

# HyperGrid

Accessing Complex  
Information Spaces

## Content

- Motivation
- Information Seeking
- Complex Information Space
- Zooming Interface Paradigm
- Attribute Space
- HyperGrid
- Demo
- Conclusion & Outlook
- Submitted Papers

# Motivation

- Decision-making based on accessing, sorting, comparing and relating heterogeneous multi-dimensional data
  - e.g. flight connections, media library, file management
- Usual task, but very demanding
  - e.g. Hyperlink structure, window management, list visualization
  - Lost in Hyperspace

115 JAN RDU SFO																
ORD AIRPORT CONST-ARRIVE EARLY																
15 JAN THU RDU/EST SFO/PST -3																
FOR MORE AVAILABILITY SEE -OAK SFO SJC																
1	1765	F7	Y7	B7	H7	G7	Q7	V7	RDUOUD	8	N	653A	884A	72S	B/V	0
		K7	M7	N7	W7											
2	485	F7	Y7	B7	H7	G7	Q7	V7	SFO	9	N	855A	1147A	580	B/V	0
		K7	N7	W7												
3	1191	F7	Y7	B7	H7	G7	Q7	V7	RDUSFO	9	N	728A	1250P	757	BS/VS	1
		H7	K7	M7	N7											
4	1661	F7	Y7	B7	H7	G7	Q7	V7	RDUDFW	9	N	625A	837A	580	B/V	0
		H7	K7	M7	N7											
5	964	F7	Y7	B7	H7	G7	Q7	W7	SFO	8	N	920A	1120A	763	V	0
		V7	K7	M7	N7											

Google Web Search Results for "flight connection basel london": 37,000 results.

Top results include:

- Swiss International Air Lines | UK & Ireland , About SWISS, plane ...  
... a number of flights out of the UK, the route from London Heathrow to Basel ... one day-round-trip connection between Bern and the EuroAirport in Basel. ... yourcountry.swiss.com/local/swi-in-pr-press-release-25.02.03-uk - 21k - Cached - Similar pages
- Swiss International Air Lines | UK & Ireland -> Trip Planner ...  
... SWISS restarts daily flights between Basel and London City ... also ensures good connections to the SWISS intercontinental and European transfer network ... yourcountry.swiss.com/local/trip-planner-uk/tg-tt-in-new-flights-uk.htm - 25k - Cached - Similar pages  
[ More results from yourcountry.swiss.com ]
- Cheap Flights to Basel Euroairport from the UK  
... Flights from London to Basel have recently been stepped up, as easyJet have pulled out of ... Connections. See rail connections via Zurich or Geneva. ... www.flightradar24.com/Europe/Switzerland/Basel.asp - 25k - Cached - Similar pages
- Swiss Low Cost No Frills Airlines (altitude Travel)  
... A Danish airline which operates flights between Basel and Copenhagen in ... low cost connections from Zurich to London Luton, from Basel to Luton, ... www.attitudetravel.com/switzerland/lowcostairlines/ - 41k - Cached - Similar pages
- Cheap Flights From openjet.com - europe's low fare flight search ...  
openjet provides independent flight comparison between Europe's major low fares ... Frustrated with figuring out connections between different airlines? ... www.openjet.com/ - 51k - 12 Mar 2005 - Cached - Similar pages
- tuscany italy tuscany tourists guide travel tips trasportations ...  
... Nearly forty flights a day on departure, domestic connections (Bologna, ... Barcelona, Basel, Brussels, Frankfurt, Geneva, London Gatwick, Munich, ... www.welcometuscany.it/trasportations/flight.htm - 41k - 12 Mar 2005 - Cached - Similar pages

