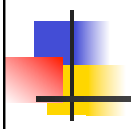
Human-Computer Interaction IS4300



Today

- Social Interaction
- Face-to-Face Communication
- UIs for Social Media

Social Interaction

- Why care?
  - Humans are social creatures.
  - You should consider the social impact of your designs.
  - We can facilitate social interaction with tech.
- Disciplines
  - anthropology
  - sociology
  - social psychology

Communication

The fundamental building block of sociality

Notation

- Each utterance on a new line, preceded by speaker initial (Diane,Beth,Ned).

B: [1 So what are you looking for]?

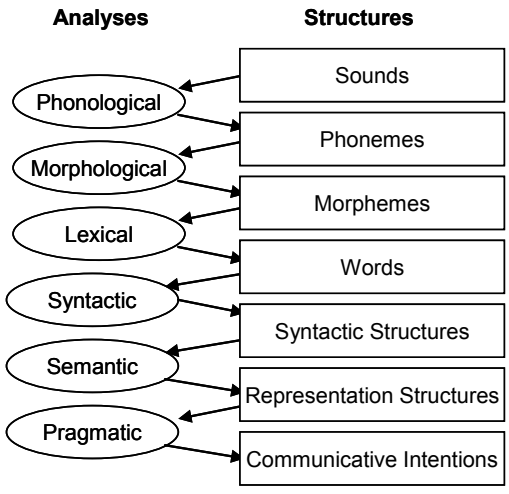
1: right hand point at B

N: Oh, um, I think three bedrooms.

Human Dialogue

Why should HCI designers/researchers study it?

Hierarchical Structure of Language

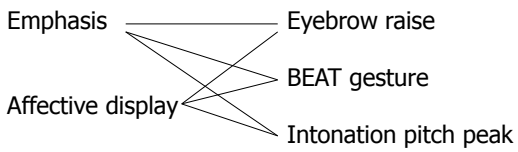


Discourse, Dialogue & NVB are all pragmatic concerns

- Intimately depend on context
- Discourse is concerned with
  - The combinatorial meaning of utterances (internal context)
  - Other contextual phenomena (external context)
    - Deixis
    - Social deixis
    - Grounding & referring
    - Etc.

Conversational behavior vs. function

- Eyebrow raise is a *conversational behavior*
- Emphasis is a *conversational function*
- There is a many-to-many mapping between behaviors and functions

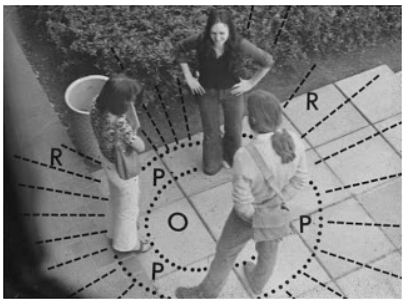


Types of Conversational Function

- Propositional
- Interactional
- Affective
- Attitudinal
- Relational
- …

Proxemics *functions?*

- Engagement & disengagement
- Social distance
- Immediacy behavior



Eye gaze *functions?*

- Attention
- Deictic
- Turn-taking

Eyebrows

- Emphasis
- Affective displays

Headnods *functions?*

- Emphasis
- Greetings
- Backchannels
- Acknowledgements

Hand gesture *functions?*

- *Form… (from David McNeil)*
  - Beat
  - Deictic
  - Iconic
  - Metaphoric
  - Emblematic
- Function
  - Emphasis
  - Propositional/Semantic
  - Turn-taking / interruption

Turn-taking

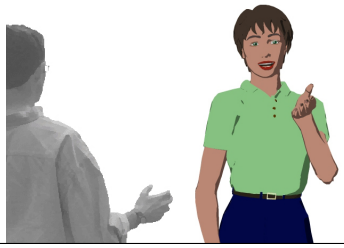
- Interlocutors cannot talk at once
- Cues for 'giving turn'
  - Gaze at next speaker
  - Pause
  - Rising end intonation
- Cues for taking 'taking turn'
  - Speaking
  - Gesturing

Grounding

- Process by which interlocutors come to a shared understanding of what is said
- A collaborative process
- Mechanisms
  - Requests for acknowledgement
  - Acknowledgements
    - Can be contingent move
  - Request for repair
  - Repair

Embodied Conversational Agents

- recognize and respond to verbal and non-verbal input
- generate verbal and non-verbal output.
- use conversational functions such as turn taking, feedback, and repair mechanisms.
- can negotiate conversational process, as well as contribute new propositions to the discourse.



