

**Automated Avatars:
Animating Conversation
in Online Games using "Spark"**

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Outline

- Introduction
- Motivation
- Related Work
- Approach
- SPARK
- Evaluation
- Conclusion

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Introduction: Avatars



Avatar representing players in Spark

Introduction: Presence

- The feeling of presence in the game world is affected by:

Avatar interaction



Control overhead



Introduction: Presence

- The feeling of presence in the game world is affected by:

↑ Avatar interaction



↑ Control overhead



Introduction: Smart Avatars

- Avatars that can react believably to the game world on their own, increase sense of presence while reducing control overhead.



Death by Karma Physics™



Tantrums in Freedom Force™

Introduction: Smart Avatars

- Different game types rely on different types of avatar smarts

- Shooters
 - Dealing and receiving death...
- Adventure
 - Reaching and grabbing objects...
- Social games
 - Having conversations?

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Motivation: Face-to-Face



Motivation: Face-to-Face

- When interacting face-to-face, humans naturally integrate:

- speech
- intonation
- hand gestures
- facial displays
- eye gaze
- head movement
- body posture



Motivation: Face-to-Face

• These behaviors serve functions

Speech	Filled pauses	
Intonation	Raise eyebrows	
Gaze towards	Posture	Nod
Smile	Shake head	Beat
Point	Gaze away	Gesture
Lower eyebrows	Toss head	
Body orientation	Pause	



INTERACTIONAL
Awareness/Recognition
Initiate/Break contact
Take/Give turns

PROPOSITIONAL
Emphasize/Contrast
Refer
Depict feature
Change topic
Request/Give feedback

Motivation: Face-to-Face

• These behaviors serve functions

INTERACTIONAL
Awareness/Recognition (Goffman 1963)
Initiate/Break contact (Kendon 1990)
Take/Give turns (Duncan 1974)



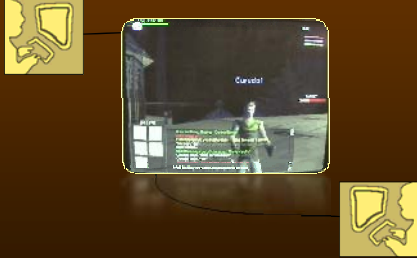
PROPOSITIONAL
Emphasize/Contrast (Argyle 1973)
Refer (Bavelas 1995)
Illustration (McNeill 1992)
Change topic (Kendon 1990)
Request/Give feedback (Chovil 1991)

Motivation: Avatar Conversation



Are these functions served?

Motivation: Avatar Conversation



The Avatar doesn't even know you're talking!

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Related Work



Interactional behaviors:

BodyChat

(Vilhjálmsón & Cassell, 1998)



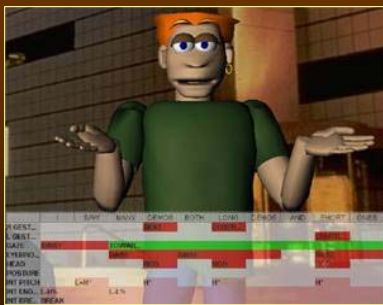
Propositional behaviors:

BEAT

(Cassell, Vilhjálmsón & Bickmore, 2001)



BodyChat in 1997



BEAT in 2000



Related Work

Comic Chat



(Kurlander, Skelly, et al., 1996)

MOOse Lodge



(Shi et al., 1999)

3dMe Emote



(3dMe Inc., 2002)

There



(There Inc., 2003)

Demeanour



(Gillies, Ballin & Dodgeson, 2004)

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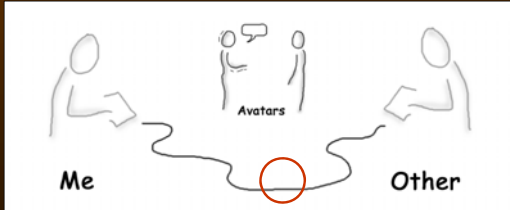
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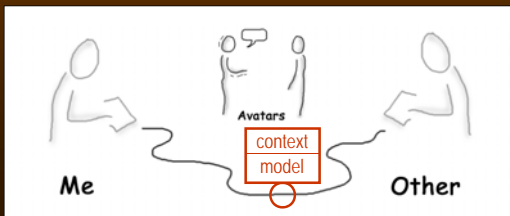
Approach: Monitoring

- Avatars can produce the appropriate nonverbal behaviors by monitoring the chat channel



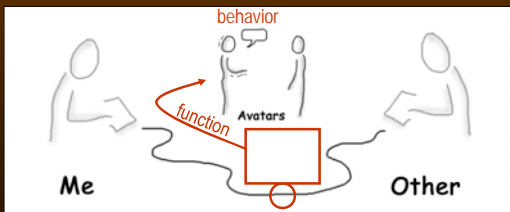
Approach: Monitoring

- The monitoring needs a model of communication and a dynamic discourse context



Approach: Production

- The monitoring can result in a functional description from which supporting behavior is produced



