



Engaging Content
Engaging People

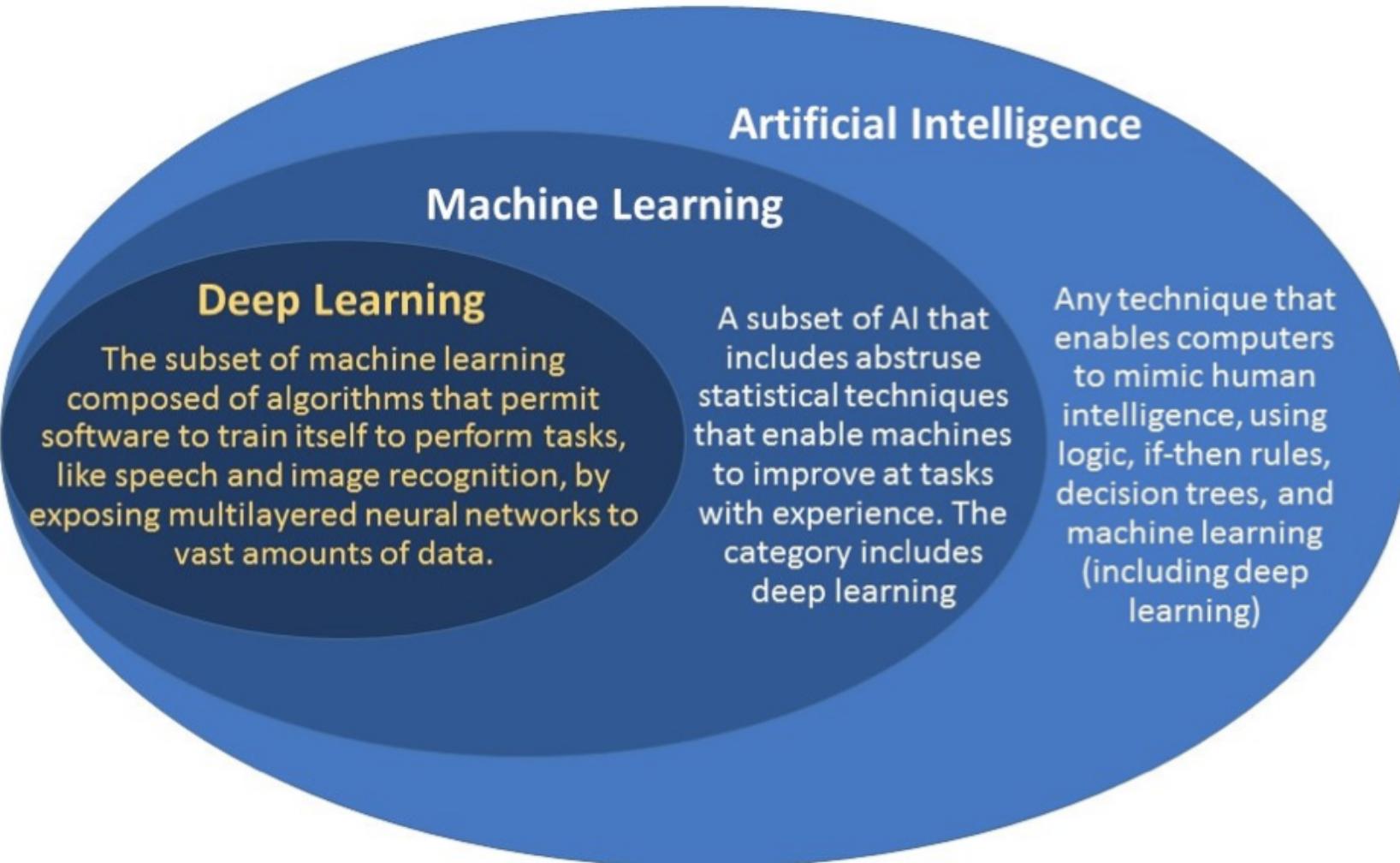
Dialogue Systems and Human Machine Interaction – The User

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A Cognitive Perspective

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When I Started with Dialogue

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A Wasted Youth!

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Early 2000s

Speaking Autonomous
Intelligent Devices



Late 2000s

Shared Control via
Dialogue



2010s

Situated Intelligent
Systems

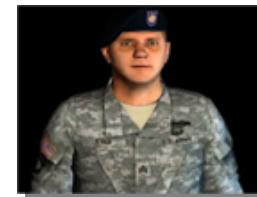


Definition

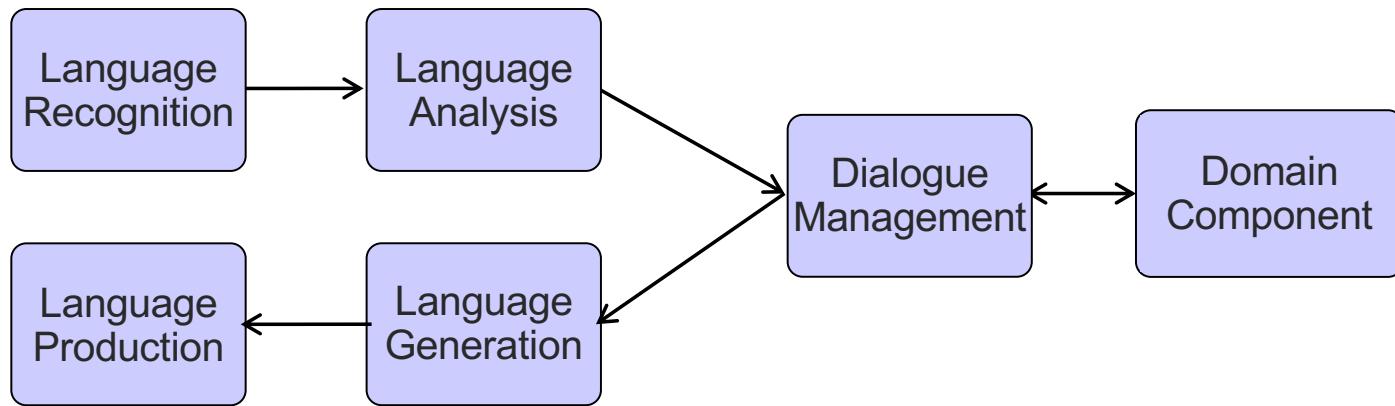
Systems immersed in a real or virtual environment which can perceive, reason on, and act on that environment

Examples

- Automotive systems
- Virtual characters
- Assistance systems
- Service robots
- Graphical, textual and tactile communication insufficient
- Importance of the verbal channel