Motivation

- Intuitive
- Multi-modal
- Social

Example: REA

- Acknowledgment of user's presence
  - Proxemics, facial display
- Feedback function
  - Headnod, paraverbal (e.g. "mmhmm"), eyebrows
- Turntaking function
  - User speech, gesture
  - Rea gaze
- Greeting, Farewell
- Emphasis
- Multimodal propositional output

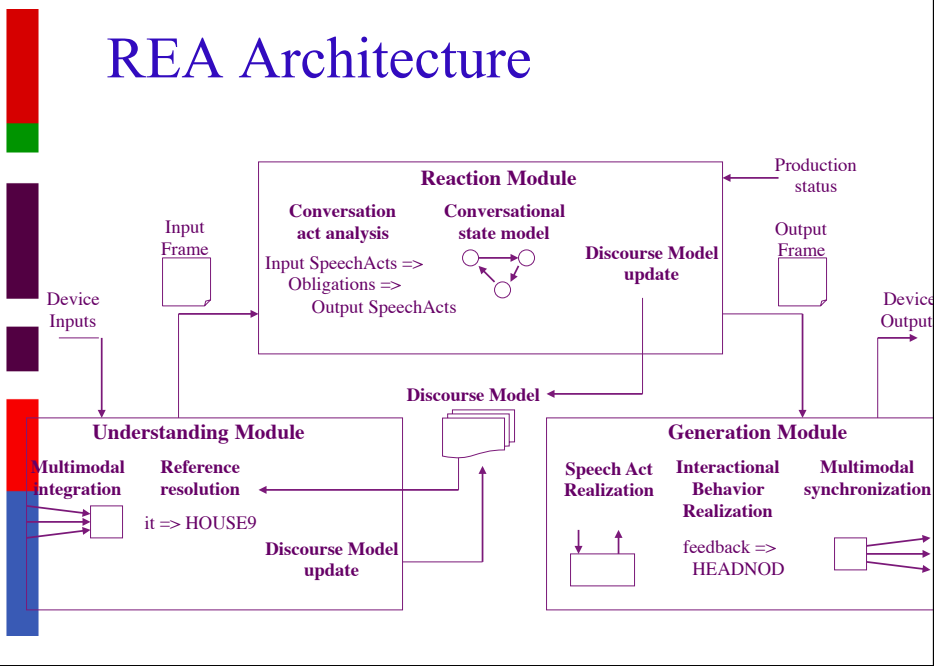
Rea Turn-Taking Model

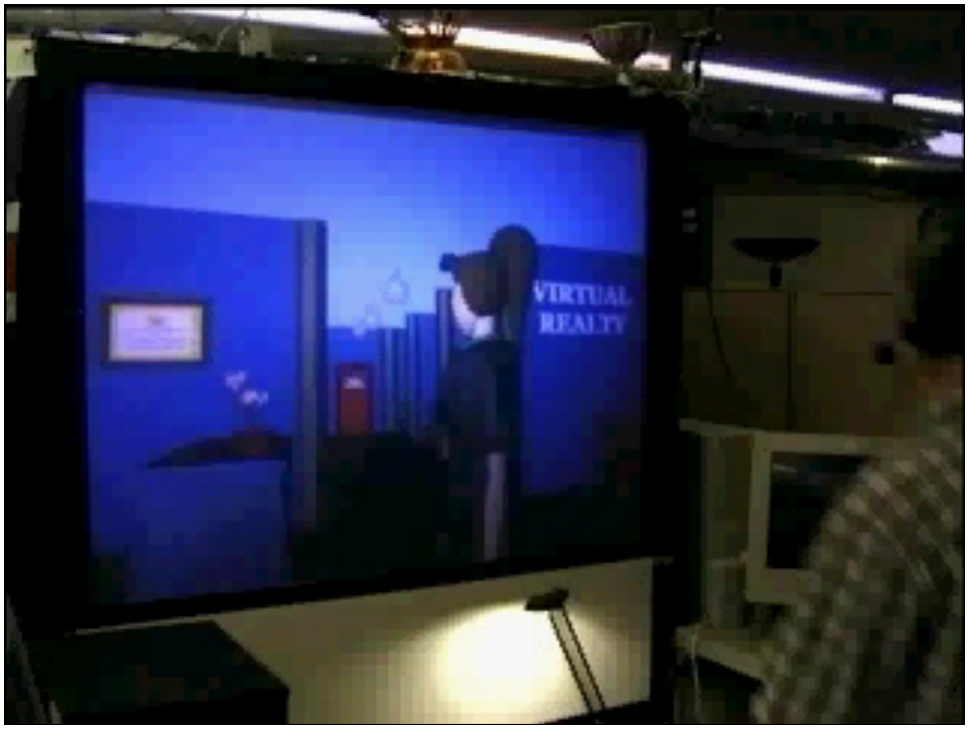
State	User Input	Input Function
Rea speaking	Gesture	Wanting turn
	Speech	Taking turn
User speaking	Pause of <500 msec.	Wanting feedback
	Imperative phrase	Giving turn
	Interrogative phrase	Giving turn
	Declarative phrase & pause >500 msec. & no gesture	Giving turn
	Declarative phrase & long gesture or pause	Holding turn

