User Interfaces for IR Systems

Norbert Fuhr

EU Intensive Programme “Information Foraging”, Nijmegen, 22/8/11
Contents

1. Classical Interfaces
2. Visualizations
3. Agent-based systems and mixed-initiative interfaces
4. Conclusion
Interaction styles

- command languages
- forms
- menus
- direct manipulation
- agents (delegation)
- mixed initiative
Classical Interfaces

- Forms
- Menus
User Interfaces for IR Systems
Classical Interfaces
Forms
Search forms
Classical Interfaces

Forms

Search forms
ACM DL Advanced Search

**Words or Phrases**
Find [any field] with
  - all of
  - (and)
  - [any field]
  - Title
  - Abstract
  - Review
  - none of this text

**Names**
Find [any field] with names
  - using ○ all ○ any ○ none of the names

**Keywords**
Find author's keywords
  - using ○ all ○ any ○ none of the keywords

**Affiliations**
Find company or school
  - using ○ all ○ any ○ none of the affiliations

**Publication**
Find publication
  - using ○ all ○ any ○ none of the names

**Published since** [year] ○ Published before [year] ○

**In publication types** ○ Journal ○ Proceeding ○ Transaction ○ Magazine ○ Newsletter

**Conference**
Find sponsor names
  - using ○ all ○ any ○ none of the names

Find year (yyy)
  - using ○ any ○ none of the years

**Identification codes**
Find DOI
Forms with direct feedback
Example:: Google toolbar
Forms with direct feedback
Example:: Google toolbar
Forms with direct feedback
Example:: Google toolbar
Menus

Selection of databases and document types in Daffodil

![Diagram of Daffodil database selection interface]

- Google
- BibDBIS
- PLib
- HCIBIB
- Springer

Data Sources:
- BibDB
- Achilles
- ArXiv
- CiteSeerIS
- CompuScience
- GetInfo

Data Types:
- LeaBIB
- ACM
- DBLP
- DBLPIS
- Metadata
- PDF
- PS
- DOC
- PPT
Menus: Faceted Search
Product selection in Amazon

Nikon Coolpix L22 12.0MP Digital Camera with 3.6x Optical Zoom and 3.0-Inch LCD (Black)
Price: $199.65 $95.85
Customer rating: 4.5 stars (406)
See newer model of this item

Olympus Stylus 5010 14 MP Digital Camera with 5x Wide Angle Dual Image Stabilized Zoom and 2.7-inch LCD (Titanium)
Price: $169.99 $87.99
Customer rating: 5 stars (5)

Fujifilm X100 12.3 MP APS-C CMOS EXR Digital Camera with 23mm Fujinon Lens and 2.8-Inch LCD
Price: $1,199.95
Customer rating: Not in stock; order now and we'll deliver when available

Sony Cyber-shot DSC-HX5V 10.2MP CMOS 10x Wide Angle Zoom Digital Camera with Optical Steady Shot Image Stabilization and 3.0 inch LCD
Price: $189.00

Nikon COOLPIX L24 14 MP Digital Camera with 3.6x NIKKOR Optical Zoom Lens and 3-Inch LCD (Black)
Price: $189.00

Nikon COOLPIX L120 14.1 MP Digital Camera with 21x NIKKOR Wide-Angle Optical Zoom Lens and 3-Inch LCD (Black)
Price: $279.99
Menus: Faceted Search

