Automated Reference Assistance: Reference for a New Generation

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What is the ARA?

• Software designed to
  – Enhance, not replace traditional reference service
  – Elicit information about users & what they need
  – Suggest appropriate resources
  – Operate 24 x 7
Why is the ARA?

• Users value convenience, speed, ease-of-use
  – Prefer remote access, e-resources, & independence
  – U-grad students use inappropriate e-resources
    • Less than 6% of surface Web is scholarly content
    • No single Web search engine indexes more than 16%
    • Web magnifies problems with poor search strategies

• The number, names, & content of e-resources overwhelm & confuse both users & librarians
1999 Remote Use of E-Resources

No reference librarian available to assist

- Carnegie Mellon
- Johns Hopkins
- Lehigh
2000-01 Statistics

Over past 5 years:
- Gate counts down 6%
- Circ down 3.5%
- Reference up 0.5%
16% of Reference is Digital

- Email
- Chat

- Other
- Staff
- Faculty
- Grad
- U-grad
1998 Survey Reference Service

- **U-grad**
  - Use: 40%
  - Never use: 20%
  - Never heard of: 40%

- **Grad**
  - Use: 60%
  - Never use: 20%
  - Never heard of: 20%

- **Faculty**
  - Use: 80%
  - Never use: 20%
  - Never heard of: 0%
Goals of the ARA

• Intervene & guide
• Facilitate learning & independence
• Match preferences & lifestyles
• Begin to close the gap between perceived ease of using the Web & perceived cumbersomeness of using the library
What the ARA Does

• Interviews users
• Limits the number of resources to choose from
• Dynamically groups the resources available
• Provides information about the resources
• Provides links to resources
• Submits queries to resources
ARA Architecture

Web Browser
Application Server
Inference Engine
Relational Databases
Reference Interview Resource Database Journal Information
XML Files
Welcome to the ARA, CMU's Automated Reference Assistant. I can help you find books, journals, articles and other resources. Currently, I know of 63 sources of information that might be useful for you.

Tell me what you're looking for:

You're looking for a **book** about

called

written by

You're looking for an **article** in the journal named

in the subject area

You're looking for **information** about

in the subject area
ARA Inference Engine

• Interviews user to focus the information need
• Converts user’s information need into a query of the Resource database & Reference Interview database
• Transforms the results of the query into useful reference advice, a list of suggested resources, & follow-up questions
ARA Reference Interview Database

• Set of questions a librarian might ask a user
• Information about when it’s appropriate to ask each question
• Actions associated with each answer
  – To update the facts the ARA “knows” about what the user is looking for
ARA Resource Database

- Contains facts about every resource the ARA “knows”
  - Resource name
  - Resource level
  - Dates of coverage
  - Item types
  - Subject areas
  - Dewey Decimal ranges
  - Full text availability
  - Internet address
  - Full descriptions
  - Brief descriptions
  - Other facts
    - Atlas = maps & geography
    - Encyclopedia = general information
    - Poems = can be located through concordances & indexes of first lines
ARA Journal Information Database

- Identify databases that index a journal
- Identify databases with full-text
- Disambiguate journal titles
- Incorporated from JAKE
ARA Action

User answers questions & submits a request

Inference Engine
Converts user information need into a query

Advice, a ranked list of resources & follow-up questions

Reference Interview database
Algorithm determines which follow-up questions are valid for which user-provided facts

Resource database
Algorithm determines which resources are appropriate to user need
Resource Database Example

Resource Database Example

ARA ARTICLE Search

CAMEO (the library catalog) has a complete list of all journals which the library possesses.

Search CAMEO for the journal 'nature'

If you are looking for a particular article from 'nature', it may be available online.

I know of the contents of many databases. Would you like to see which databases contain the journal 'nature'?

I know of 8 basic resources for article in 'nature':

- **ArticleFirst**
  - OCLC index of articles from the contents pages of journals

- **CAMEO**
  - CMU's online library catalog

- **CMU Journal list**
  - Searchable database of all CMU-owned journals

- **CMU's Full-text Journals List**
  - CMU Libraries alphabetical list of full-text journals

- **CQ Library**
  - In-depth analysis reporting on the most current and controversial issues of the day

- **Expanded Academic ASAP**
  - Scholarly journals, news magazines, and newspapers - many with full text and images

- **Lexis-Nexis Academic Universe**
  - A wide range of news, business, legal, medical, and reference information

- **PITTCAT**
  - University of Pittsburgh's Library Catalog

Tell me more about what you're looking for

Searching for:

- query='nature' formset=
- qsymtype=title formset=

Reference assistance

List of most relevant resources
Reference Interview Example

You can look up 'particle physics' in the dictionary or in the encyclopedia.

The library catalog, CAMEO, may also have books, journals, videos, or other information about 'particle physics'. You can search the library catalog for subject='particle physics' or items with 'particle physics' in the title.
I can also help you locate articles, dissertations, statistics, or standards about 'particle physics'.
I know of 5 basic resources for info about 'particle physics'.

- **Britannica Online**  (look up 'particle physics')
  The complete encyclopedia, with related Internet sites and more (more...)
- **Lexis-Nexis Academic Universe**
  A wide range of news, business, legal, medical, and reference information (more...)
- **Merriam-Webster Collegiate OnLine Dictionary**  (look up 'particle physics')
Merriam-Webster Collegiate OnLine Dictionary (more...)
- **Wilson Biographies**
  The full text of the biographies from more than 100 print volumes of biographical reference books (more...)
- **World Almanac**
  The World Almanac - fundamental reference resources (more...)

Tell me more about what you're looking for

Limit to subject area: Arts

Search for: information

Submit

Reference Interview follow-up questions
ARA Technology

- Inference & resource information stored in XML
- Oracle 8i relational database technology
- Information retrieved by Java Beans
- Interface constructed using Java Server Pages
- Easy to add, remove, or modify resources
- Easy to customize
ARA Schedule

• Spring 2002
  – Index all e-resources in the Resource Database
  – Conduct user study & revise interface
  – Submit grant proposal

• Summer 2002 – release prototype

• Fall 2002
  – Market the ARA on campus
  – Monitor & study usage
ARA 2002-2004

• Improve the Inference Engine & Interview model
• Improve interface design & functionality
• Index print resources in the Resource Database
• Integrate chat software
  – No evidence that simply using appropriate resources will improve student work
ARA Dreams

• Enable spoken dialog between users & librarians
• Enable users to select a reference personality
  – Implement multiple virtual reality agents
    ✓ African American ✓ Male
    ✓ Asian ✓ Female
    ✓ Hispanic ✓ Young
    ✓ Punk ✓ Old

• Commercialize & offer ARA versions adapted for different kinds of libraries
Thank you!

- Photos from Associated Press Photo Archives

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