Rea Conversational Behaviors

State	Output Function	Behaviors
User Present	Open interaction	Look at user. Smile. Headtoss.
	Attend	Face user.
	End of interaction	Turn away.
	Greet	Wave, "hello"
Rea Speaking	Give turn	Relax hands. Look at user. Raise eyebrows
	Signoff	Wave. "bye"
User Speaking	Give feedback	Nod head Paraverbal
	Want turn.	Look at user. Raise hands. Paraverbal("umm").
	Take turn.	Look at user. Raise hands to begin gesturing. Speak.

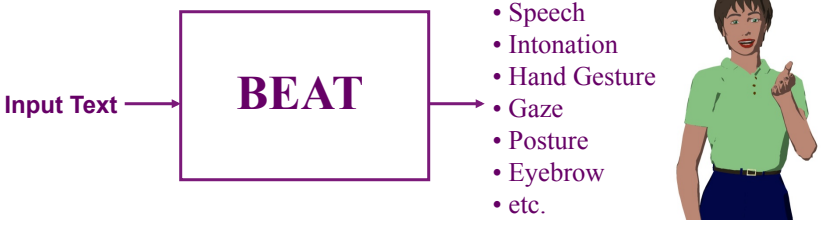
REA Architecture



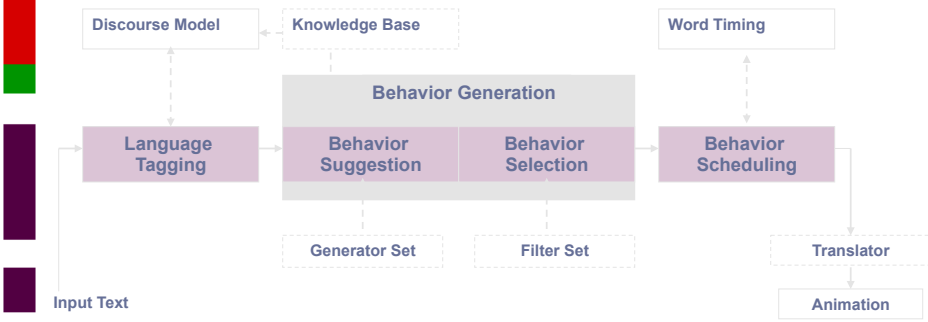


BEAT: An Extensible Toolkit for Generating Coverbal Behavior

- A toolkit to make building new ECAs easier
- Encapsulates all linguistic knowledge required to add nonverbal behavior to a script

