

# Chatting with Your Clock: Using Conversation to Design a Voice User Interface

CS 6456 User Interface Software  
Georgia Institute of Technology  
Dr. Keith Edwards  
Fall 2021



Adam **Coscia**

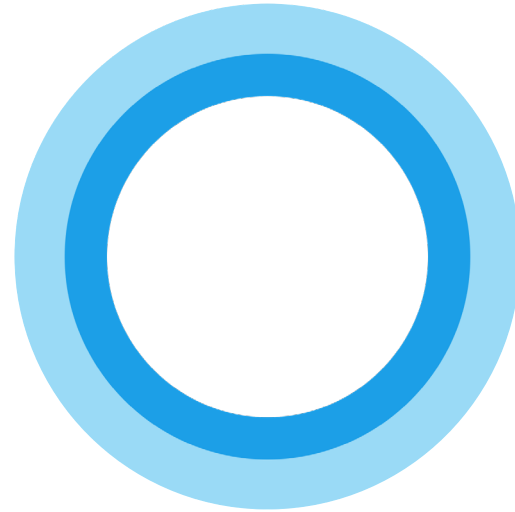


# Intelligent Personal Assistants



Apple  
**Siri**

2011



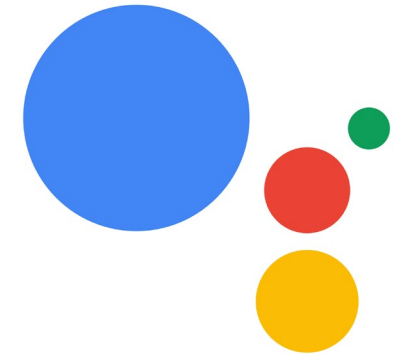
Microsoft  
**Cortana**

2014



Amazon  
**Alexa**

2014



Google  
**Assistant**

2016

# Voice/Speech User Interface (VUI)

## Pros:

- Accessible, Familiar, Used in existing devices
- Strong **Mechanics** (fast, low physical effort)

## Cons:

- Error-prone (recognition, synthesis, frustrating)
- Poor **Affordances** (where's the instruction manual??)
- Mixed **Feedback** (did it work?)

How can we design a system that “converses” with the user to improve **affordances** and **feedback**?

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# SpeechActs

Yankelovich et  
al. SIGCHI'95

SpeechActs: "The first draft is ready for your comments.  
Eric."

User: Reply and include the current message.

SpeechActs: Preparing message to Eric Baatz. Begin  
recording after the tone. When finished,  
pause for several seconds.

User: Eric, I'll get those to you this afternoon.

SpeechActs: Say cancel, send, or review.

User: Send.

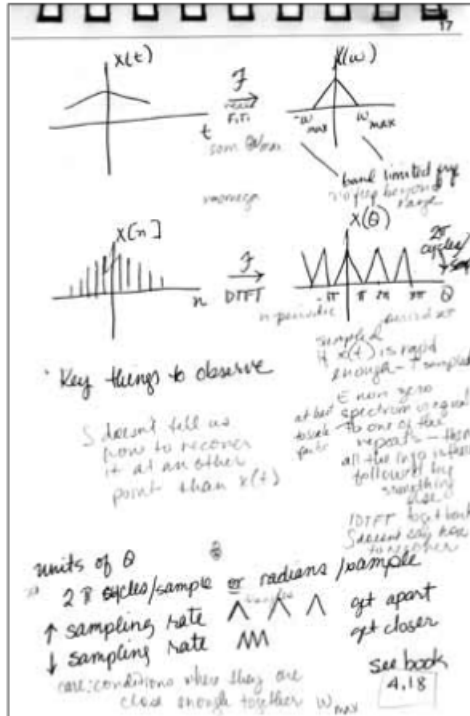
SpeechActs: Message sent. What now?

User: Next message.