Product selection in Amazon

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**Classical Interfaces**

**Menus**
### Menus: Faceted Search

Product selection in Heise

<table>
<thead>
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<td>Sensorauflosung ab</td>
<td>unter 6 Megapixel (84)</td>
<td>ab 6 Megapixel (2206)</td>
<td>ab 8 Megapixel (2112)</td>
<td>ab 10 Megapixel (1863)</td>
<td>ab 12 Megapixel (1369)</td>
<td>ab 14 Megapixel (635)</td>
<td>ab 16 Megapixel (113)</td>
<td>unbekannt (5)</td>
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<td>Sensorauflosung bis</td>
<td>bis 6 Megapixel (97) bis 8 Megapixel (271) bis 10 Megapixel (685) bis 12 Megapixel (1177) bis 14 Megapixel (1893) bis 16 Megapixel (2216) über 16 Megapixel (74) unbekannt (5)</td>
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<td>CCD (2034) CMOS (248) unbekannt (15)</td>
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<td>Sensorgroesse</td>
<td>unter 1/3&quot; (3) ab 1/3&quot; (2097) ab 1/2.5&quot; (2080) ab 1/2.3&quot; (1736) ab 1/2&quot; (121) ab 1/1.8&quot; (94) ab 1/1.7&quot; (71) ab 1/1.6&quot; (12) unbekannt (195)</td>
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<tr>
<td>Bildformat</td>
<td>1:1 (81) 4:3 (2252) 3:2 (1280) 16:9 (1744)</td>
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<tr>
<td>Optischer Zoom</td>
<td>unter 3x (98) ab 3x (2184) ab 3.6x (1508) ab 4x (1440) ab 5x (966) ab 10x (273) ab 15x (107) unbekannt (13)</td>
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<td>Anfangsbrennweite</td>
<td>bis 24mm (145) bis 28mm (1114) bis 32mm (1288) bis 35mm (1868) bis 38mm (2147) über 38mm (15) unbekannt (133)</td>
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<tr>
<td>Endbrennweite</td>
<td>unter 100mm (91) ab 100mm (2069) ab 150mm (548) ab 200mm (345) ab 300mm (195) ab 400mm (86) ab 500mm (44) unbekannt (135)</td>
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<tr>
<td>Lichtstarke max</td>
<td>bis 1:1.8 (8) bis 1:2.0 (21) bis 1:2.8 (587) bis 1:3.5 (1840) bis 1:4.0 (1774) unbekannt (521)</td>
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</tbody>
</table>
Menus: Faceted Search
Mail search in Thunderbird

Dear Maristella Agosti,

many thanks for your prompt feedback! This is great news! We are very pleased. Following the recommendations of several lecturers from past ESSIR's, we...

Proposal for hosting ESSIR 2007 in Germany

to: Catherine Bonnet

Dear Catherine,

any news concerning the decision about ESSIR 2007?

Probably our offer is not appropriate, since we can't host more than 60..

ESSIR lectures

to: Massimo Melucci

Dear Massimo,

here is my data:
- title: Prof..

Mail search in Thunderbird
### Menus: Faceted Search

#### HiBrowse: Hierarchic Facets

![HiBrowse Interface](image)

<table>
<thead>
<tr>
<th>Physical Disease</th>
<th>Therapy</th>
<th>Child AND Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal Disease</td>
<td>2468</td>
<td>8411</td>
</tr>
<tr>
<td>Abnormal Body Build</td>
<td>111</td>
<td>1</td>
</tr>
<tr>
<td>Breast Disease</td>
<td>1976</td>
<td>15</td>
</tr>
<tr>
<td>Cardiovascular Disease</td>
<td>726</td>
<td>15</td>
</tr>
<tr>
<td>Connective Tissue</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Digestive System</td>
<td>481</td>
<td>1855</td>
</tr>
<tr>
<td>Ear Nose Throat</td>
<td>116</td>
<td>3696</td>
</tr>
<tr>
<td>Endocrine Disease</td>
<td>58</td>
<td>3696</td>
</tr>
<tr>
<td>Eye Disease</td>
<td>171</td>
<td>2371</td>
</tr>
<tr>
<td>Head and Neck Disease</td>
<td>8467</td>
<td>2371</td>
</tr>
<tr>
<td>Hematologic Disease</td>
<td>8282</td>
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<tr>
<td>Mouth Disease</td>
<td>53</td>
<td>2371</td>
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<tr>
<td>Musculoskeletal Disease</td>
<td>88</td>
<td>2371</td>
</tr>
<tr>
<td>Neurologic Disease</td>
<td>300</td>
<td>2371</td>
</tr>
<tr>
<td>Pelvic Disease</td>
<td>19</td>
<td>2371</td>
</tr>
<tr>
<td>Respiratory Tract Disease</td>
<td>60</td>
<td>2371</td>
</tr>
<tr>
<td>Skin Disease</td>
<td>15</td>
<td>2371</td>
</tr>
<tr>
<td>Soft Tissue Disease</td>
<td>46</td>
<td>2371</td>
</tr>
<tr>
<td>Thorax Disease</td>
<td>15</td>
<td>2371</td>
</tr>
<tr>
<td>Urogenital Tract Disease</td>
<td>629</td>
<td>2371</td>
</tr>
<tr>
<td>Therapy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Faceted Search

