



Gridspace

CONVERSATION DESIGN
IAP 2023

February 1, 2023

Conversation Design

- Interactions between a human and a digital agent conducted in *natural language*
- Leverage technology to give digital agents verbal and decision-making skills approaching human ability
- Meet human objectives, goals, and needs

Conversation Design

It's all coming together!

- Automatic Speech Recognition
- Natural Language Understanding
- Text-to-Speech (Speech Synthesis)

Conversational Interfaces

- Text-Based Chatbots & Voice User Interfaces (VUIs)
- Voice Agents/Assistants

Why VUI?

- An interface which people already know how to use
- People know how to converse in natural language

Example VUI Conversation

Someone designed this!

Situation: A virtual agent for an insurance company takes a call from a current customer



Aside # 1: The Future is Now

- The evolution of VUIs will leap forward; it's mid-leap now
- Large Language Models (LLMs)
- Futureproof Principles and Practices
- The long-foreseen end of Interactive Voice Response (IVR)?

VUI Design Fundamentals

The DNA: Turns

- The individual back-and-forth exchanges between conversational partners
- Multiple successive turns may be held by one partner

VUI Design Fundamentals

The DNA: Turns

Agent: What was the name of your first pet?

VUI Design Fundamentals

The DNA: Turns

Agent: What was the name of your first pet?

Human: I've never had a pet in my entire life.

VUI Design Fundamentals

The DNA: Turns

Agent: What was the name of your first pet?

Human: I've never had a pet in my entire life.

Agent: Let's try something else!

VUI Design Fundamentals

The Ruling Constraints: Linearity & Ephemerality

- Linked Concepts
- Higher Stakes
- “What was that thing you said earlier?”

VUI Design Fundamentals

The Inescapable Truth: Cognitive Load

- Demand on memory
- Increased load is the consequence of linearity & ephemerality
- Easy to underestimate

VUI Design Fundamentals

The Champion: Signposting

- Conversational markers
- Manages linearity & ephemerality
- Eases cognitive load
- Builds confidence and trust!

VUI Design Fundamentals

The Heart and Soul: Error Recovery

- Always necessary, often surprising
- Key to iterative design
- Tempting to discount and de-prioritize

VUI Design Fundamentals

The Heart and Soul: Error Recovery

Types and Sources of errors:

- ASR (mis-recognized words)
- NLU (confusing of meaning)
- TTS (digital mispronunciations and flubs)
- Human behavior
- Technical issues

Aside # 2: The Future is Written

- Great VUIs require great dialog writing
- The tools are changing, but the need for specialized dialog writing is not going away

Aside # 2: The Future is Written

Great VUI Dialog Is:

- Empathetic
- Concise
- Anticipatory
- Collaborative
- Sensitive to Style

Aside # 2: The Future is Written

VUI Writing Inspirations & Foundations:

- Screenplays, Theater, Radio Essays & Journalism
- Professional experience in customer service, patient care, counseling, etc.

An Exercise to the Reader for Next Time

- A voice bot must ask a human caller “What is your date of birth?” but something goes wrong! Briefly describe the next two conversational turns when the interaction suffers from:
 - a) an Automatic Speech Recognition error
 - b) a Natural Language Understanding error
 - c) a Text-to-Speech (Speech Synthesis) error
- In the enrollment process for a new customer, a virtual agent must ask ten mandatory questions. Write signposting dialog for (only) the virtual agent which aims to prepare the customer for this part of the conversation. Consider addressing the duration, difficulty, necessity, etc. of the task.

Solutions from Last Time: Emotion, DA, Personality and Lying

- Record yourself saying the same phrase with different intonations, emotions and dialog acts (e.g. as a question, concerned, happy etc.). Listen careful to each one and see if you can list what gives each variation its characteristic sound.
- Uptalk, pitch variation, timbre differences, small inflections
- Now take away the words. Do your sentences hold the same meaning?
- Now get a voice bot (alexa, siri, an online app) to repeat the same sentences. What prosodic approach are they taking and how does it affect the interpretation?
- Follow up question: How do they compare to our voice assistant, Grace? (demo available on www.gridspace.com)

-

Solutions from Last Time: Conversation Design

- A voice bot must ask a human caller “What is your date of birth?” but something goes wrong! Briefly describe the next two conversational turns when the interaction suffers from:
 - a) an Automatic Speech Recognition error
The human speaker’s birthdate is mis-transcribed as “tune force” instead of “June fourth”. The bot replies: “I’m sorry, I probably misheard you. Could you say that again?”
 - b) a Natural Language Understanding error
The human speaker uses an unexpected date format, “Eighth of Second, Ninety-Two”. The bot replies: “I’m sorry, I didn’t understand. With “April 3rd, 1989” as an example, could you tell me again?”
 - c) a Text-to-Speech (Speech Synthesis) error
A bizarre glitch makes the bot’s utterance “date of birth” sound like “day bird”. The human speaker wants to be sure they know what’s happening, so they say: “What was that?”
- In the enrollment process for a new customer, a virtual agent must ask ten mandatory questions. Write signposting dialog for (only) the virtual agent which aims to prepare the customer for this part of the conversation. Consider addressing the duration, difficulty, necessity, etc. of the task.
Bot: “Next I have ten questions to ask you. We can’t skip any of them, but they’re not difficult. It should only take a minute or two.”