Shallow & Deep QA Systems

Ling 573
NLP Systems and Applications
April 9, 2013

Announcement

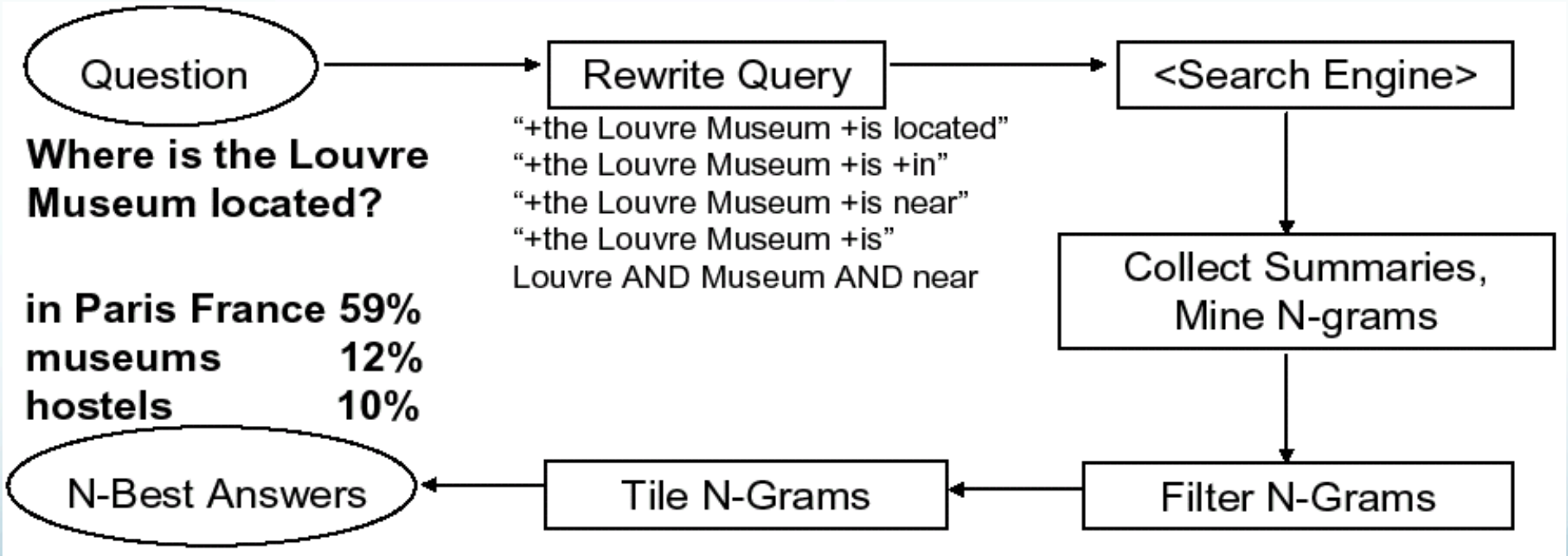
- Thursday's class will be pre-recorded.
- Will be accessed from the Adobe Connect recording.
- Will be linked before regular Thursday class time.
- Please post any questions to the GoPost.

Roadmap

- Two extremes in QA systems:
  - Redundancy-based QA: Aranea
  - LCC's PowerAnswer-2
- Deliverable #2

Redundancy-based QA

- AskMSR (2001,2002); Aranea (Lin, 2007)



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  - In 'easy' passages, simple string match effective

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- Many systems incorporate some redundancy
  - Answer validation
  - Answer reranking
    - LCC: huge knowledge-based system, redundancy improved

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      - Where is the Louvre Museum located? =>
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- Create type-specific answer type (Person, Date, Loc)

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      - Where is A? -> A is located in ?x (specific)
  - Inexact reformulation: bag-of-words

Query Reformulation

- Examples

What year did Alaska become a state?

[baseline]	What year did Alaska become a state
[inexact]	Alaska became a state
[exact]	Alaska became a state ?x

Who was the first person to run the mile in less than four minutes?

[baseline]	Who was the first person to run the mile in less than four minutes?
[inexact]	the first person to run the mile in less than four minutes
[exact]	the first person to run the mile in less than four minutes was ?x
[exact]	?x was the first person to run the mile in less than four minutes

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  - Generation
  - Voting
  - Filtering
  - Combining
  - Scoring
  - Reranking

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  - Approximate chunking – without syntax
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    - Specific, frequent: Question terms, stopwords

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- Example after filtering:
  - Who was the first person to run a sub-four-minute mile?

Candidate	Score
Bannister	137
Roger	114
Roger Bannister	103
English	26
...	...

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  - Type-neutral & Type-specific: drops 5%

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    - Also, increments score so long bad spans lower
- Improves significantly

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Candidate	Score
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Sir Roger Gilbert Bannister	286
Sir Roger Bannister	280
Bannister Sir Roger	278
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Englishman Roger Bannister	1853
Sir Roger Gilbert Bannister	1775
Sir Roger Bannister	1768
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- Promote best answer candidates:
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  - Use answer type specific forms to raise matches
    - E.g. ‘where’ -> boosts ‘city, state’
- Small improvement depending on answer type

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- Aranea download:
  - http://www.umiacs.umd.edu/~jimmylin/resources.html

Deliverable #2: Due 4/19

- Baseline end-to-end Q/A system:
  - Redundancy-based with answer projection

  also viewed as
  - Retrieval with web-based boosting

- Implementation: Main components
  - Basic redundancy approach
  - Basic retrieval approach (IR next lecture)

Data

- Questions:
  - XML formatted questions and question series
- Answers:
  - Answer ‘patterns’ with evidence documents
- Training/Devtext/Evaltest:
  - Training: Thru 2005
  - Devtest: 2006
  - Held-out: ...
- Will be in /dropbox directory on patas
- Documents:
  - AQUAINT news corpus data with minimal markup