- uses formal attributes for restricting the answer set
- shows number of items satisfying each facet value
- number are updated whenever a selection is made
- undoing a selection should be easy
- less useful for content-oriented criteria
Visualizations

- Document surrogates
- Structuring of result sets
Document surrogates

- Sorting criterion: RSV / attribute value (e.g. date)
- Document entry:
  - Title
  - Metadata (date, source, size)
- Document summary
  - Query-dependent
  - Query-independent
- Clicking on the document icon / title leads to the complete document
Surrogates with query-independent summaries

Results: 1 to 20 of 283422

1. In vivo post-translational modifications of recombinant mussel adhesive protein in insect cells.
   Lim S, Kim KR, Choi YS, Kim DK, Hwang D, Cha HJ.
   PMID: 21732552 [PubMed - as supplied by publisher]

2. Engineering the pentose phosphate pathway to improve hydrogen yield in recombinant Escherichia coli.
   Kim YM, Cho HS, Jung GY, Park JM.
   PMID: 21732330 [PubMed - as supplied by publisher]

3. Cell surface display of carbonic anhydrase on Escherichia coli using ice nucleation protein for C.
   Fan LH, Liu N, Yu MR, Yang ST, Chen HL.
   PMID: 21732326 [PubMed - as supplied by publisher]
Query-dependent document summaries

*retrieval in context*

About 20,800,000 results (0.18 seconds)

- Scholarly articles for *retrieval in context*
  - ... of information seeking and *retrieval in context* - Ingwersen - Cited by 407
  - ... with and without *retrieval of context*: An event-related ... - Wilding - Cited by 134
  - ... hippocampus in the acquisition and *retrieval of context* ... - Matus-Amat - Cited by 99

SIGIR 2004 Workshop - Information Retrieval in Context
ir.dcs.gla.ac.uk/context/ - Cached
6 Sep 2004 – Thus truly context-aware and -dependent retrieval will become feasible. This workshop will explore a variety of theoretical frameworks, ...

IRiX - Information Retrieval in Context
www.dcs.gla.ac.uk/IRiX/ - Cached
The ESF Exploratory Workshop on Information Retrieval in Context (IRiX) is ...

Show more results from gla.ac.uk

[PDF] Personalized Information Retrieval in Context
ir.ii.uam.es/~acemedia/publications/mrc06.pdf
File Format: PDF/Adobe Acrobat - Quick View
by D Vallet - Cited by 19 - Related articles
Personalized Information Retrieval in Context. David Vallet,.. Miriam Fernández,.. Pablo Castells,.. Phivos Mylonas,.. † and Yannis Avrithis ...
Structuring of result sets

show document in context
show document in relation to
  - query terms
  - Boolean query structure
  - collection survey
  - descriptive metadata
  - hyperlink structure
  - document structure
  - other documents
InfoCrystal: term combinations in the result set
Tabular display: Envision

Envision Query Window

File  Edit  Query  Window

Query History:

New Query

Q#  Found  Query: Short form
1  25  User interface design
2  50  A. Card, Stuart K.
3  75  A. Card, Stuart K.; Ehlert

Authors:
Card, Stuart K.