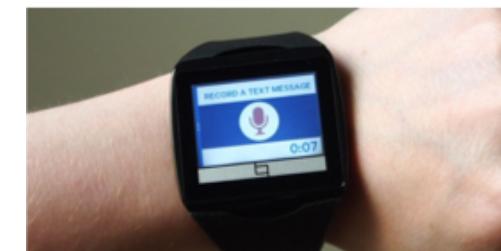
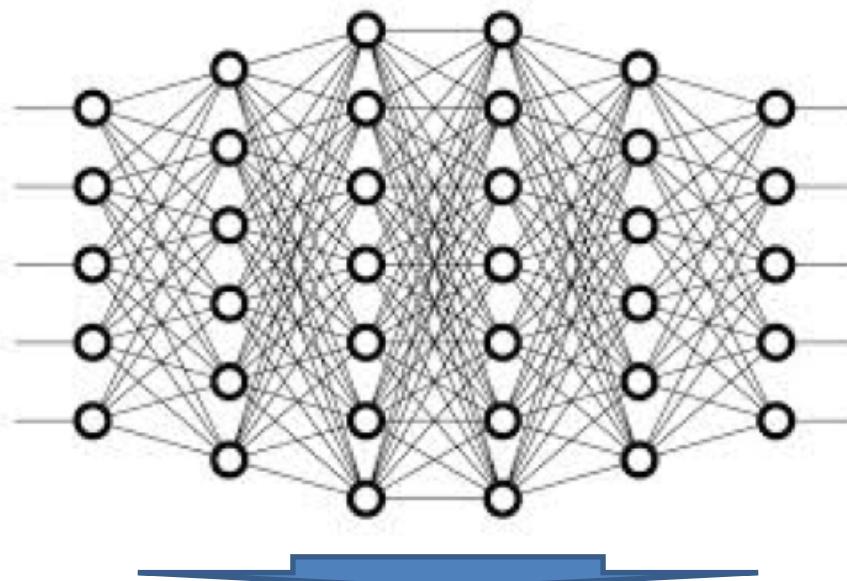
- *Architectures of natural language processing components which can be used to enable spoken interfaces to applications*
- *Prototypical spoken dialogue system architecture*



- **Dialogue manager responsibilities**
 - Link language technology and domain component logic
 - Integrate user utterances (dialogue actions)
 - Plan system dialogue actions

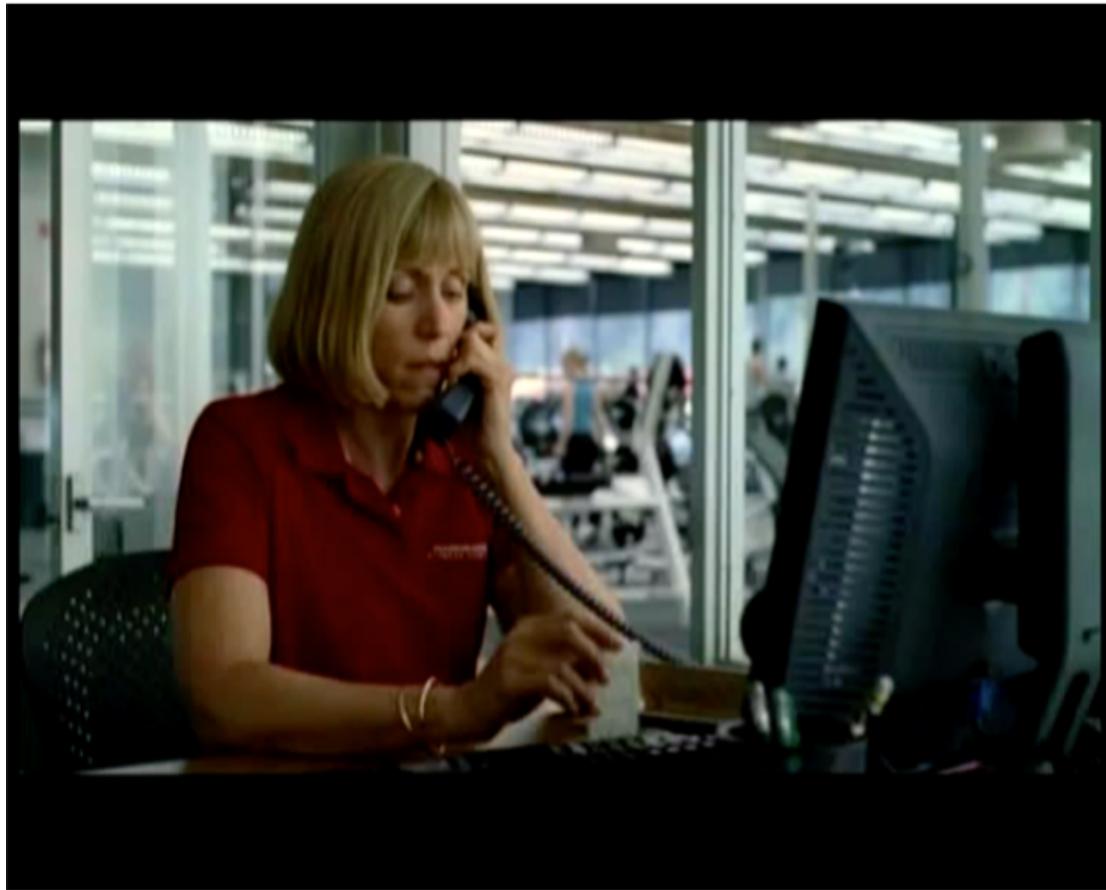
Exciting Times!!!

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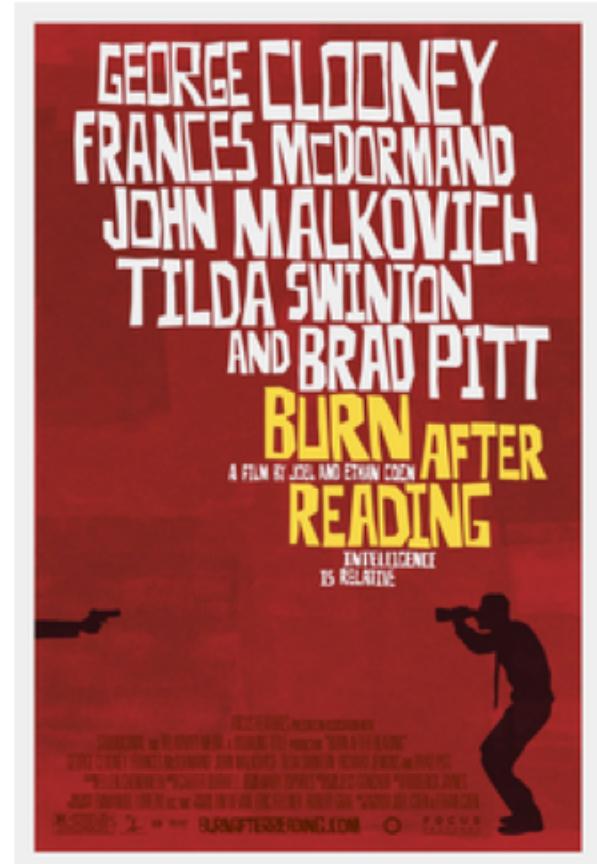


