* questions for performance evaluation of QAR using YA-Data

□ Metrics

▣ Question-matching

- Accuracy

▣ Answer-ranking

- Mean Reciprocal Rank (MRR)

- The average position in the *ranking* of the *first* relevant retrieved answer

- Precision@K ($K = 1, 5, \text{ and } 10$)

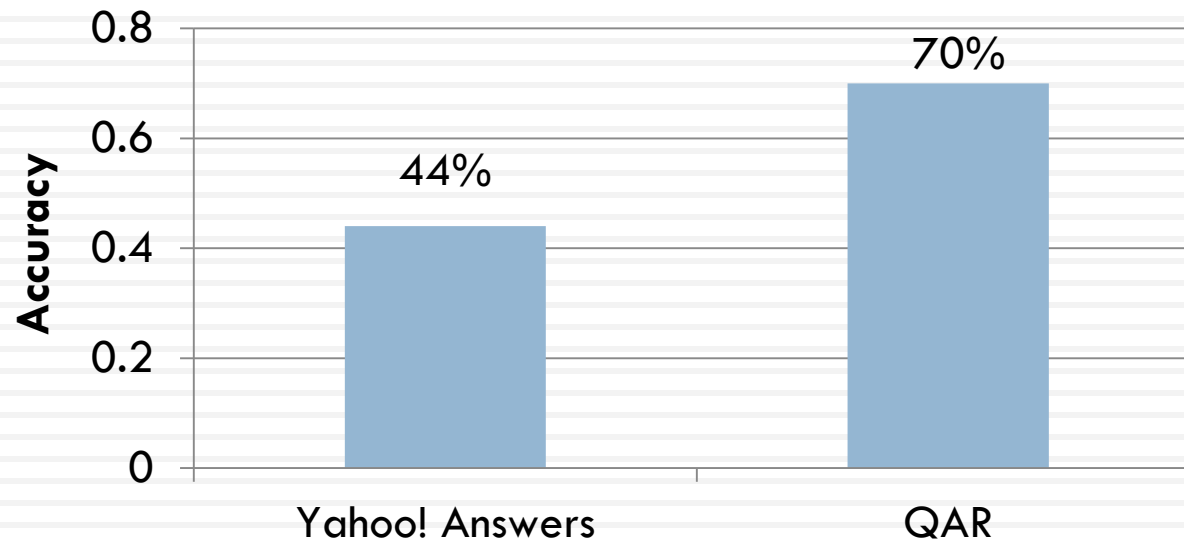
- Evaluate the *relevancy* of the top-K retrieved answers

- Mean Average Precision (MAP)

- Evaluate the *average precision* of the retrieved answers

Experimental Results

- Accuracy ratios of Yahoo! Answers and QAR in identifying questions that are the *same* or *semantically similar* to each question in QA-dataset
- ▣ Accuracy ratios are determined by independent appraisers