Words In Title:
human-computer interaction

Content Words:

Envision Graphic View: Query #2.1

File  Edit  Results

Best 75 Items Found

Icon Label: Relevance Rank
Icon Color: Est. Relevance
Icon Size: Uniform
Icon Shape: Item Type

V-Axis:

Card, S. K.
Card, Stuart
Card, Stuart K.
Carroll, John H.
Entin, Klemen R.
Fuchs, Henry
Hartson, H. R.
Henderson, D. Austin
Hill, Ralph D.

User Rating

Not Useful

Shape Legend

Back  Journal  Proceedings  Article

X-Axis:  Pub. Year

Envision Item Summary: Query #2.1

Icon  Useful  Est. Rel  Author/Editor  Year  Title
1  360  Card, Stuart K.  1986  Understanding key constraints governing human-computer interfaces
2  348  Card, Stuart K.  1981  The Psychology of Human-Computer Interaction
5  302  Card, Stuart K.  1984  Human Limits and the VDT Computer Interface

Envision search results display.
Time aspect: Google Timeline

2004-05  Search other dates

Apr 2004 - Google launched Gmail in April 2004. It is still in beta test mode. To open an account, users must either request the service from Google by sending the company a text message from a mobile phone or be invited via e-mail by an existing Gmail user. Despite the ...

Oct 2004 - By Juan Carlos Perez | IDGNS Google Inc. on Thursday launched a beta test version of Google SMS, a new service that lets users of wireless devices query Google for specific information, such as business or residential listings, product prices and word definitions, the company announced ...

From Gmail Now Scans for Viruses - Related web pages
www.pcworld.com/news/article/0,aid,123807,00.asp

From Update: Google introduces wireless service | Networking - InfoWorld - Related web pages
www.infoworld.com/article/04/10/07 ...
Structuring of result sets

Geographic aspect: Google Maps
Analytical and browsing-oriented visualizations

- Hyper Grid: table-oriented presentation for analytical approach
- HyperScatter: two-dimensional presentation for browsing
  both with zooming down to single instances
### Visualizations