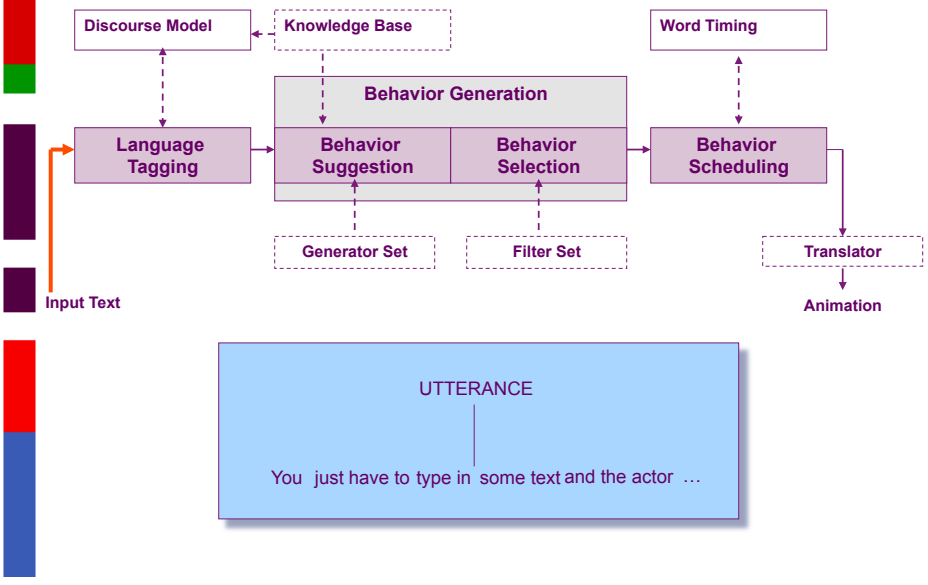


BEAT Architecture



"You just type in some text, and the actor talks and gestures by itself!"

XML Trees Passed Among Modules



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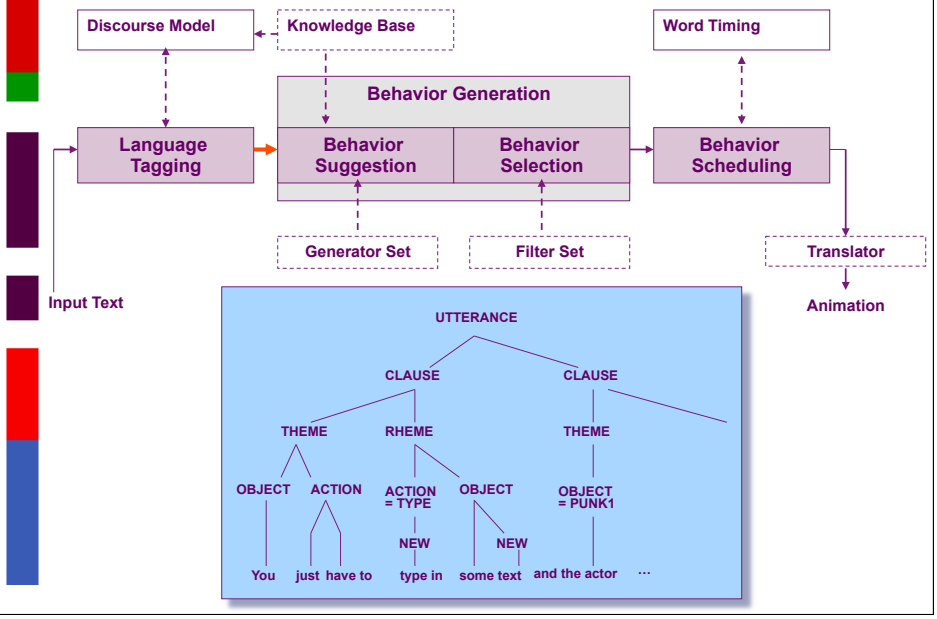

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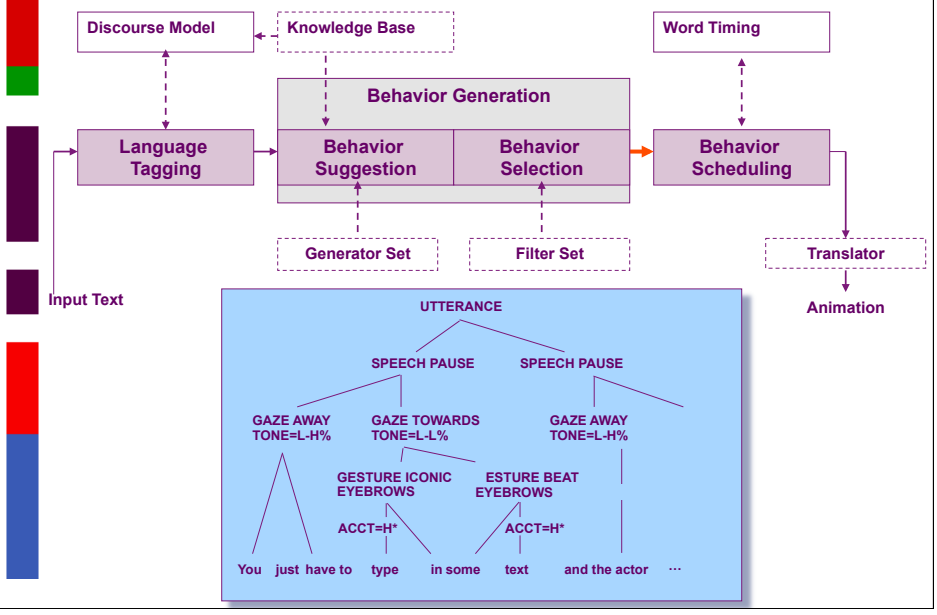