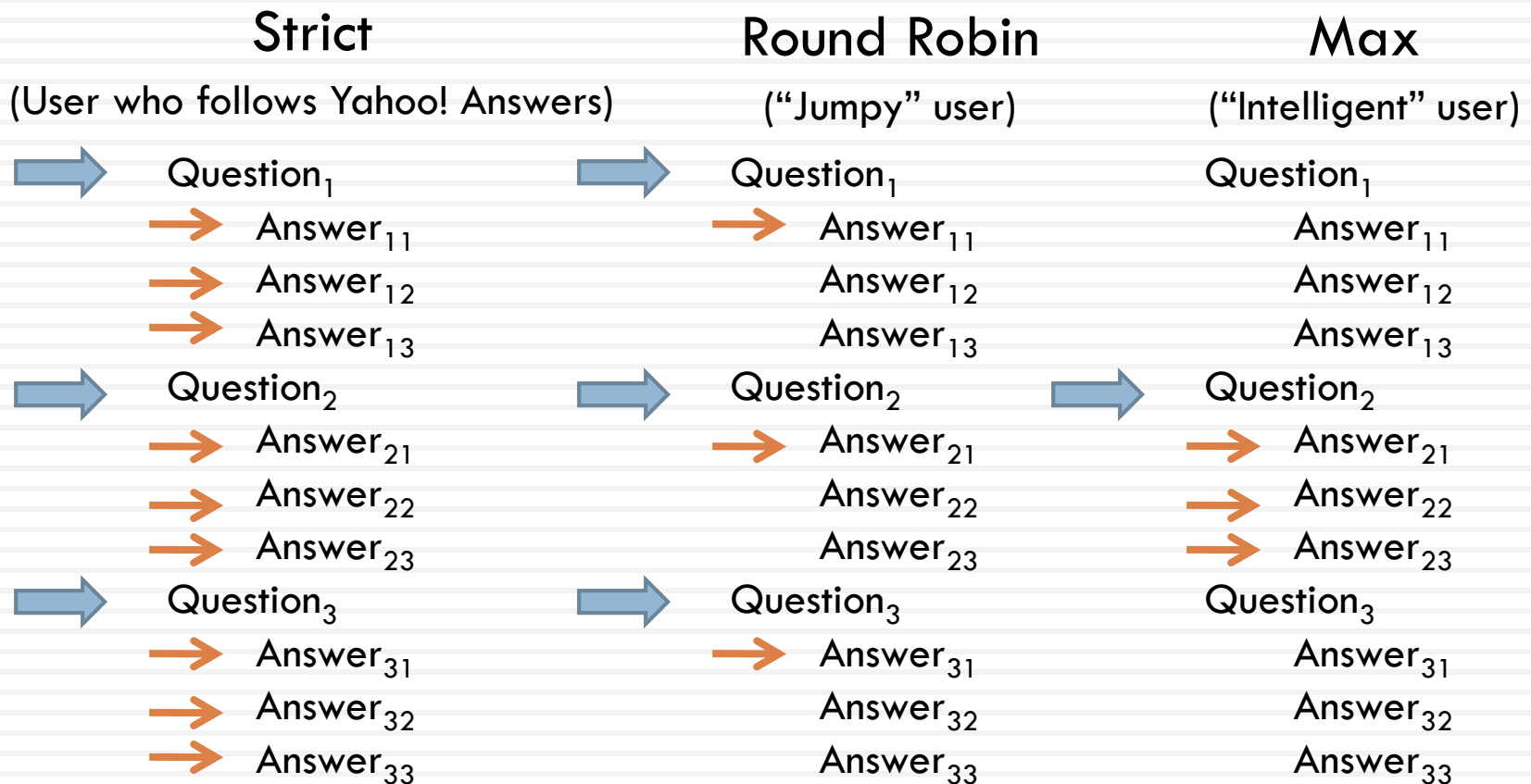


Experimental Results

Answer Ranking

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□ Baselines Strategies

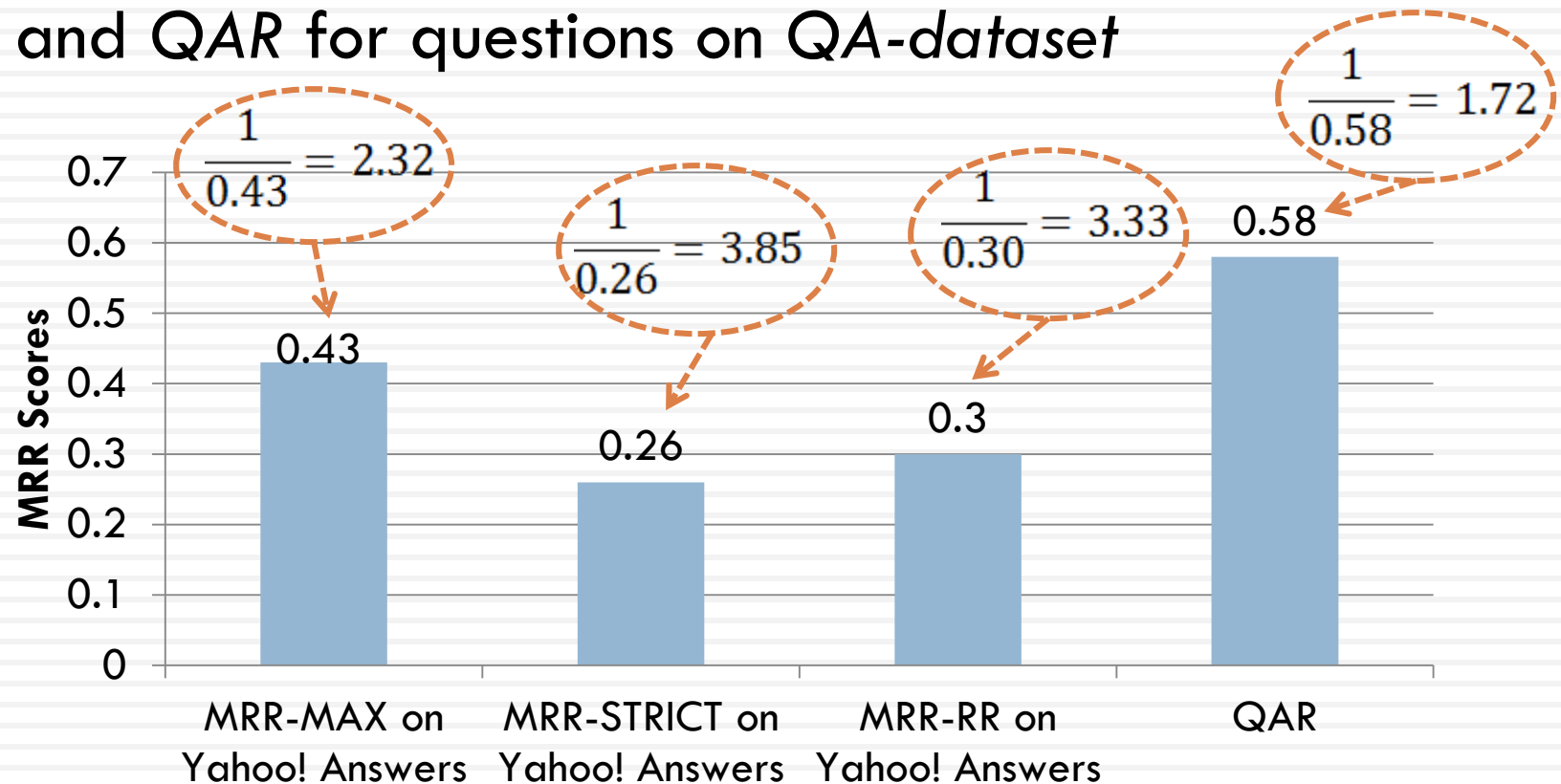


Experimental Results

Answer Ranking

17