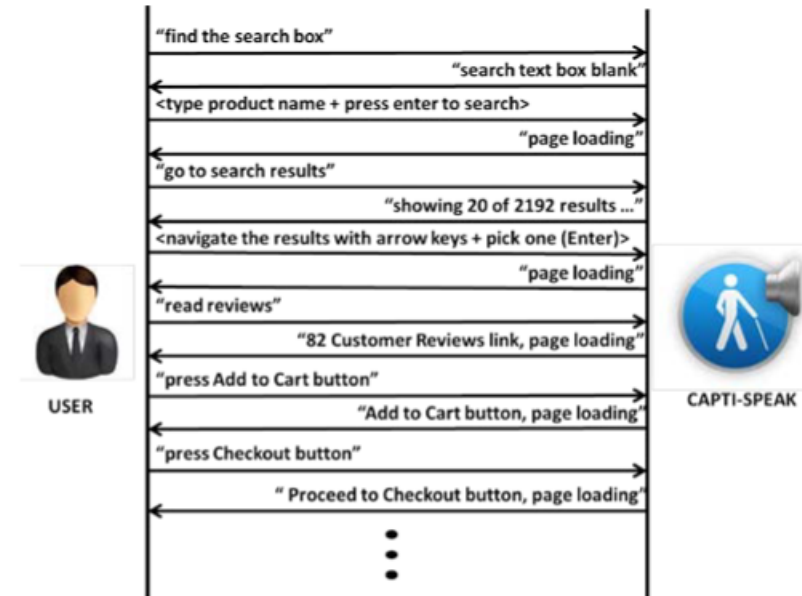
SpeechActs: New message two from Stuart Adams,  
subject "Can we meet at 3:00 today?"

User: Switch to calendar...

# Related Work (cont.)



Stifelman et al. SIGCHI'01  
**The Audio Notebook**



Ashok et al. W4A'15  
**Capti-Speak**

# System

Repo: <https://github.com/AdamCoscia/Conversational-VUI>

Demo: <https://adamcoscia.github.io/sections/projects/Conversational-VUI/index.html>

**CS 6456 Group Project** Press the 'Start recording' button to talk with the system.

11/23/2021, 1:17:29 AM

Test voice

Voice Settings

Google US English (en-US)

Rate 1



Pitch 1



Start recording

Show/hide output

| <u>Time</u> | <u>Speaker</u> | <u>Result</u> | <u>Utterance</u>  |
|-------------|----------------|---------------|---|
| 1:16:36 AM  | User           | Keyword       | please set an alarm   |
| 1:16:37 AM  | System         | Clarify       | Of course. And when would you like that alarm scheduled for?  |
| 1:16:46 AM  | User           | Keyword       | tomorrow  |
| 1:16:46 AM  | System         | Clarify       | Certainly! And what time would you like to set the alarm for? |
| 1:16:56 AM  | User           | Keyword       | 2 p.m.  |
| 1:16:57 AM  | System         | Success       | Great! Your alarm is set.                                     |
| 1:17:07 AM  | User           | Keyword       | thank you can you make an event for 1 p.m.                    |
| 1:17:08 AM  | System         | Clarify       | And how long is your event for?                               |
| 1:17:15 AM  | User           | Keyword       | 2 hours   |
| 1:17:16 AM  | System         | Success       | Great! Your event is set.                                     |