Speech Recognition

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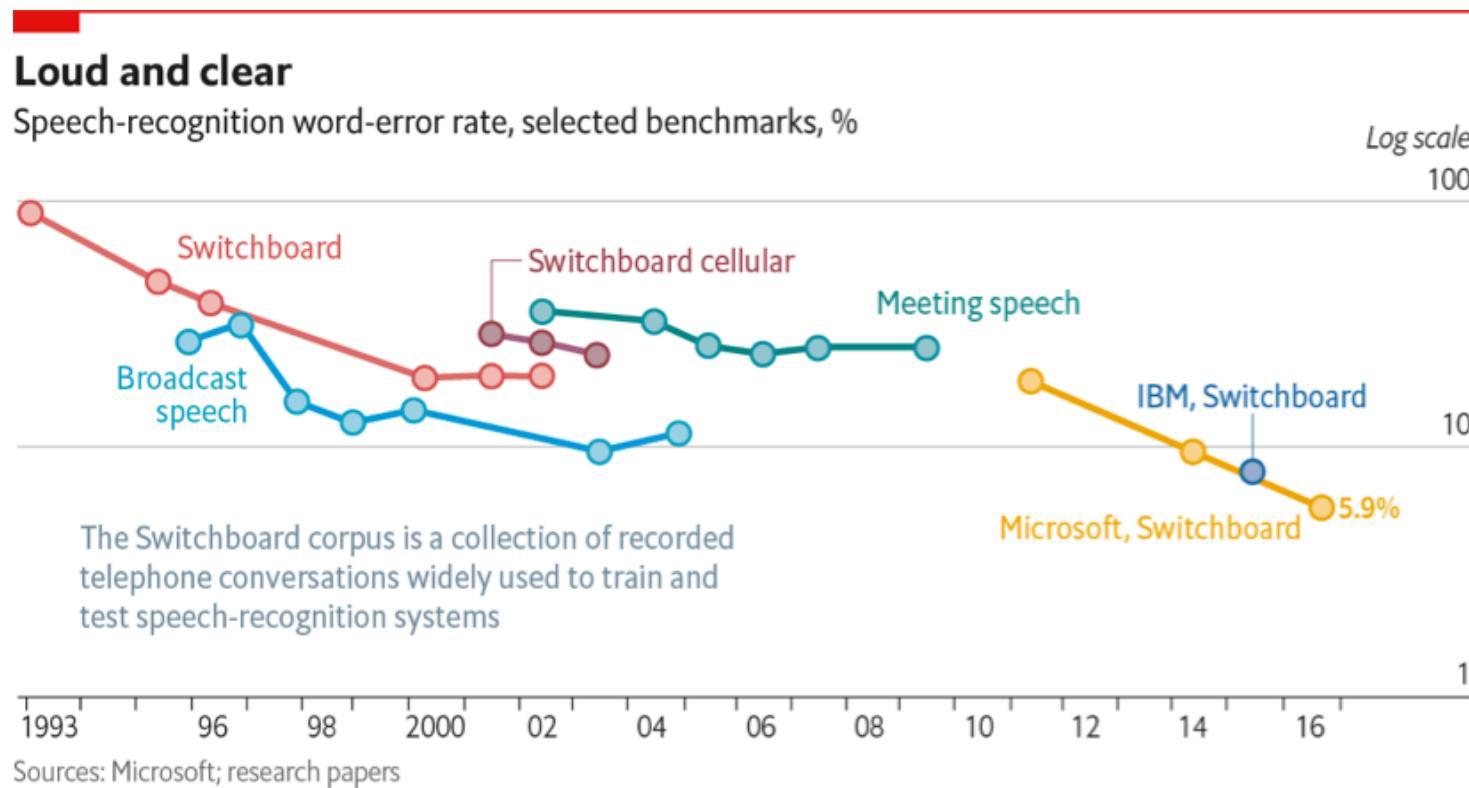


Scene from Burn After Ready 2008



A Rocky Road

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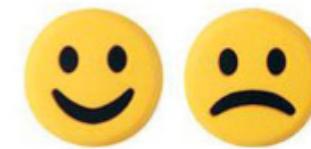
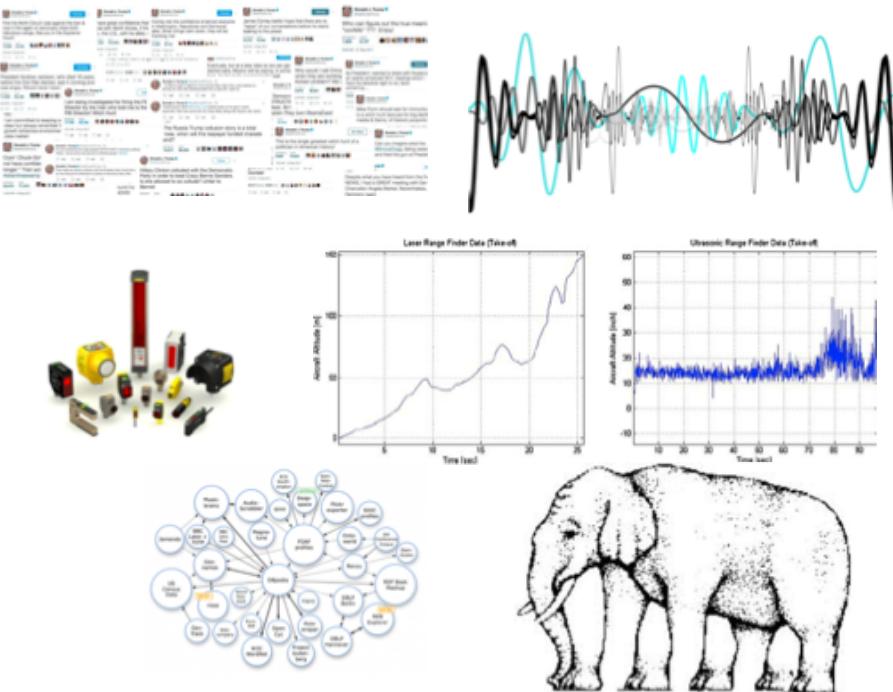
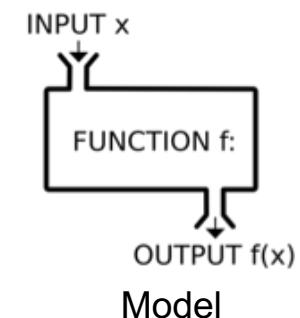
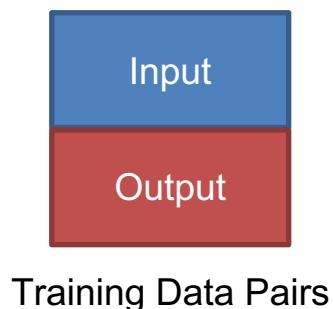
“Dialogue Systems are Academic Suicide”

-- said by a visiting Human Computer Interaction professor to me 6 months before I submitted my dissertation



Supervised Learning

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Classification



Regression

Alexa at Large!

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Unknown

Today at 5:53 AM on Living Room echo dot



reply

Today at 5:53 AM on Living Room echo dot



alexa search briefing

Today at 5:27 AM on Kitchen Echo



alex play some classical music

Yesterday at 5:26 PM on Kitchen Echo



Text not available. Click to play recording.

Yesterday at 5:26 PM on Living Room echo dot



Text not available. Click to play recording.