# Information Seeking

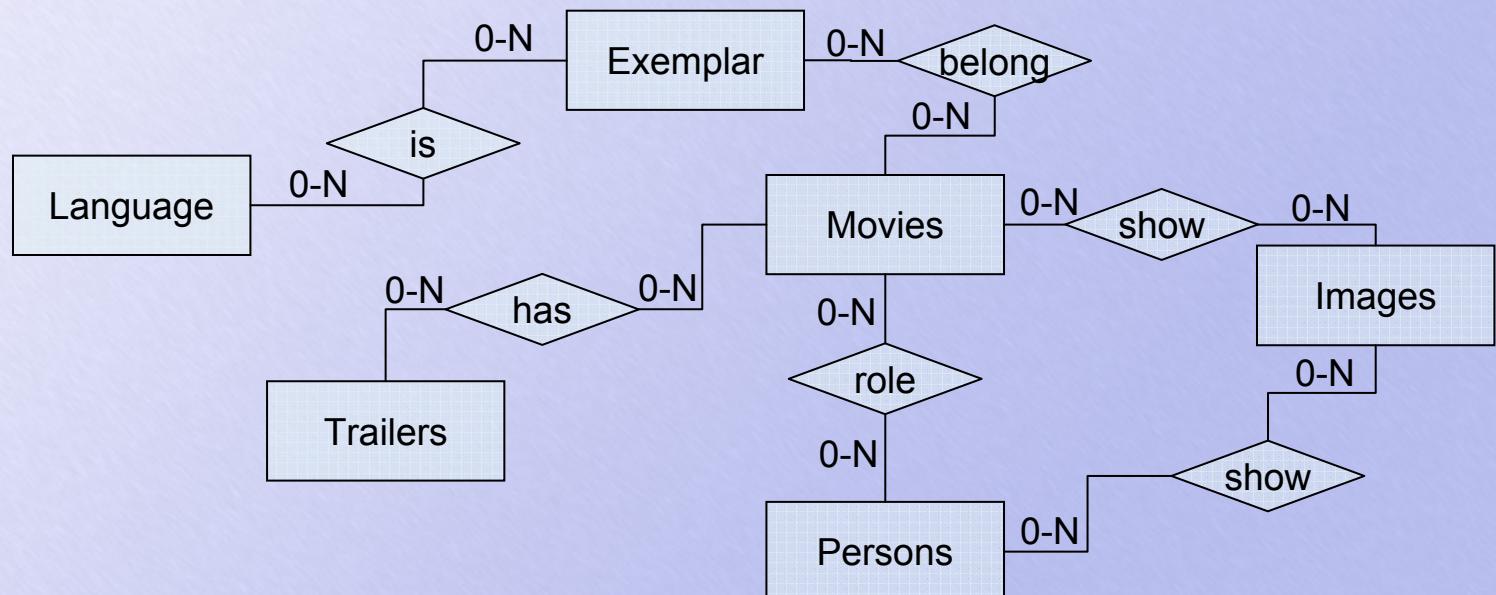
Search Strategies (Shneiderman/Marchionini):

- Analytical search (known-item search)  
Specific information need, planned, goal driven
- Browsing strategies (browsing for inspiration)  
Undefined need, open-ended, data driven

“...as the need shifts in part or whole, the strategy often shifts as well...” (Bates)

