Answering Multiple Questions on a Topic from Heterogeneous Resources

**Project Goals**

- **Answering in Context**
  - Topic analysis: separating name from restrictive modifiers
  - "philanthropist Alberto Vilar"
  - Reference resolution in questions
  - "What is Vilar's nationality?"
  - "What is the philanthropist's nationality?"
  - "Name other famous Americans with Cuban ancestry."
  - Use "Alberto Vilar" in retrieval
  - Duplicate removal through diversity-based reranking

- **Expanding Knowledge Sources**
  - Factoid: added Teoma search engine for Knowledge Mining
  - List: 20 times more expected answer type lists than last year
  - Definition: newer patterns give greater variety of information
  - Can match adjacent patterns
  - Add simple anaphora resolution

**Results**

### Task

<table>
<thead>
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<th>Task</th>
<th>best</th>
<th>CSAIL04-1</th>
<th>CSAIL04-2</th>
<th>median</th>
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### CSAIL04-1

- **List Questions**
  - How reliable is answer type filtering?
  - Include top 25% of guesses?
  - Definition Questions?
  - Reference Resolution: none

- **Answer Merging**
  - Order nuggets by:
    - quality of topic match,
    - quality of the definition's source,
    - novelty of answer contents over previous definitions and all question answer pairs for the topic.

### Dictionary Lookup

- **Project webster.com definition onto AQUAINT documents**

- **Document Lookup**
  - Use topic as a search query, and retain sentences containing it, subject to passage-retrieval scoring

**Definition Questions**

- **Database Lookup**
  - Using surface patterns, pre-compile every knowledge nugget about every entity into a database.
  - Sample patterns:
    - copular: A tralact (that is pattern that is regular, but poor at scales)
    - antonym: A aslaf (that is regular, but poor at scales)

- **Dictionary Lookup**
  - "What is the vagus nerve?"
  - Dictionary definition: either of the 10th pair of cranial nerves that arise from the middle and supply chiefly the visceral...

**List Questions**

- **Expected Answer Types**
  - Guess answer candidates are generic (named entity, noun phrase)
  - List answer candidates come from pre-compiled categories

- **Document Retrieval**
  - Fetch relevant document chunks from the AQUAINT corpus

- **Answer Selection**
  - Remove near-duplicate answers

- **Answer Extraction**
  - Select best answers and guesses

**Factoid Questions**

- **Web DBs**
  - Knowledge Annotation
  - Knowledge Mining

- **Answer Projection**
  - Extract exact answers from candidate document chunks

**The Aranea System**

- **Knowledge Annotation**: Make use of freely available structured and semi-structured knowledge on the Web using wrapper and database techniques.

- **Knowledge Mining**: Leverage the tremendous amount of free text available on the Web with redundancy-based statistical techniques.

- **Google Top 100 Documents and Snippets**

- **Answer Projection**: Retrieve candidate documents using the question.
  - Score documents using the candidate answers in passage-retrieval techniques.
  - Select the highest ranked document as the supporting document.

### References

- "Michael Katz, Matthew Bilotti, Sue Felshin, Aaron Fernandes, Wesley Hildebrand, Ron Katzir, Jimmy Lin, Daniel Loreto, Gregory Marton, Federico Mora, Ozlem Uzuner"