- Average *MRR* scores achieved by Yahoo! Answers and QAR for questions on QA-dataset

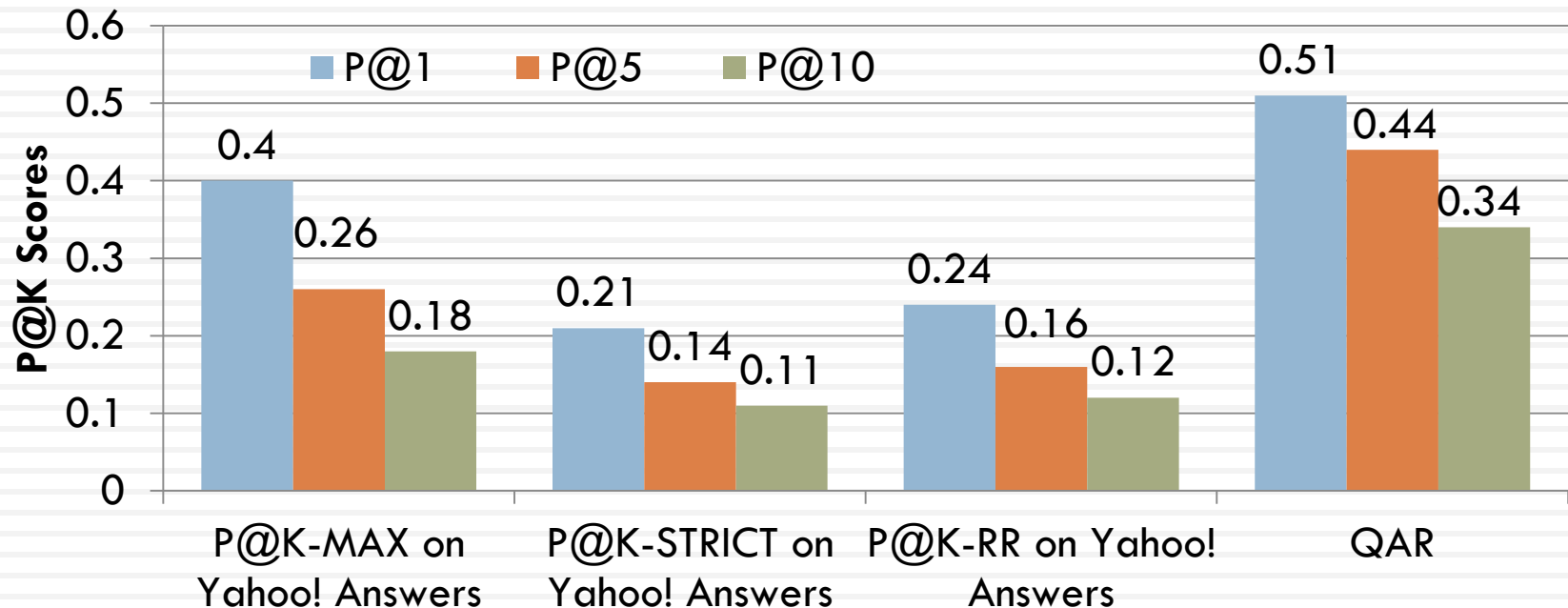


Experimental Results

Answer Ranking

18

- Average *Precision@K* scores achieved by Yahoo! Answers and QAR for questions on QA-dataset