Yesterday at 5:25 PM on Living Room echo dot



alex app

Yesterday at 5:25 PM on Kitchen Echo



alex plush briefing

Yesterday at 5:19 PM on Kitchen Echo



alex place briefing

Yesterday at 5:18 PM on Kitchen Echo



alex play b. b. king of limbs

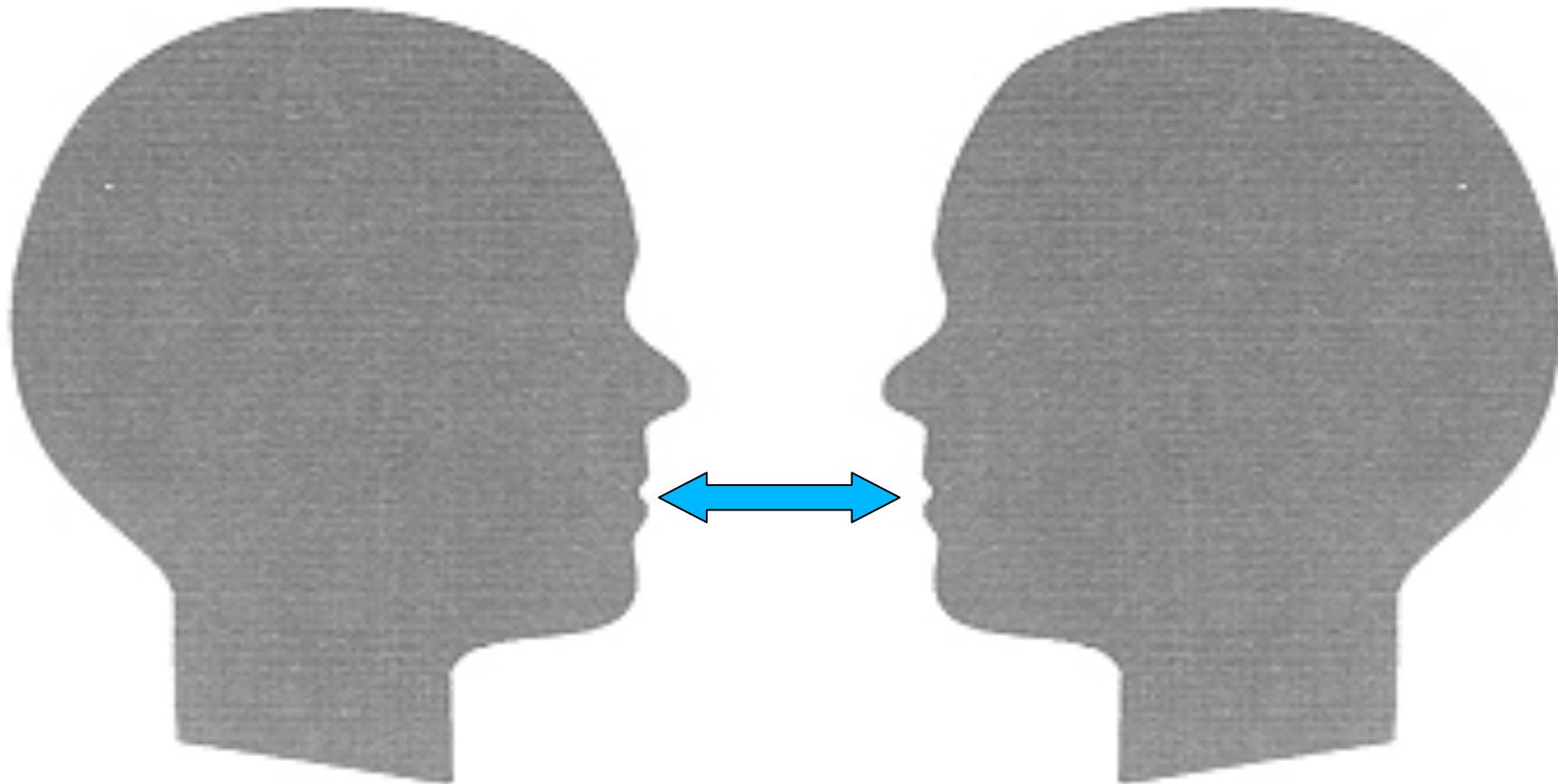
Yesterday at 9:48 AM on Kitchen Echo



wash briefing

Yesterday at 9:37 AM on Kitchen Echo

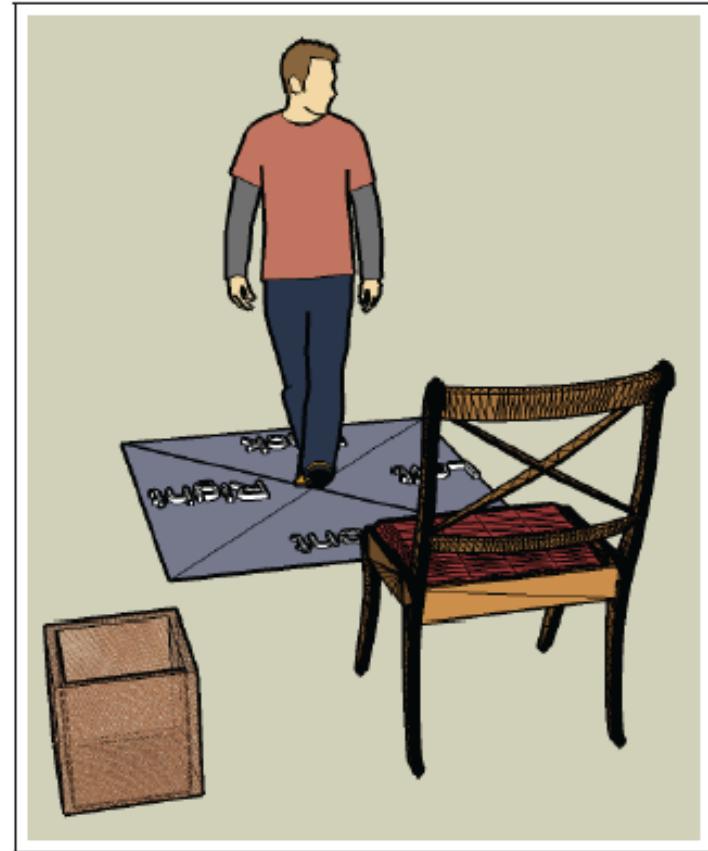
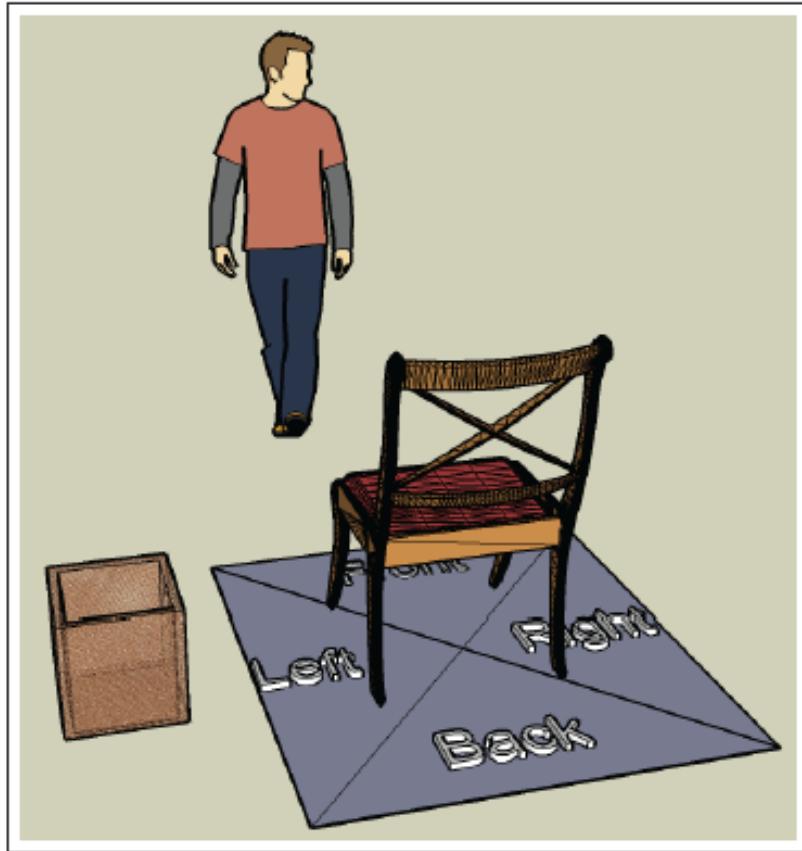