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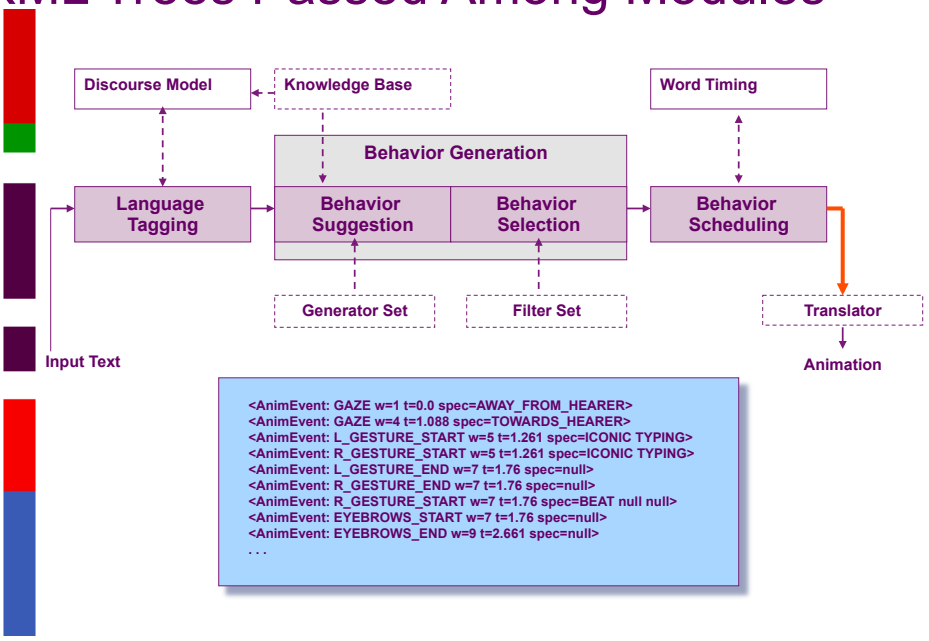
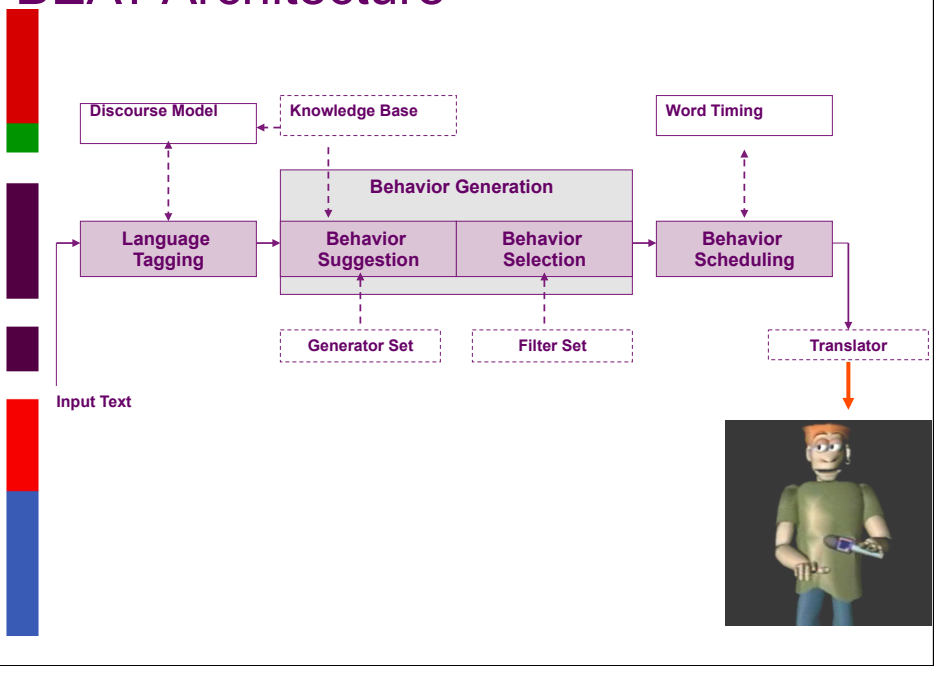
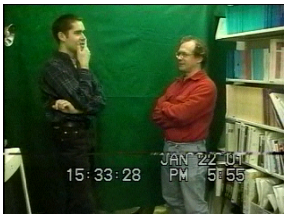