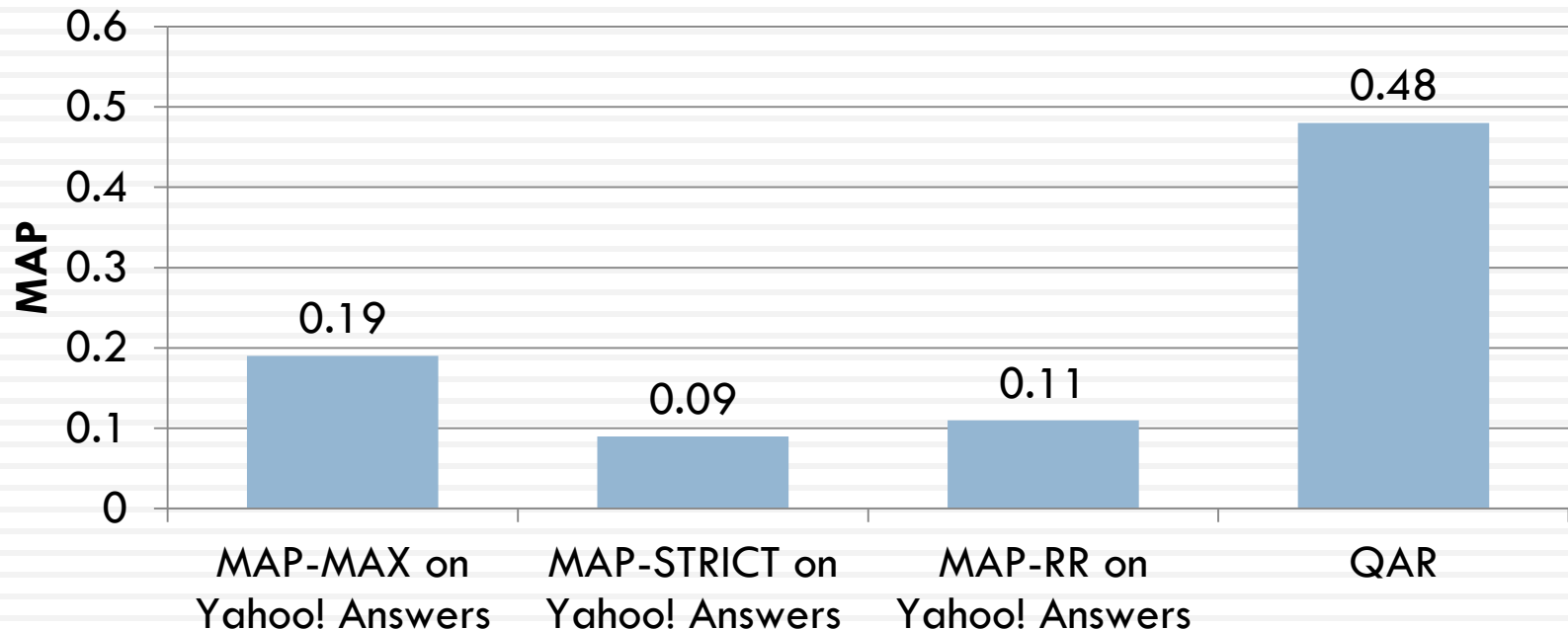


Experimental Results

Answer Ranking

19

- *MAP* scores achieved by Yahoo! Answers and QAR for questions on *QA-dataset*



Conclusions

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□ QAR

Contributions

- Exploits information available at CQA sites and extracts answers to (new) users' questions

Uniqueness

- Combines *question-matching* and *answer-ranking* to retrieve *relevant, ranked* answers in response to a user's new question
 - Does not impose an *exact-matching* constraint
 - Does not require users to *browse* through results

Validation

- Outperforms Yahoo! Answers in locating archived answers that satisfy user's information needs

Questions...

QAR

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