- Features / Problems
- Slow Serialized Communication
- Fuzzy Meanings & Imprecise Knowledge

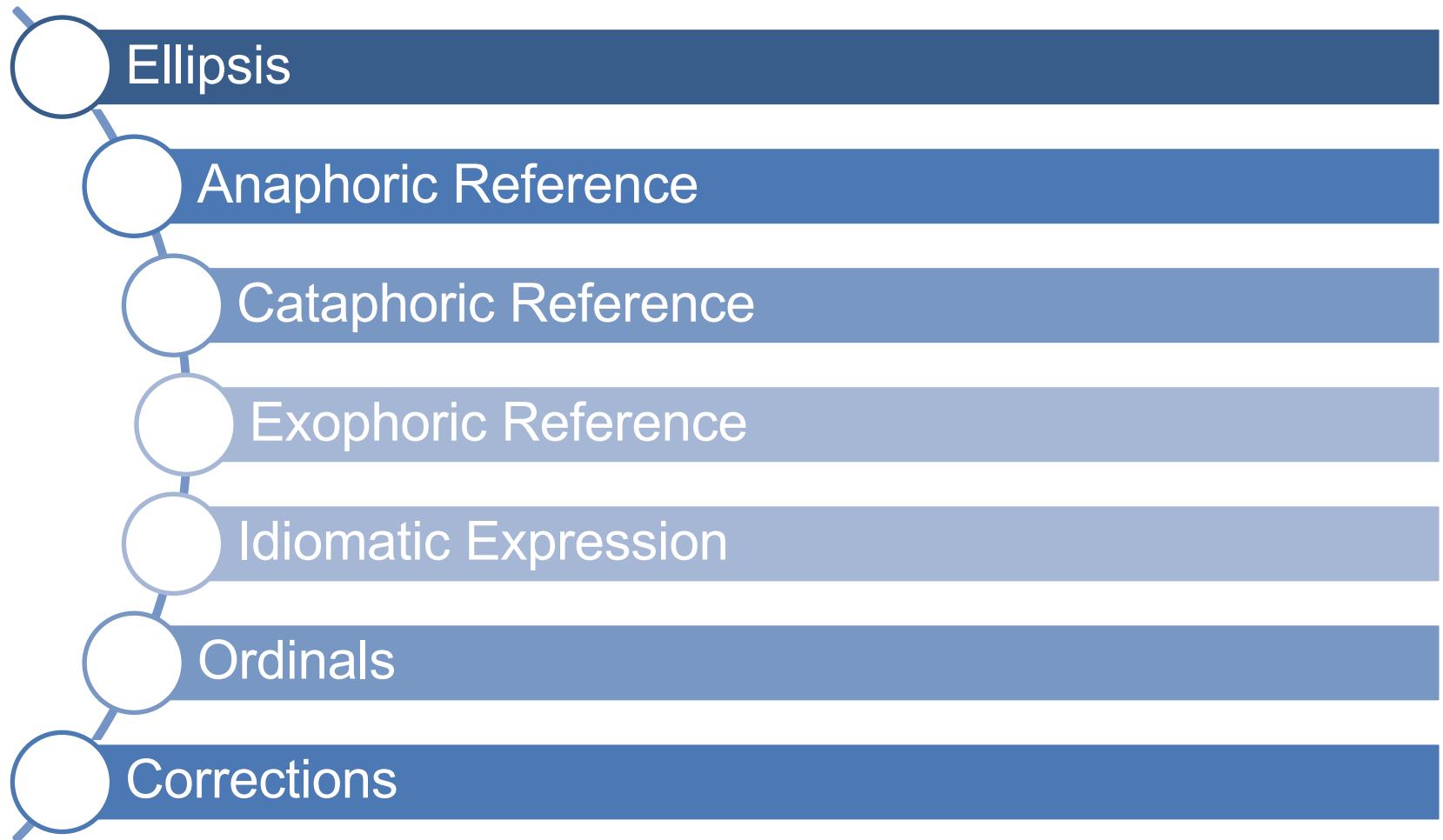
Interpretation Challenges: Reference Frames

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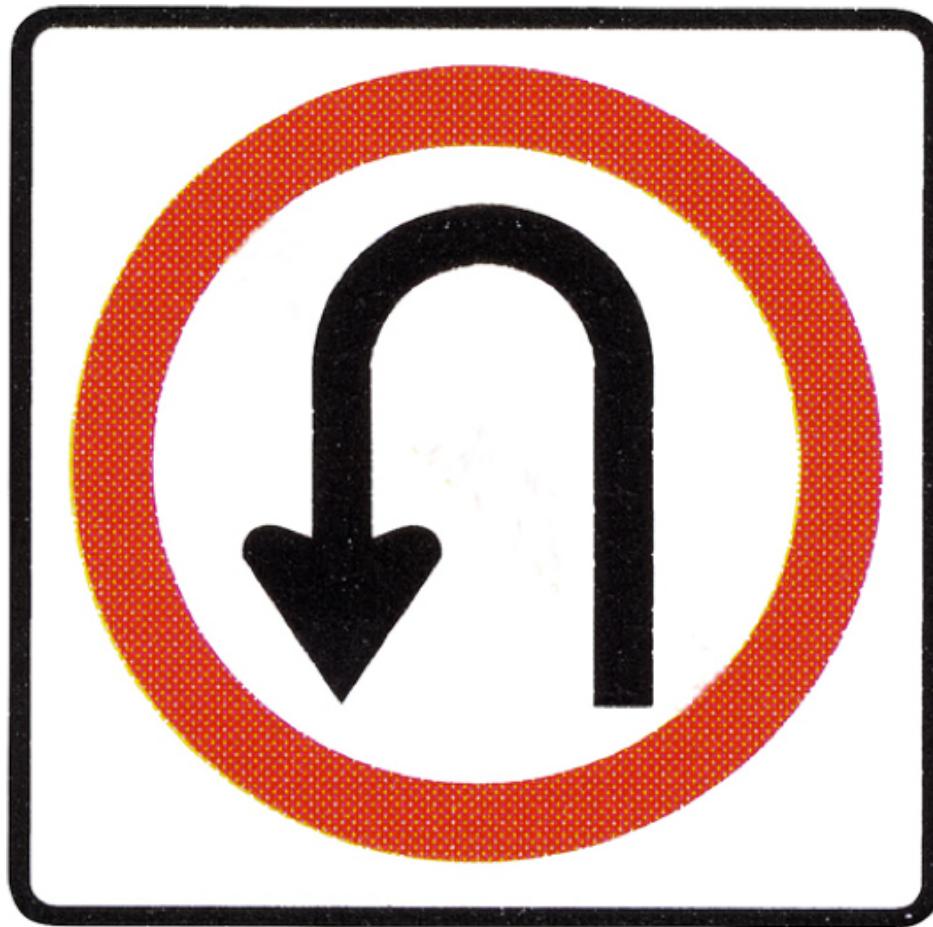
“I’m goin’ down to check my thing”