#### Structuring of result sets

**HyperGrid**

<table>
<thead>
<tr>
<th>Movie</th>
<th>Content</th>
<th>People &amp; Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1941</td>
<td>Steven Spielberg</td>
<td>35.0</td>
</tr>
<tr>
<td>Alice</td>
<td>Woody Allen</td>
<td>12.0</td>
</tr>
<tr>
<td>Always</td>
<td>Steven Spielberg</td>
<td>29.5</td>
</tr>
<tr>
<td>American Raspberry</td>
<td>Bradley R. Swinoff</td>
<td>0.05</td>
</tr>
<tr>
<td>Amistad</td>
<td>Steven Spielberg</td>
<td>40.0</td>
</tr>
<tr>
<td>Artificial Intelligence: AI</td>
<td>Steven Spielberg</td>
<td>90.0</td>
</tr>
<tr>
<td>Austin Powers in Goldmember</td>
<td>Jay Roach</td>
<td>63.0</td>
</tr>
<tr>
<td>Big</td>
<td>Penny Marshall</td>
<td>18.0</td>
</tr>
<tr>
<td>Blues Brothers, The</td>
<td>John Landis</td>
<td>27.0</td>
</tr>
<tr>
<td>Catch Me If You Can</td>
<td>Steven Spielberg</td>
<td>52.0</td>
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<tr>
<td>Choiseans, The</td>
<td>Robert Aldrich</td>
<td>6.5</td>
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<tr>
<td>Christine</td>
<td>John Carpenter</td>
<td>9.7</td>
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<tr>
<td>Close Encounters of the Third Kind</td>
<td>Steven Spielberg</td>
<td>20.0</td>
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<tr>
<td>Color Purple, The</td>
<td>Steven Spielberg</td>
<td>15.0</td>
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<td>E.T. the Extra-Terrestrial</td>
<td>Steven Spielberg</td>
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<tr>
<td>Empire of the Sun</td>
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<tr>
<td>Goonies, The</td>
<td>Richard Donner</td>
<td>19.0</td>
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<tr>
<td>Gremlins</td>
<td>Joe Dante</td>
<td>11.0</td>
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<tr>
<td>Hooli</td>
<td>Steven Spielberg</td>
<td>70.0</td>
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<tr>
<td>Indiana Jones and the Last Crusade</td>
<td>Steven Spielberg</td>
<td>48.0</td>
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<tr>
<td>Indiana Jones and the Temple of Doom</td>
<td>Steven Spielberg</td>
<td>26.0</td>
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<tr>
<td>Java</td>
<td>Steven Spielberg</td>
<td>12.0</td>
</tr>
<tr>
<td>Jurassic Park</td>
<td>Steven Spielberg</td>
<td>63.0</td>
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<td>Lost World: Jurassic Park, The</td>
<td>Steven Spielberg</td>
<td>73.0</td>
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<td>Love Letter, The</td>
<td>Peter Chan</td>
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<td>Minority Report</td>
<td>Steven Spielberg</td>
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<td>Steven Spielberg</td>
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<td>Raiders of the Lost Ark</td>
<td>Steven Spielberg</td>
<td>20.0</td>
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<td>Red Ribbon Blues</td>
<td>Charles Windster</td>
<td>3.0</td>
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<td>Saving Private Ryan</td>
<td>Steven Spielberg</td>
<td>70.0</td>
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<td>Schindler’s List</td>
<td>Steven Spielberg</td>
<td>25.0</td>
</tr>
<tr>
<td>Sugarland Express, The</td>
<td>Steven Spielberg</td>
<td>3.0</td>
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<tr>
<td>Tenegale, The</td>
<td>Steven Spielberg</td>
<td>60.0</td>
</tr>
</tbody>
</table>
Visualizations

Structuring of result sets

HyperGrid

A screenshot of a user interface for a visualization system, showing a search for "spielberg" with results from movies and people related to Steven Spielberg.
### HyperGrid

#### Movie Search

<table>
<thead>
<tr>
<th>Title: E.T. the Extra-Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Film Links:</strong> mehr...</td>
</tr>
<tr>
<td><strong>Production Year:</strong> 1982</td>
</tr>
<tr>
<td><strong>AkT-Titel:</strong> E.T. and Me, E.T. the Extra Terrestrial, The 30th Anniversary, E.T. - Der Außerirdische</td>
</tr>
<tr>
<td><strong>Taglines:</strong> He is afraid. He is totally alone. He is 3 million light years from home.; His Adventure On...</td>
</tr>
<tr>
<td><strong>MPAA Rating:</strong> PG5</td>
</tr>
<tr>
<td><strong>Runtime:</strong> 115</td>
</tr>
<tr>
<td><strong>Color Info:</strong> Color</td>
</tr>
<tr>
<td><strong>Filming Locations:</strong> 7121 Lonzo Street, Tujunga, Los Angeles, California, USA; Crescent City, Cal...</td>
</tr>
<tr>
<td><strong>Director(s):</strong> Steven Spielberg</td>
</tr>
<tr>
<td><strong>Actors:</strong> Henry Thomas, Dee Wallace, Robert MacNaughton, Drew Barrymore, Peter Coyote, K.C. Martel, Sean Frye, C. Thomas Howell, David M. O'Dell, Richard Swingle, Frank Tho...</td>
</tr>
<tr>
<td><strong>Genre(s):</strong> Adventure, Drama, Family, Fantasy, Sci-Fi</td>
</tr>
<tr>
<td><strong>Keywords:</strong> dark, scene, fish-out-of-water, friendship, utopia, whimsical, entire-title-is-capitalized- acronym, single-parent, encounter, mother-son-relationship; pizza-delivery truck...</td>
</tr>
<tr>
<td><strong>Plot:</strong> While visiting the Earth at night, a group of alien botanists is discovered and disturbed by an approaching human task force. Because of the more than hastily take-off, one of the v...</td>
</tr>
<tr>
<td><strong>Number of Votes:</strong> 65447</td>
</tr>
<tr>
<td><strong>Rating:</strong> 7.8</td>
</tr>
<tr>
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Visualizations