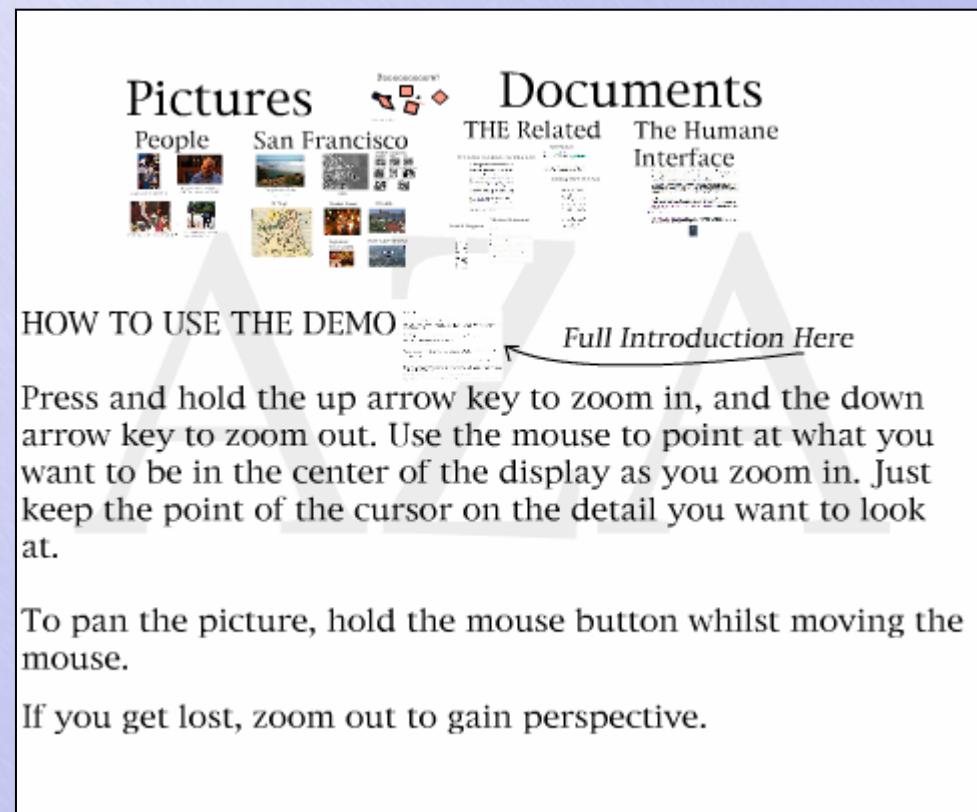
# Complex Information Spaces

- meta data and real data
- data/media types (int, text, pdf, pics, movies...)
- > 25 attributes and thousands of data sets
- m:n relationships



# Zooming Interface Paradigm

- Access to infinite plane with infinite resolution
- No Hyperlinks and windows
- Recognition of landmarks and relative positions (psi-effect)
- Real world behavior
- Semantic zooming



## Zooming Interface Paradigm

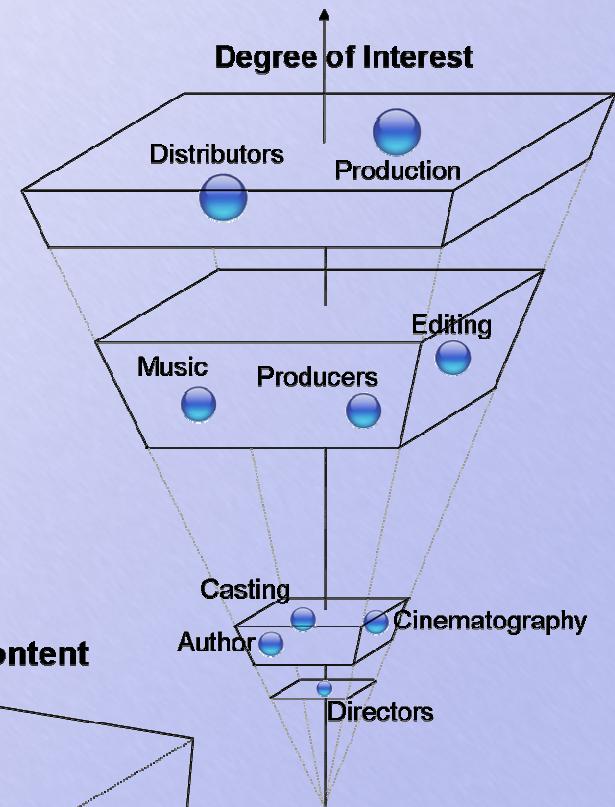
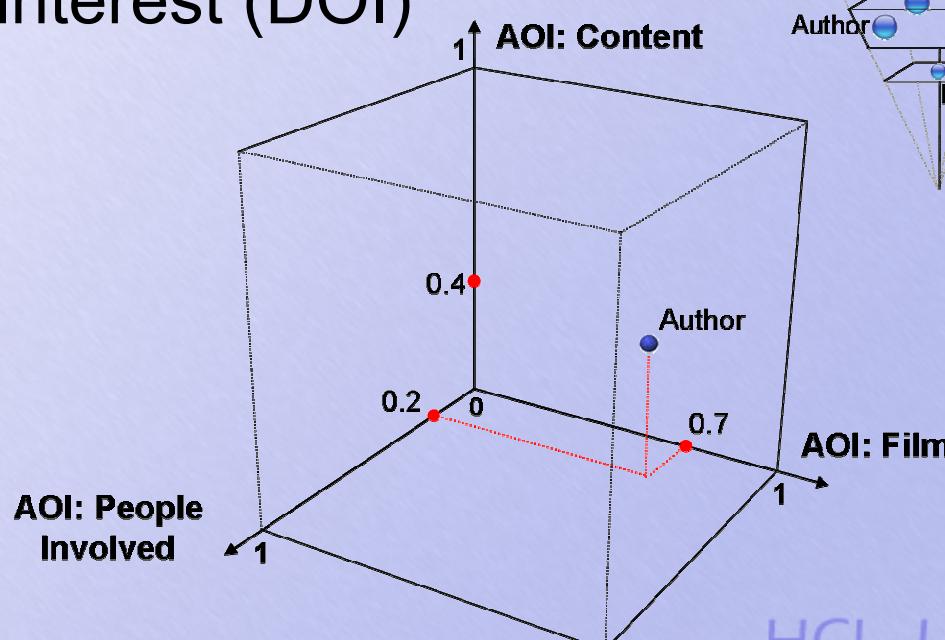
Problems:

- Acceptance
- Relation between objects
- No guidance

→ Lost in Zoomspace?

# Attribute Space

- Modeling the information space for semantic zooming
- Aspect of interest (AOI) & Degree of interest (DOI)



# HyperGrid

- Combination of traditional interface concepts and zooming interface paradigm
- Tabular visualization with zooming technology
- Structuring complex information space
- Exploration by guidance, restricted degree of freedom
- Filter and sort functionalities
- Details on demand  
Focus and context

## Drew Barrymore

48 hits

Show: all Titles

Film	People Involved	Year	
<no filter>	<no filter>	<no filter>	
2000 Malibu Road	Joel Schumacher	1992	
2004 World Series	Bill Wehr	2004	
Title: 50 First Dates Tagline: Imagine having to win over the girl of your dreams... every friggin' day. Alternate Titles: Fifty First Dates ; Fifty First Kisses ; 50 erste Dates [de] Country: USA Language: English; Hawaiian; Mandarin	<p><b>Genre:</b> Comedy; Romance  <b>Plot:</b> Henry Roth (Sandler) is a veterinarian living in Hawaii who enjoys the company of vacationing women. He leaves the playboy life behind after he falls for Lucy (<a href="#">Barrymore</a>), who suffers from short-term memory loss. Since she can never remember meeting him, Henry has to romance Lucy every single day and hope that she falls for him.</p> <p><b>Comment Title:</b> The fish doctor  <b>User Comment:</b> Not being an Adam Sandler fan, we avoided this film when it was released earlier last year. The premise sounded too much like "Groundhog Day". We took a chance the other night when it was shown on cable, and frankly, we found the movie entertaining.</p>	<p><b>Drew Barrymore</b></p>  <p><b>Alternative Name:</b> -  <b>Date of Birth:</b> 22 February 1975  <b>Location:</b> Culver City, California, USA  <b>Filmography as:</b>          Actress, Producer, Miscellaneous Crew, Director, Herself, Archivmaterial, Notable TV Guest Appearances...</p>	2004
Altered States	Ken Russell	1980	
Bad Girls	Jonathan Kaplan	1994	
Title: Batman Forever Tagline: - Alternate Titles: Batman 3 ; Forever ; Batman Forever [de] Country: USA Language: English Year: 1995	<p><b>Plot [Batman Forever]</b></p> <p>- The Dark Knight of Gotham City confronts a dastardly duo: Two-Face and the Riddler. Formerly District Attorney Harvey Dent, Two-Face incorrectly believes Batman caused the courtroom accident which left him disfigured on one side; he has unleashed a reign of terror on the good people of Gotham. Edward Nygma, computer-genius and former employee of millionaire Bruce Wayne, is out to get the philanthropist; as The Riddler he perfects a device for draining information from all the brains in Gotham, including Bruce Wayne's knowledge of his other identity.</p>	<p><b>Directors:</b> Joel Schumacher  <b>Cast:</b> Val Kilmer, Tommy Lee Jones, Jim Carrey, Nicole Kidman, Chris O'Donnell, Michael Gough, <a href="#">Pat Hingle</a>, <a href="#">Drew Barrymore</a>, Debi Mazar, Elizabeth Sanders, <a href="#">Rene Auberjonois</a>, Joe Grifasi, Philip Moon, Jessica Tuck, Dennis Paladino, Kimberly Scott, Michael Paul Chan, <a href="#">Jon Favreau</a>, Greg Lauren, Ramsey Ellis, Michael Scratton, Eileen Seelye, David U. Hodges, Jack Betts, Tim Jackson, Daniel Reichert, Glory Fioramonti, Larry A. Lee, Bruce Roberts, George Wallace, Bob Zmuda, Rebecca Budig, Don 'The Drago...</p> <p><b>Cinematography:</b> Stephen Goldblatt  <b>Writing Credits:</b> Bob Kane, Lee Batchler, Janet Scott <a href="#">Batchelor</a>, <a href="#">Lee Batchelor</a>, <a href="#">Janet Scott</a>, <a href="#">Batchelor</a>, <a href="#">Alvin</a></p>	1995
Best Men	Tamra Davis	1997	
Boys on the Side	Herbert Ross	1995	
Cat's Eye	Lewis Teague	1985	
Charlie's Angels	McG	2000	
Charlie's Angels: Full Throttle	McG	2003	
Confessions of a Dangerous Mind	George Clooney	2002	