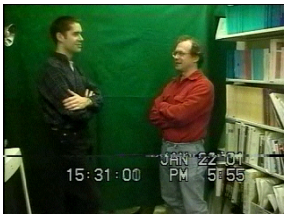
BEAT Architecture

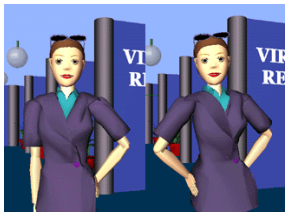


Empirical Studies: Posture Shifts

Cassell, Nakano, Bickmore, Sidner &Rich. "Non-Verbal Cues for Discourse Structure." ACL '01







Posture shifts with respect to discourse segment

	Monologues (0.06/s)			Dialogues (0.07/s)		
	ps/s	ps/int	energy	ps/s	ps/int	energy
Inter-dseg	0.340	0.837	0.832	0.332	0.533	0.844
intra-dseg	0.039		0.701	0.053		0.723


Finish_Topic / GiveUp_Turn

Resulting Models

New Topic Level	Gesture		
	NONE	POINT	REGION
No Change	80.8%	13.1%	6.1%
PAGE	63.6%	13.6%	22.7%
SECTION	48.3%	32.8%	19.0%
ITEM	31.2%	65.9%	2.9%

Nurse Gaze

Speaking, not gesturing: **gaze at document 65%**
Speaking and gesturing: **gaze at document 83%**

What are the implications for computer-mediated communication?

Transfer effects

- carry expectations into electronic media …

  … sometimes with disastrous results

- may interpret failure as rudeness of colleague

e.g. personal space

- video may destroy mutual impression of distance

Back channels (grounding) - media effects

Restricting media restricts back channels

video	–	loss of body language
audio	–	loss of facial expression
half duplex	–	lose most voice back-channel responses
text based	–	nothing left!

Text-based communication

Most common media for asynchronous groupware
exceptions: voice mail, answer-phones

Familiar medium, similar to paper letters
but, electronic text may act as speech substitute!

Types of electronic text:
- discrete directed messages, no structure
- linear messages added (in temporal order)
- non-linear hypertext linkages
- spatial two dimensional arrangement

In addition, linkages may exist to other artefacts

ALAN DIX, JANET FINLAY, GREGORY D. ABOWD, RUSSELL BEALE
HUMAN-COMPUTER INTERACTION
THIRD EDITION

Problems with text

No facial expression or body language
⇒ weak *back channels*

So, difficult to convey:
affective state – happy, sad, …
illocutionary force – urgent, important, …

Participants compensate:
'flaming' and smilies
;-) :-( :-)

Maintaining context

Recall *context* was essential for disambiguation

Text loses external context, hence deixis
(but, linking to shared objects can help)

1. **Alison:** Brian's got some lovely roses
2. **Brian:** I'm afraid they're covered in greenfly
3. **Clarise:** I've seen them, they're beautiful

Both (2) and (3) respond to (1)
… but *transcript* suggests greenfly are beautiful!

ALAN DIX, JANET FINLAY, GREGORY D. ABOWD, RUSSELL BEALE
HUMAN-COMPUTER INTERACTION
THIRD EDITION

Coping strategies

People are very clever!
they create *coping strategies* when things are difficult

Coping strategies for slow communication
attempt to increase granularity:

eagerness – looking ahead in the conversation game
- **Brian:** Like a cup of tea? Milk or lemon?

multiplexing – several topics in one utterance
- **Alison:** No thanks. I love your roses.

Other concerns in ch 24

- Presence
- Relationship
- Culture
- Relationship to HCI
  - Social Network Analysis
  - Compliance / Persuasion
  - Anonymity
  - Presence
  - Awareness

Social Interfaces
Benyan Ch 15

Social Media

- Explosion in use of technologies to connect people.
- Facebook, Google+, eBay, TripAdvisor, Twitter, etc. etc.
- Used by millions of people everyday

Benyan's history

- 1945-1989 hypertext
- 1993 Mosaic
- -2001 web explosion & crash
- 2004+ web 2.0->social media

Social Media

Wilson & Mislove

- Social media has transformed society
  - Reduced barriers to communication
  - Democratized content publication
- As a computer scientist...
  - Tend to ignore users
  - Social media makes users a part of the system
- Important to understand interactions
  - Within the system (traditional CS)
  - Between users and system (HCI)
  - Among users (sociology)

What is social media?