From Interpretation to Production

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Qualities of Produced Content - Grice

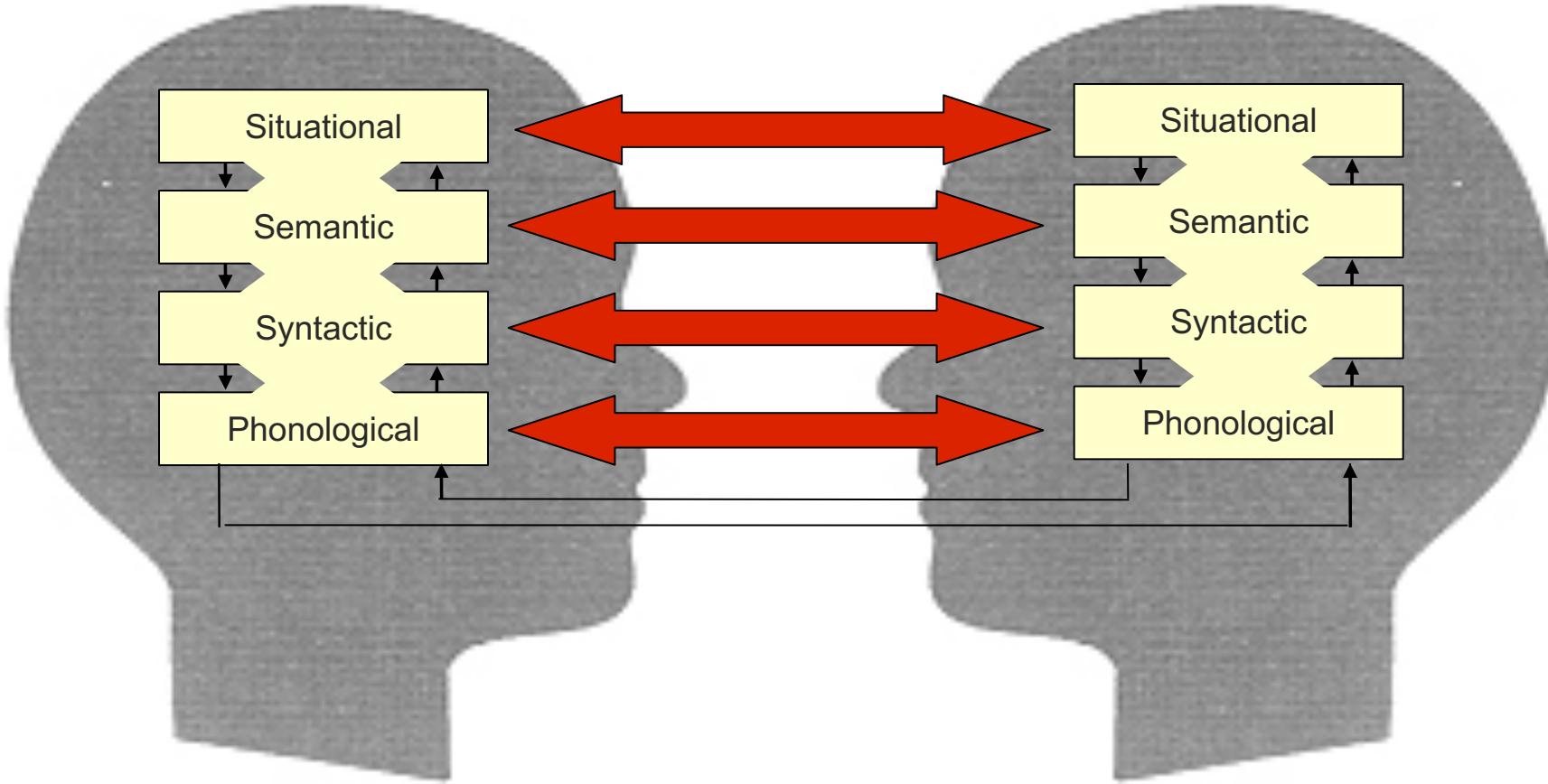
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Maxim Name	Maxim Description
Quantity	Say neither more nor less than the discussion requires
Relevance	Be relevant to the discourse and conversational goals
Manner	Be orderly and coherent
Quality	Do not lie or make unsupported claims



Human Cognition & Spoken Communication

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- Tactics & Models
- Psycholinguistic Mechanisms: Interactive Alignment, others.
- Multi-Functionality in expression... **Communicative Function**



Do we need to worry about this?