## Martin Scorsese

97 hits

Show: [all Titles](#)

Film	Content	People Involved	Year
<no filter>	drama	<no filter>	199
<input type="checkbox"/> Bringing Out the Dead	Drama	Martin Scorsese	1999
<input type="checkbox"/> Title: Cape Fear <b>Tagline:</b> There is nothing in the dark that isn't there in the light. Except fear. <b>Alternate Titles:</b> Kap der Angst [de]	<b>Genre:</b> Crime; Horror; Thriller; Drama <b>Plot:</b> Sam Bowden is a small-town corporate attorney /"Leave It to Beaver"-esque family-man. Max Cady is a tattooed, cigar-smoking, bible-quoting, psycho... <b>Comment Title:</b> Cape Fear (1991)	<b>Directors:</b> Martin Scorsese <b>Cast:</b> Robert De Niro, Nick Nolte, Jessica Lange, Juliette Lewis, Joe Don Baker, Robert Mitchum, Gregory Peck, Martin Balsam, Illeana Douglas, F... <b>Cinematography:</b> Freddie Francis	1991
<input type="checkbox"/> Casino	Crime; Drama	Martin Scorsese	1995
<input type="checkbox"/> Clockers	Drama; Crime	Spike Lee	1995
<input type="checkbox"/> Con gli occhi chiusi	Drama	Francesca Archibugi	1994
<input type="checkbox"/> Title: Goodfellas <b>Tagline:</b> "As far back as I can remember, I've always wanted to be a gangster." -- Henry Hill, Brooklyn, N.Y. 1955. <b>Alternate Titles:</b> GoodFellas ; Wise Guy ; GoodFellas - Drei Jahrzehnte in der Mafia [de] <b>Country:</b> USA <b>Language:</b> English; Italian <b>Year:</b> 1990 <b>Length:</b> 145 <b>Poster:</b> 	<b>Genre:</b> Crime; Drama <b>Plot:</b> Henry Hill is a small time gangster, who takes part in a robbery with Jimmy Conway and Tommy De Vito, two other gangsters who have set their si... <b>Comment Title:</b> A true classic <b>User Comment:</b> This is the gangster film at its finest. Scorsese is on top form as are Pesci and De Niro. Liotta has never bettered the performance he give... <b>Rating:</b> 8.6 <b>Recommendations:</b> The Godfather Trilogy: 1901-1980, Casino, The Godfather, The Godfather: Part II, Once Upon a Time in America, Bound by Honor, C... <b>Certification:</b> Argentina:18; Australia:R; Canada:18A ; Chile:18; Finland:K-16; France:-16; Germany:16; Hong Kong:IIB; Italy:VM14; Japan:PG-12; Netherlan... <b>Credits:</b> -	<b>Directors:</b> Martin Scorsese <b>Cast:</b> Robert De Niro, Ray Liotta, Joe Pesci, Lorraine Bracco, Paul Sorvino, Frank Sivero, Tony Darrow, Mike Starr, Frank Vincent, Chuc... <b>Cinematography:</b> Michael Ballhaus <b>Writing Credits:</b> Nicholas Pileggi, Nicholas Pileggi, Martin Scorsese <b>Music:</b> A. Emmett Adams, Richard Adler, Paul Anka, Jeff Barry, Eric Clapton, Donovan, Ernie Erdman, Paul Evans, Claude François, Jim Gord... <b>Producers:</b> Barbara De Fini, Bruce S. Pustin, Irwin Winkler <b>Editing:</b> James Y. Kwei, Thelma Schoonmaker <b>Production:</b> Bruce S. Pustin	1990
<input type="checkbox"/> Grace of My Heart	Comedy; Drama; Music	Allison Anders	1996
<input type="checkbox"/> Guilty by Suspicion	Drama	Irwin Winkler	1991
<input type="checkbox"/> Kicked in the Head	Comedy; Drama	Matthew Harrison	1997
<input type="checkbox"/> Kundun	Drama	Martin Scorsese	1997
<input type="checkbox"/> Mad Dog and Glory	Comedy; Drama	John McNaughton	1993
<input type="checkbox"/> Quiz Show	Drama	Robert Redford	1994
<input type="checkbox"/> The Last Castle			2005