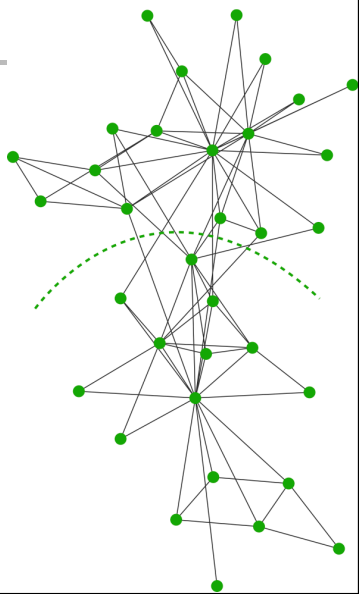
Wilson & Mislove

- Systems with *user interaction as critical component*
- Online *communities*
  - Facebook, MySpace, YouTube
- *Communication* systems
  - Skype, Instant Messaging
- Social *news media*
  - Blogs, iReport
- Online *worlds*
  - World of WarCraft, Second Life
- Online *marketplaces*
  - eBay, Etsy, Square

Network Science

Wilson & Mislove

- Natural fit with social media sites
  - Networks are a way to represent *interactions*
  - Users typically only interact with small subset of others
- Opportunities for large-scale research on social networks
- Degrees of *influence and effect beyond friends*
  - Obesity *Fowler and Christakis, NE J. Med. 2007*



Example: Business Internal Social Networking Site

IBM Beehive

2007-2011

Joan DiMicco

IBM Today

- **IBM's business:**
  software, consulting, information technology (IT) services
- **350,000 employees**
- **170 countries**
- **intranet:**
  - employee directory
  - blogs
  - forums
  - social bookmarking

IBM's logo in 1924

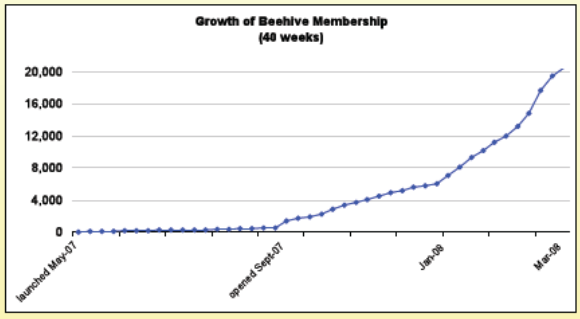
Overview of Beehive

- **launched in 2007 internally**
  - Today: users moving to Connections
- **opt-in social networking site**
- **profiles – self-branding**
- **shared content – connecting**
  - photos, lists, events
- **buzz – social interaction**

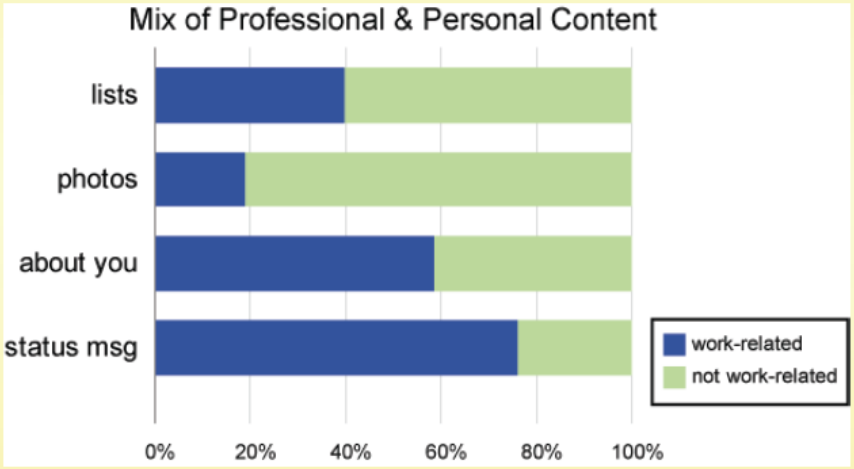
Beehive profile reflects current activity