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Command and Control

**Voice based Information
Retrieval**



Fluid Conversational
Systems

Situated Task Oriented
Dialogue



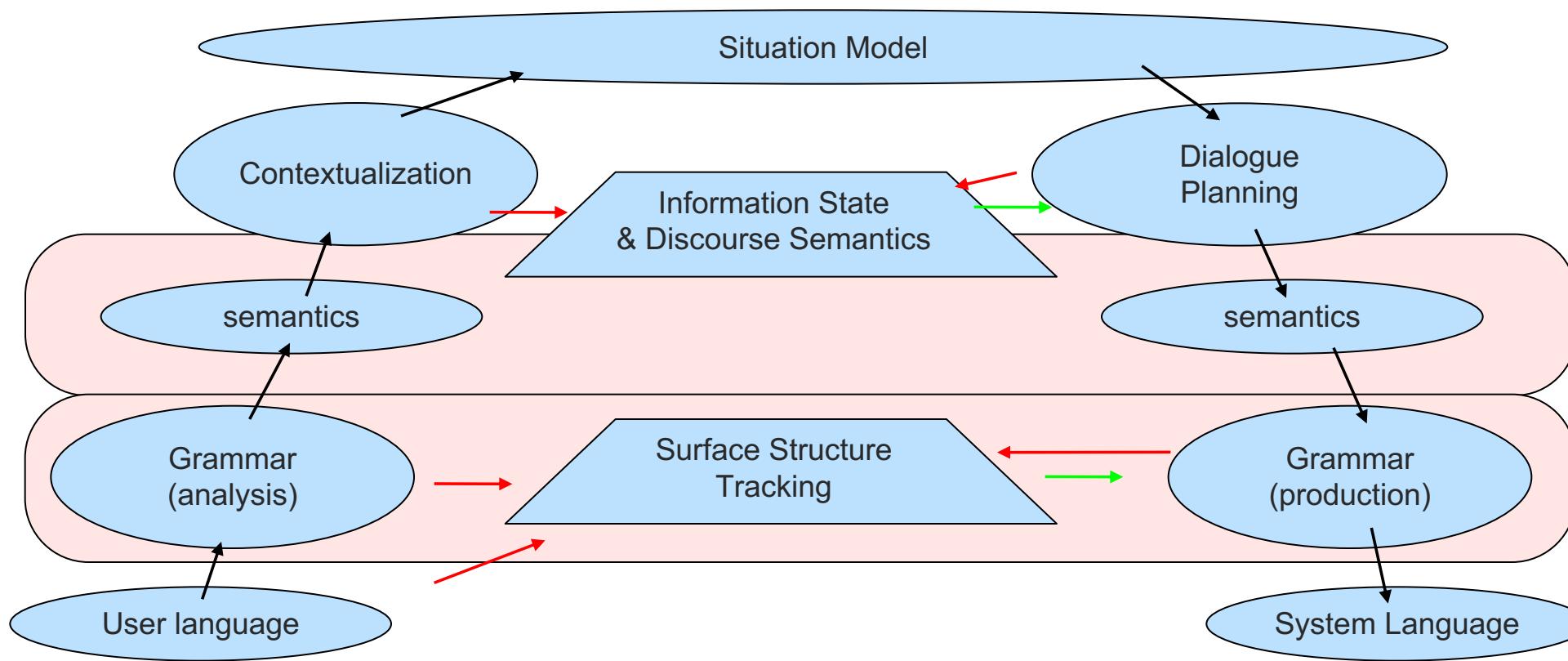
- Interlocutors in HHI studies show alignment effects
- Alignment frequent in task-oriented dialogues
(Reitter et al 2006a/b)
- Alignment is associated with task success
 - Tutorial system dialogues (Ward 2007)
 - Route instruction dialogues (Reitter et al 2007)
- People can treat machines like people
- Empirical evidence of HCI alignment
 - Loudness & Pause Latency (Suzuk et al 2007)



- Natural Conversational Agents
- By definition must employ alignment and adaptation models
- Practical Dialogue Systems
 - Alignment may enhance user acceptance
 - Language Shaping
 - Success Monitoring