Structuring of result sets

HyperGrid
Visualizations

Structuring of result sets

HyperGrid
User Interfaces for IR Systems
Visualizations
Structuring of result sets

HyperGrid

Steven Spielberg
Alternative Names: Steve Spielberg, Steven Spielberg
Date of Birth: 18 December 1946 (Age: 61)
Place of Birth: Cincinnati, Ohio, USA

Internet:
Movie-Sites: IMDB, OFDb, Yahoo-Movies
Search: Wikipedia, Google, MSN, Yahoo
Bookmarks: Del.icio.us, Diigo.com
Images: IMDB, Google-Image-Search, MSN-Image-Search, Flickr-Search
Citing: Wikinote
Videos: YouTube, Google-Video

Movies:
Keywords: Keyword-Tagcloud for Steven Spielberg.
Partner: Actor-Tagcloud for Steven Spielberg.
Roles: Producer, Director, Miscellaneous Crew, Writer, Editor, Actor, Second Unit Director or Assistant Director, Visual Effects, Himself, Archivmaterial, Notable TV Guest Appearances
Visualizations
Structuring of result sets

HyperScatter

Legend
- Zoom: left and right mouse button
- Bounding-Box: Create a box with the mouse-cursor
Structuring of result sets

HyperScatter
Visualizations

Structuring of result sets

HyperScatter
User Interfaces for IR Systems

Visualizations

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**HyperScatter**

![HyperScatter interface](image)

- **Title**: Spy Who Loved Me, The
- **Internet Links**: more...
- **Production Year**: 1977
- **Aka-Titles**: James Bond 007 - Der Snin, der mich liebte: Annette 007
- **Taglines**: ...In The Biggest Bond of All - Everybody's hot for Action -
- **MPAA Rating**: PG
- **Runtime**: 125
- **Color Info**: Color
- **Filming Locations**: Abu Simbel Temple, Abu Simbel, Egypt, Abu
- **Countries**: UK
- **Poster**:

**Director(s)**: Lewis Gilbert

**Actors**: Roger Moore, Barbara Bach, Curt Jürgens, Richard Kiel, Caroline

**Writer(s)**: Ian Fleming, Christopher Wood, Richard Maibaum

**Genres**: Action; Adventure; Thriller

**Keywords**: spy-film; title-mentioned-in-song; hero;

**Plot**: James Bond (Moore) is back again and his new mission is to find

**Quotes**: Stromberg: Well gentlemen, now that the moment has come to bid

**Alternate Versions**: Cut in Sweden (about 90 sec) when released

**Trivia**: The hull number on the sail of the U.S. submarine USS Wayne in

**Rating**: 7.1

**Number of Votes**: 15571

**Budget**: 14.0

**Gross (US)**: 1.54

**Gross/Budget**: 0.11

**Producer(s)**: Albert R. Broccoli, William P. Carillidge

**Cinematographer(s)**: Claude Renoir

**Composer(s)**: Marvin Hamlisch

**Soundtrack**: “Air On A G String” ‘Johann Sebastian Bach’ (qv); “Piano Concerto No. 18”

**Costume Designer(s)**:

**Editor(s)**: John Glen

**Production Designer(s)**: Ken Adam
Visualizations
Structuring of result sets

HyperScatter
HyperScatter

Roger Moore
Alternative Names: Sean Connery; Sir Roger Moore; Turk Thrust II
Date of Birth: 14 October 1927 (Age: 80)
Place of Birth: Stockwell, London, England, UK