DEMO

**Repo:**

<https://github.com/AdamCoscia/Conversational-VUI>

**Demo:**

<https://adamcoscia.github.io/sections/projects/Conversational-VUI/index.html>



# Issues in **Speech Recognition**



Volume  
Accents  
Colloquialisms

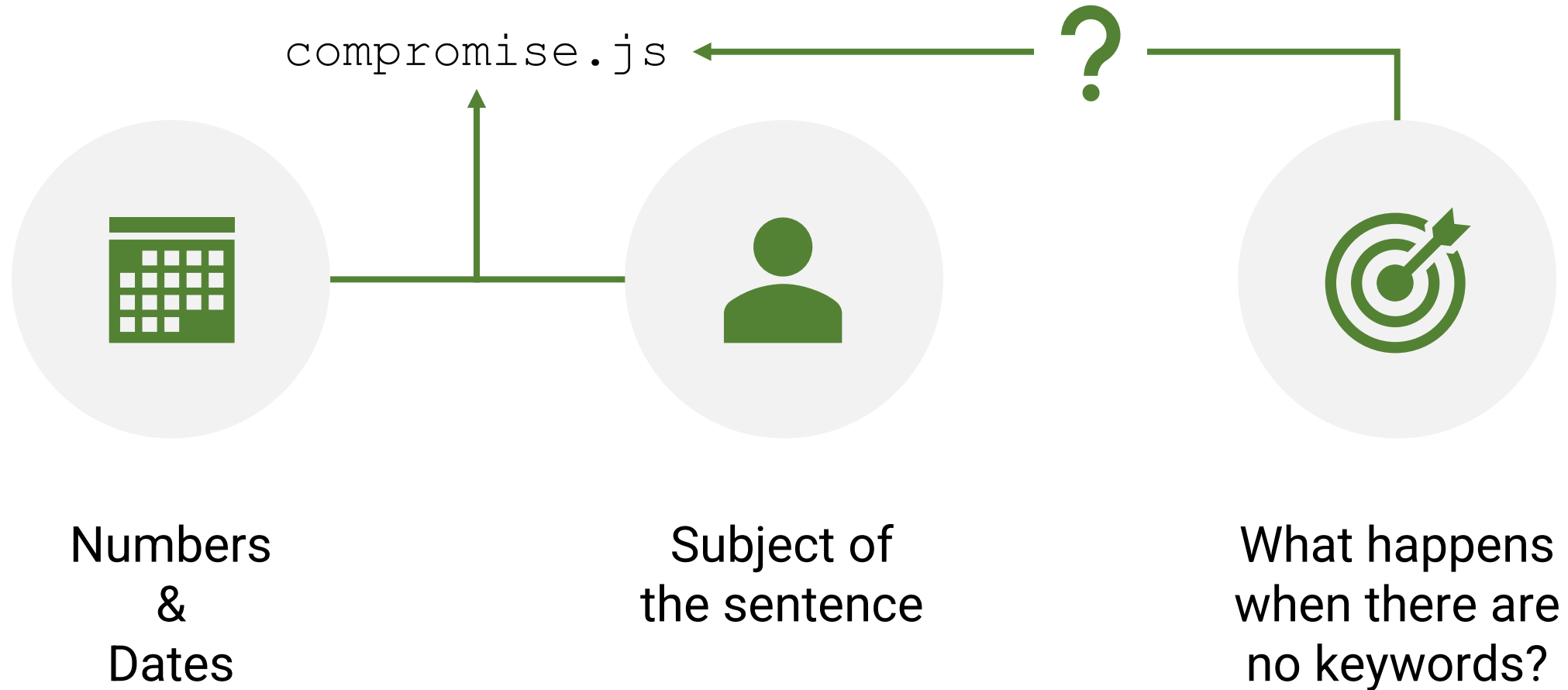


Missed phrases  
e.g.  
“o’ clock”



Lack of feedback  
from API

# Issues in Text Extraction and Topic Modeling



# Design Alternatives

## Grice's Four Maxims of Conversation

1. Be truthful
2. Provide as much information as necessary, but no more than needed
3. Stay relevant to the user's needs/context
4. Be clear, concise, and unambiguous

## Contextual Responses

- e.g., "it", "that", "them"

## Sub-conversations

- e.g., "how about 5 p.m.?" "you're busy then, how about 6 p.m.?"

## Sentiment Analysis

# App Alternatives

## Note-taking application

1. *Write*
2. *Read*
3. *Group*
4. *Search*

# Lessons Learned



Expect the unexpected



Your choice of API matters



Representation matters



Look to other areas for inspiration



Build for the 80% use case

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