Rapid growth, enthusiastic users

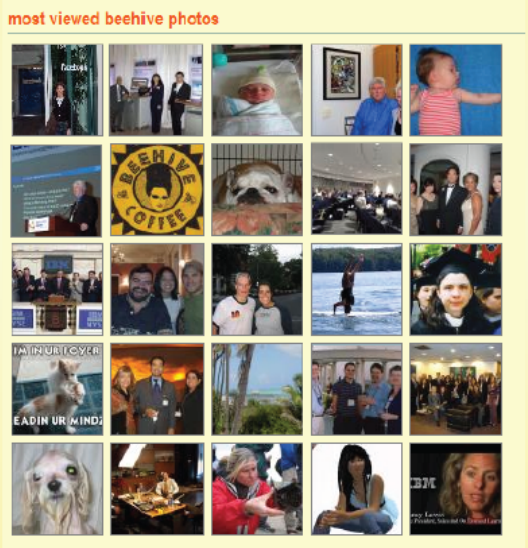
- **Over 60,000 users**
  - 80,000 photos, 22,000 lists, 3600 events
- **67 countries, 60% non-US**



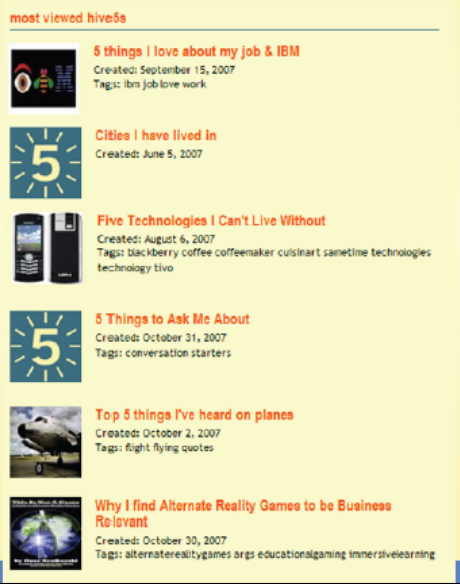
Blending work and non-work



Photos:
babies, pets, vacations, team photos



Lists: travel, hobbies, humour, opinions, advice



Events: presentations, conferences, social events hosted at IBM, brainstorms

Sharing with their colleagues

- ***More sharing with "weak ties" than close colleagues***

"[Beehive] helped me … maintain loose social ties with people I don't have a close, frequent connection with (which is based on a work or friendly relationship), but would like to do some maintenance to my connection with them, for the future's sake."

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Not for team sharing

- **Do you use Beehive for interacting with your immediate colleagues?**

"No, that is typically done via conference calls, emails, sametime [instant messaging]. Started using Beehive to connect with colleagues, but already in daily meetings together. Find myself connecting with people outside my daily colleagues. I already know a lot about them."

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Discovering new colleagues

- ***serendipitous discovery of new colleagues***

"Browsing contact lists of my contacts [on Beehive] also helped me get better knowledge of who should I know within IBM (by seeing who appears in multiple contact lists). I also learned about informal communities that exist within IBM - the cat lovers, the photographers, and maybe even the people who play strange musical instruments."

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Strength and Types of Relationships

Factors Predicting Relationship Strength

Predicts Strong Tie

Content recommendations between you and colleague
You interact online with *mutual* colleagues
Explicit "friend" connection between you and colleague
Colleague views your online profile

Predicts Professionally Close

You work in the same division
You have a direct management relationship

Predicts Personally Close

You view colleague's online content (e.g. photos)
You comment on colleague's profile

A Wu, DiMicco, J.M., Millen, D.R. (2010) "*Detecting Professional versus Personal Closeness Using an Enterprise Social Network Site*." Proceedings of CHI 2010, April 2010.

IBM

Main Conclusions

- **browsing, not searching**
  - unlike Facebook, employees using it to discover new people and reach out
- **privacy less of a concern**
- **aware of audience, targeting content**
- **blending of personal/professional**
  - humanizing
  - connecting global workforce
  - supporting career advancement goals

IBM

Design Considerations for Social Media

- What's different from single-user desktop UI design?
  - Identity
  - Privacy
  - Trust
  - Credit / Reputation
  - Motivating use/contribution
  - Moderating content & behavior

Exercise

- Groups
- Design a social networking site for mobile app UI designers.
- What issues do you need to address that are unique to social media?

To do

- Read
  - Agents & Avatars (Benayn Ch 17)
- Project
  - P6 – First software prototype
  - Must be running and distributable by 11/14