Internet:
Movie-Sites: IMDB OFDb Yahoo-Movies
Search: Wikipedia Google MSN Yahoo
Bookmarks: Del.icio.us Digg.com
Images: IMDB Google-Image-Search MSN-Image-Search Flickr-Search
Citings: Wikiquote
Videos: YouTube Google-Video

Movies:
Keywords: Keyword-Tagcloud for Roger Moore.
Partner: Actor-Tagcloud for Roger Moore.
Roles: Actor, Producer, Director, Costume Designer, Writer, Composer, Himself.
Multiple coordinated views
Definition of multiple coordinated views

User Interfaces for IR Systems
Visualizations
Structuring of result sets
Agent-based systems and mixed-initiative interfaces

- Agent-based systems
- Mixed initiative interfaces
- Interface agents in Daffodil
Agent-based systems and mixed-initiative interfaces

Interface agents
Agent-based systems and mixed-initiative interfaces

Letizia

- Interface agent for Web surfing
- Agent observes visited pages
- Constructs profile of interest
- Autonomously follows links from visited pages, rates them according to interest profile
- Suggests interesting pages to the user
Interface agent in MS Office XP
Interface agent in MS Office XP

Die Liste der üblichen Englisch (USA) AutoKorrektur-Einträge ist nicht verfügbar. Dieses Feature ist im Augenblick nicht installiert. Möchten Sie es jetzt installieren?

Ja  Nein
Agent-based systems and mixed-initiative interfaces

Agent-based systems

Paper clip

- observes user
- makes suggestions
- interrupts the user’s actions
- appears at the border of the window
- animated - even when only observing
- annoys the user
- switched off by most users
Agent-based systems and mixed-initiative interfaces

Agent-based systems

Paper clip

(from www.userfriendly.org/)
Agents vs. direct manipulation

Direct manipulation
- predictability
- control
- control elements
- immediate feedback
- visualization

Interface agents
- observe
- imitate
- adaptive
- trainable
- learn
- exchange messages
Synthesis of paradigms

- Delegation is necessary: cognitive overload and complexity
- Help and support for increased information literacy
- Higher-level search functions for more effective searches
Mixed initiative interfaces
(Horvitz, 1999)

- added value
- user’s uncertainty
- attention span
- cost and benefit
- dialog design with queries
- starting/stopping automated functions

- timing
- scalability
- possibility of correction, improvement
- social behavior
- history
- learning by observation
Division of labor

- trust
- autonomy
- control
- attention
User Interfaces for IR Systems
Agent-based systems and mixed-initiative interfaces
Mixed initiative interfaces

Trust

- trust is prerequisite for delegation
- trust reduces need for control
- trust must grow from experience
- trust must be evaluable at any time
- Kuhlen (1999): goal is trust based on information!
Autonomy

- information autonomy (Kuhlen)
- action autonomy
- autonomy as basis of trust
Control

- control of workflow
- control of decisions
- control of processes
- control of quality
Attention

- concentration
- costs of interrupts
- awareness
- distraction
Interface agents in Daffodil

Spelling correction

- word marked as potentially misspelled
- proposed correction appears after some delay
Syntactic errors in query formulation
Suggestion of related terms

(appear after some delay)
Usability study on proactivity in Daffodil

- 30 test persons
- focus on query formulation
- results:
  - users are very uncertain,
  - enter the same query multiple times
  - stare at keyboard
  - ignore hints displayed elsewhere on the screen
- improvements due to proactive functions:
  - less syntactic and semantic errors
  - better tactical decisions
  - users feel more certain
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Conclusion
Conclusion

- Many proposals for fancy visualizations, but
  - few of them useful for general IR
  - few evaluations only
- Current trends for advanced interfaces
  - proactive interfaces
  - interfaces based on cognitive models