## Conclusion

- HyperGrid as dynamic window into the data space
- Attribute Space as universal modeling construct for complex information spaces in ZUIs
- Symbiosis of traditional and ZUI approach
- No lose of the visual context  
Overview and detail

## Outlook

- Application Domain:
  - Desktop Search
  - Video on demand
  - TV program
  - File management / sharing
- Closer coupling with  
ZuiScat (Ph.D Thesis T. Buering) &  
SieveMap (Bachelor Thesis C. Marx)
- Further evaluations

# References

- Bates, M. L., *The design of browsing and berrypicking techniques for the on-line search interface*. In: Online Review, 13 (5), 1989, p. 407-431.
- Jetter, H.-C., Gerken, J., König, W., Grün, C., Reiterer H., *HyperGrid – Accessing Complex Information Spaces*. Submitted to HCI 2005.
- Marchionini, G., *Information Seeking in Electronic Environments*. Edited by J. Long. Cambridge Series on Human-Computer Interaction: Cambridge University Press, 1995.
- Raskin, J., *The Humane Interface: New Directions for Designing Interactive Systems*. Reading, Massachusetts: Addison Wesley, 2000.
- Rüger, M., Preim, B., Ritter, A., *Zoom Navigation: Exploring large information and application spaces*. In: Workshop on Advanced Visual Interfaces (AVI 96), ACM Press, pp. 40-48, 1996.
- Shneiderman, B., *The eyes have it: A task by data-type taxonomy for information visualizations*. In Proceedings of Visual Languages (IEEE 1996), pp. 336–343, 1996.

## Submitted Papers

Grün, C., Gerken, J., Jetter H.-C., König, W., Reiterer H.,  
*MedioVis – a User-Centred Library Metadata Browser.*  
Submitted to ECDL 2005, Wien.

Jetter, H.-C., Gerken, J., König, W., Grün, C., Reiterer H.,  
*HyperGrid – Accessing Complex Information Spaces.*  
Submitted to HCI 2005, Edinburgh.

Reiterer, H., Jetter, H.-C., König, W., Gerken, J., Grün, C.,  
*Zoomtechniken zur Exploration komplexer Informationsräume  
am Beispiel „HyperGrid“.*  
Submitted to Mensch & Computer 2005, Linz.