

SIGIR 2010 Workshop
Query Representation and Understanding
July 23, 2010 , Geneva

Query Representation and Understanding

Hang Li

Microsoft Research Asia

Query Understanding is Key for Web Search

Different Queries Can Represent Same Intent

“Distance between Sun and Earth” - Luke DeLorme

- "how far" earth sun
- "how far" sun
- "how far" sun earth
- average distance earth sun
- average distance from earth to sun
- average distance from the earth to the sun
- distance between earth & sun
- distance between earth and sun
- distance between earth and the sun
- distance between earth sun
- distance between sun and earth
- distance between the earth and sun
- distance between the earth and the sun
- distance between the sun and earth
- distance between the sun and the earth
- distance earth and sun
- distance earth from sun
- distance earth is from the sun
- distance earth sun
- distance earth to sun
- distance earth to the sun
- distance from earth to sun
- distance from earth to the sun
- distance from sun to earth
- distance from sun to the earth
- distance from the earth to the sun
- distance from the sun to earth
- distance from earth to the sun
- distance from sun to the earth
- distance of earth from sun
- distance of earth from the sun
- distance of earth to sun
- distance of earth to the sun
- distance of sun from earth
- distance of sun from the earth
- distance of sun to earth
- distance of the earth from the sun
- distance of the earth to the sun
- distance of the sun from earth
- distance of the sun from the earth
- distance of the sun to earth
- distance of the sun to the earth
- distance sun
- distance sun and earth
- distance sun earth
- distance sun from earth
- distance sun to earth
- distance to sun from earth
- distance to the sun from earth
- earth and sun distance
- how far away is the sun from earth
- how far away is the sun from the earth
- how far earth from sun
- how far earth is from the sun
- how far earth sun
- how far from earth is the sun
- how far from earth to sun
- how far from the earth to the sun
- how far from the sun is earth
- how far from the sun is the earth
- how far is earth away from the sun
- how far is earth from sun
- how far is earth from the sun
- how far is earth to the sun
- how far is it from earth to the sun
- how far is it from the earth to the sun
- how far is sun from earth
- how far is the earth away from the sun
- how far is the earth from sun
- how far is the earth from the sun
- how far is the earth to the sun
- how far is the sun
- how far is the sun away from earth
- how far is the sun away from the earth

Different Queries Can Represent Same Intent

“Youtube”

- | | | |
|-------------------|-----------------------|----------------------|
| • youtube | yuotube | yuo tube |
| • ytube | youtubr | yu tube |
| • youtubo | youtuber | youtubecom |
| • youtube om | youtube music videos | youtube videos |
| • youtube | youtube com | youtube co |
| • youtub com | you tube music videos | yout tube |
| • youtub | you tube com yourtube | your tube |
| • you tube | you tub | you tube video clips |
| • you tube videos | www you tube com | www youtube com |
| • www youtube | www youtube com | www youtube co |
| • yotube | www you tube | www utube com |
| • ww youtube com | www utube | www u tube |
| • utube videos | utube com | utube |
| • u tube com | utub | u tube videos |
| • u tube | my tube | toutube |
| • outube | our tube | toutube |

Query Understanding in Web Search

Web Search

- Query Understanding
 - Query → query representation (intent)
- Document Understanding
 - Document → document representation (content)
- Query Document Matching
 - Matching between query and document representations
- Ranking
 - Ranking based on matching
- User Understanding
 - User information and context information → user model and context model

Query Understanding

- Input: query
- Output: query representation
 - Refined query (e.g., spelling error correction)
 - Similar queries
 - Categories
 - Topics
 - Key phrases
 - Named entities

Document Understanding

- Input: document
- Output: document representation
 - Importance score
 - Categories
 - Topics
 - Key phrases
 - Named entities
 - Metadata (anchor texts, tags, associated queries)

Query Document Matching

- Input: query representation and document representation
- Output: relevance score

User Understanding

- Input: context information, user information
- Output: context model and user model

Query Understanding Tasks

1. Similar query finding : represent queries by similar queries
 - Refined queries (e.g., spelling error correction)
 - Related queries (e.g., more specific queries, more general queries)
 - Applications: query expansion/ refinement/ suggestion
2. Query (intent) classification: represent queries by categories
 - User goals (informational, navigational, transactional)
 - Topics (e.g., ODP taxonomy)
 - Time sensitivity
 - Location sensitivity
 - Other categories...

Query Understanding Tasks

3. Query parsing:

- Query segmentation
- Dependency
- Named entity recognition
- Syntactic analysis

4. Query understanding using context information and personal information

Query Understanding Is Useful of Potentially Useful

- Search relevance
- Vertical search/faceted search
- Entity search
- Task accomplishment

Today's invited talks

- Query classification
 - Donald Metzler, Fernando Diaz
- Query parsing
 - Fuchun Peng, Jian-Yun Nie, Patrick Pantel, Gu Xu
- Similar query finding & combination with relevance model
 - Michael Bendersky, Gu Xu
- Using context information and personal information
 - ChengXiang Zhai, Roise Jones, Eugene Agichtein

Open Questions and Challenges for Query Understanding

- How to define unified query representation
- Do we need unified framework for query understanding?
- Do we need new index and retrieval architecture?
- How to combine with other components
- How to conduct evaluation
- How to make effective use of both human knowledge and machine learning

Thank you