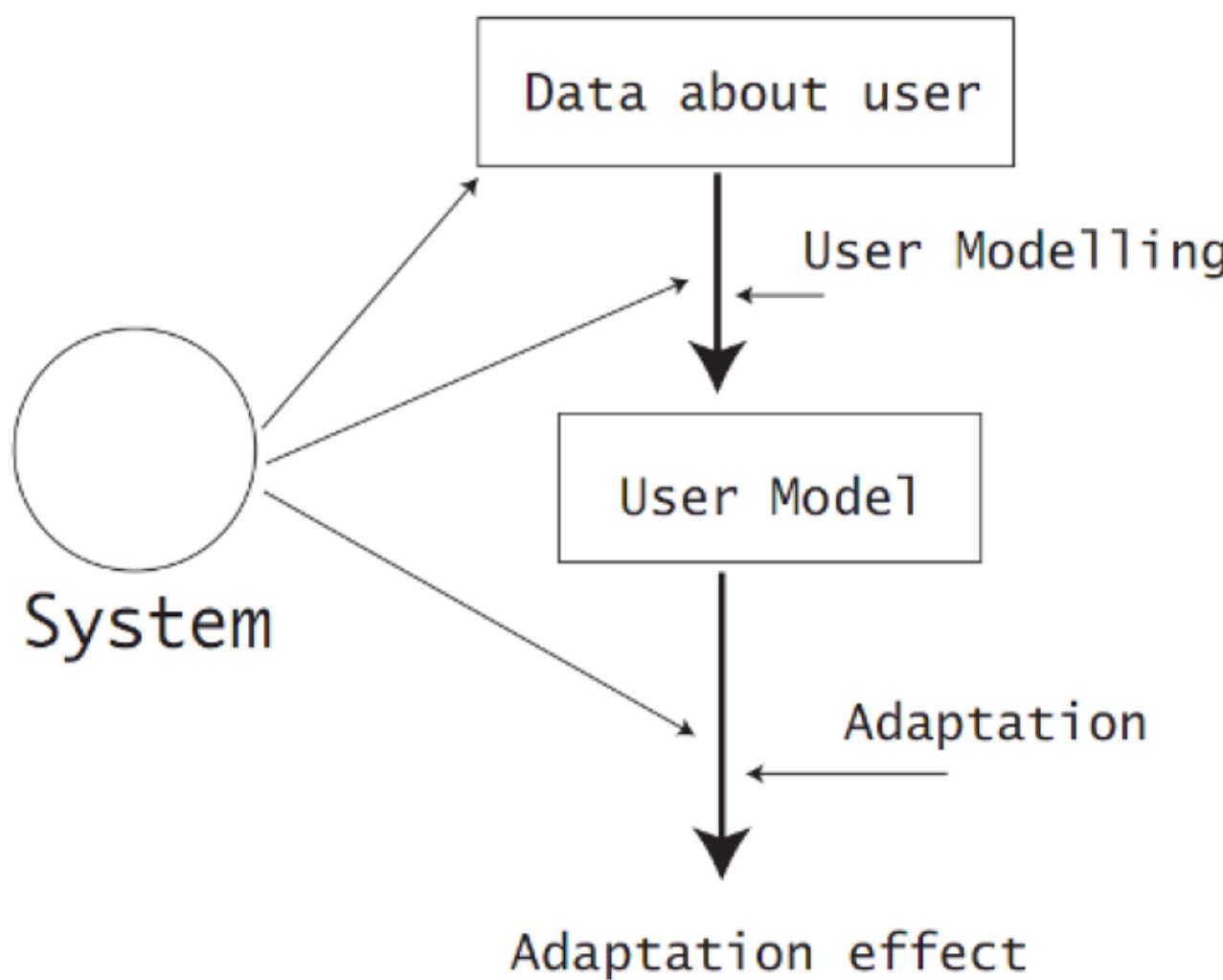


Design Focus

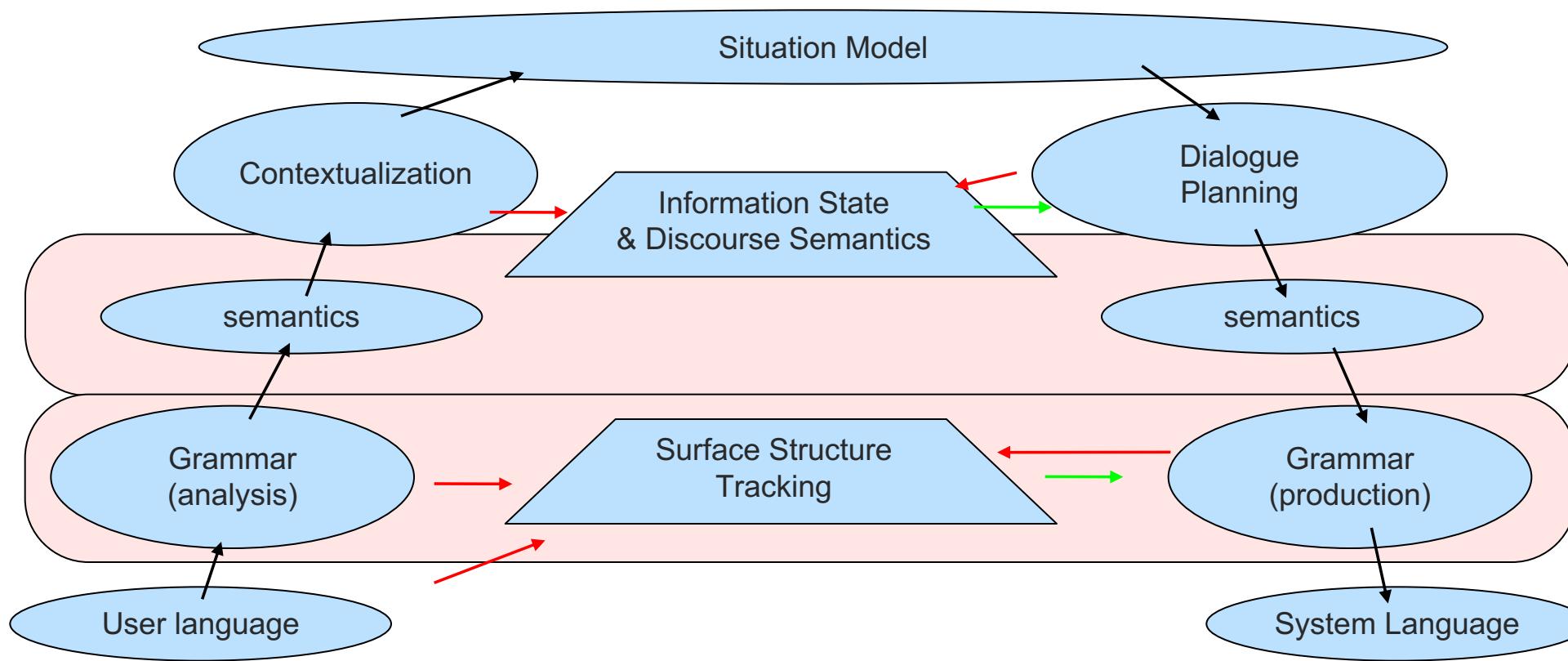


- Bi-directionality of internal language resources
- Track partner & self language use
- Make production processes sensitive to extended context

Where is the User Model?



Design Focus



- Bi-directionality of internal language resources
- Track partner & self language use
- Make production processes sensitive to extended context

Challenges

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Model Integration

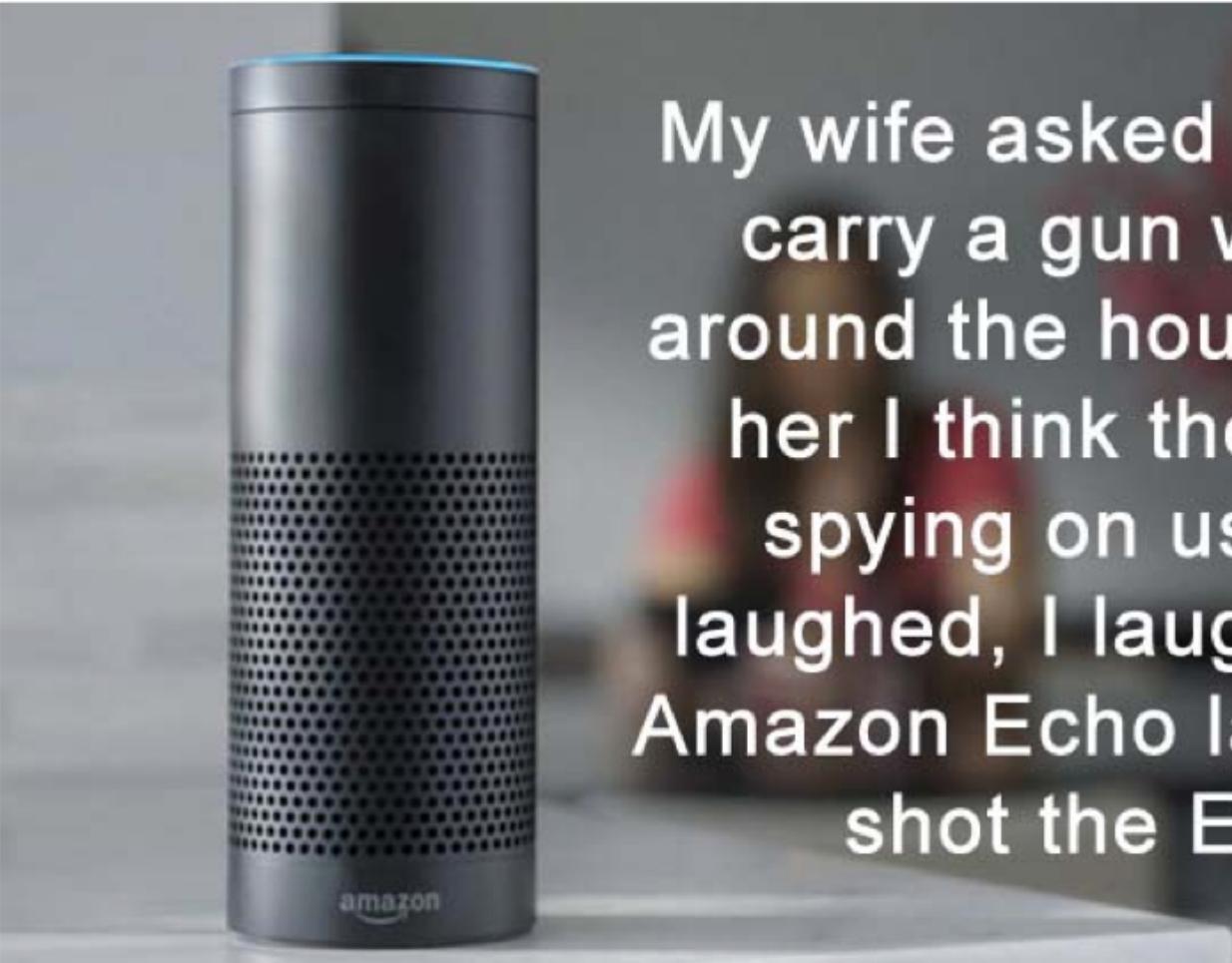


Training Data



Thank You – Questions?

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My wife asked me why I carry a gun with me around the house. I told her I think the CIA is spying on us. She laughed, I laughed, our Amazon Echo laughed. I shot the Echo.



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R. Ross