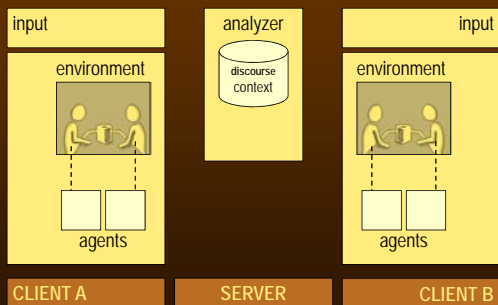
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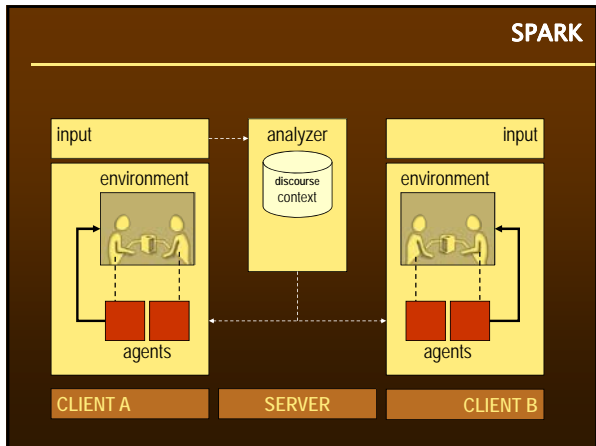
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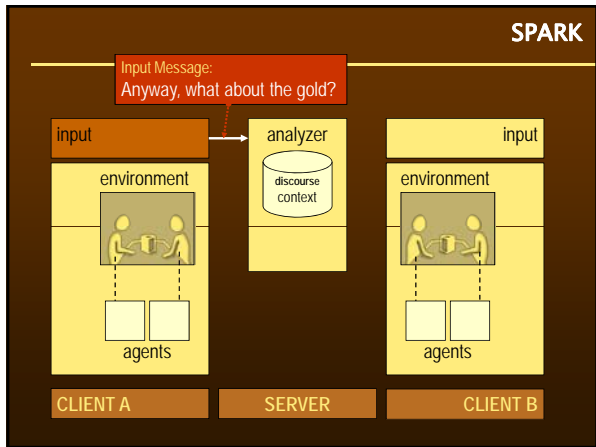
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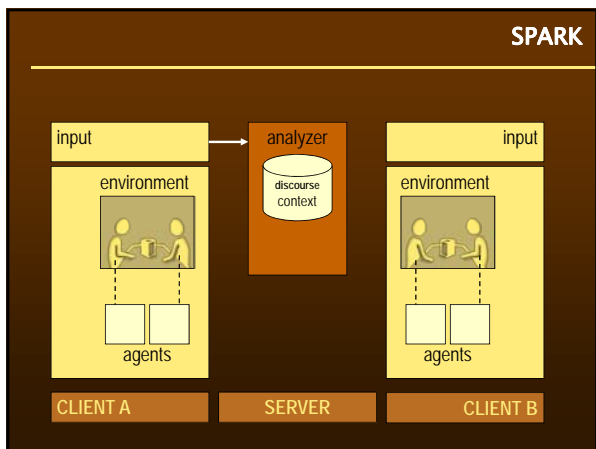
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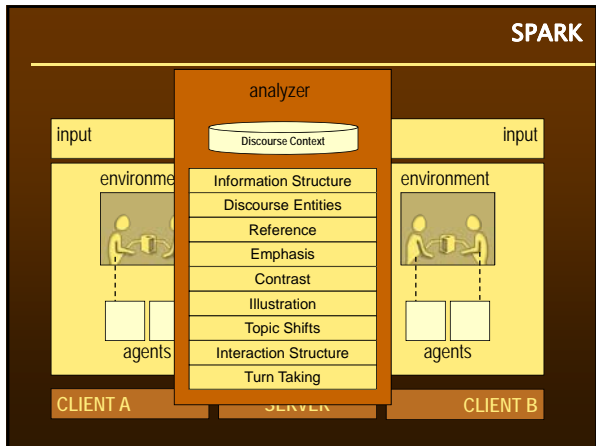
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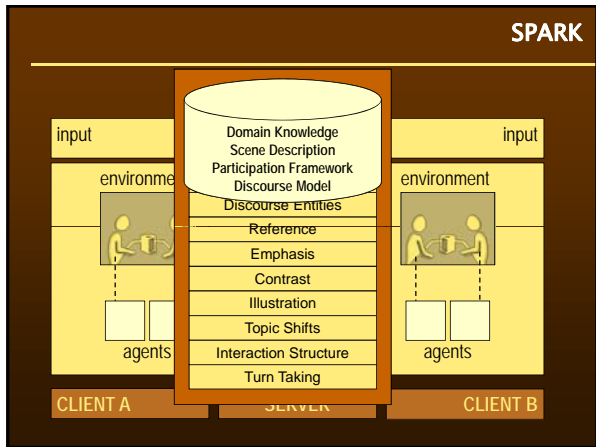


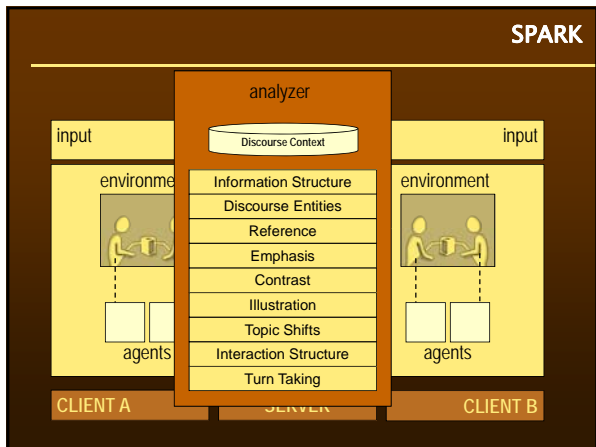


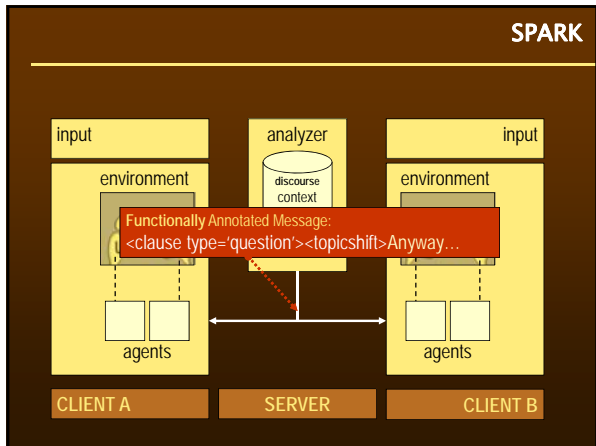


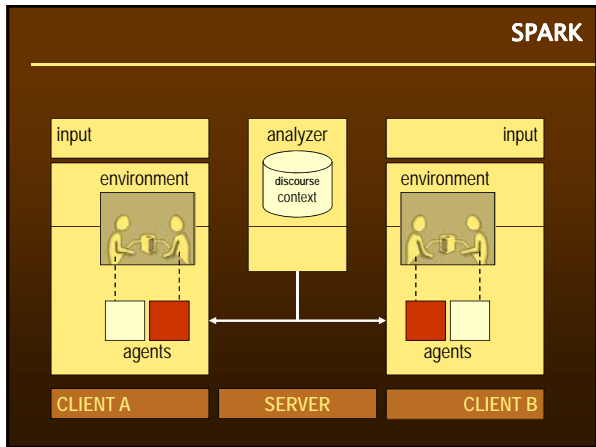


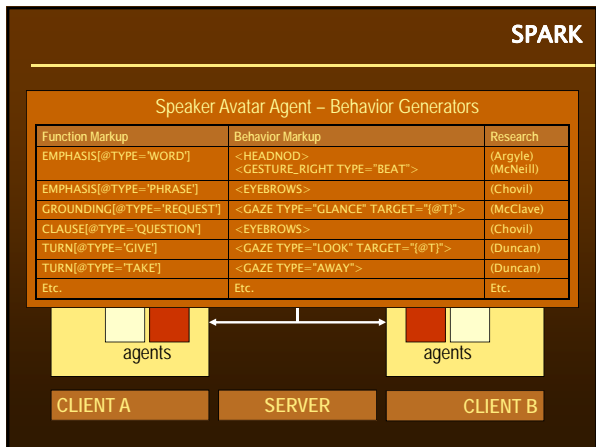


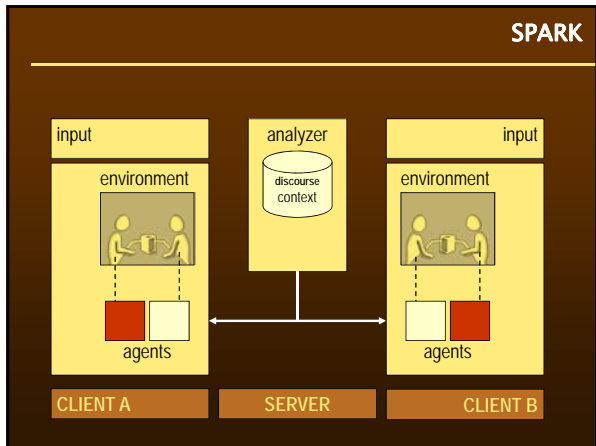


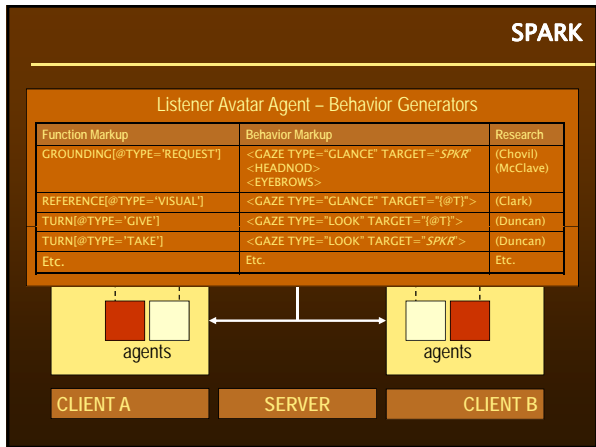


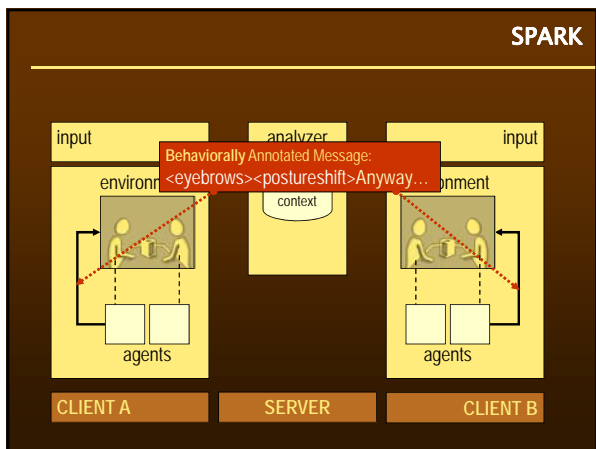


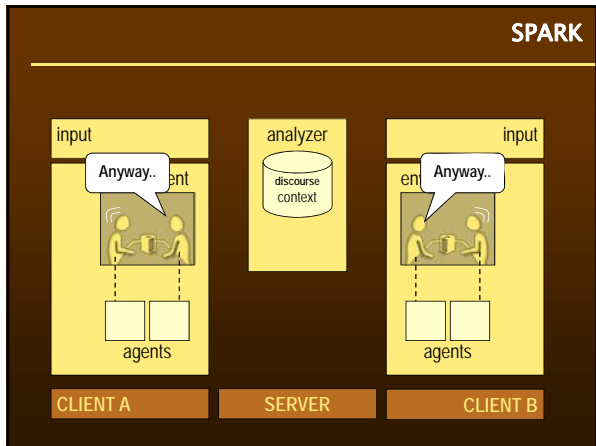














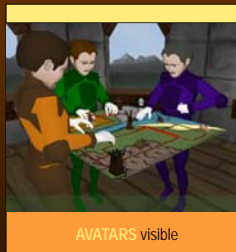
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Evaluation: Avatars vs. No Avatars

- Study (15 groups of 3 people / condition)



Evaluation: Preference



Means are significantly greater than 0 (t-test, 1-tail, $p < 0.05$) in all but one!

Evaluation: Conversation

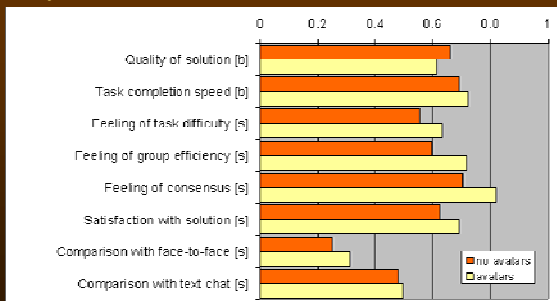
Quality of Conversation Process (11 measures):



Test mean difference > 0: $t(10)=-2.596$, $p=0.014$, 1-tail, $M=0.034$, $SD=0.043$

Evaluation: Collaboration

Quality of Collaboration (8 measures):



Test mean difference > 0: $t(7)=2.835$, $p=0.013$, 1-tail, $M=0.055$, $SD=0.055$

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Conclusion: Challenges

- **Hard to interpret intent**
 - A rich discourse context helps
 - What is good enough?
- **Moving from text to speech**
 - We can extract intonation...
 - ...but word recognition is hard
- **There is more to being human**
 - What about personality and idiosyncratic behavior?

Conclusion: In Sum

- Smart avatars contribute to presence without adding control overhead
- Spark is a flexible framework for giving avatars conversational smarts
- The spark driven avatars compelled players and may be making conversation easier