Worst Practices in Automotive Speech Interfaces

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Mobile Voice Conference, April 2015
“...Usability issues associated with in-vehicle technology increasingly influences vehicle owners' perception of vehicle dependability....

“...Bluetooth connectivity and built-in voice-recognition systems are the two most frequently reported problems.”

Why speech in the car?
“In 2013, 3,154 people were killed [and approximately 424,000 people were injured] in motor vehicle crashes involving distracted drivers.”

“Distraction was a factor in nearly 6 out of 10 moderate-to-severe teen crashes, which is four times as many as official estimates based on police reports.”

http://newsroom.aaa.com/2015/03/distraction-teen-crashes-even-worse-thought/
Imperfect Hands-Free Systems Causing Potentially-Unsafe Driver Distractions

http://newsroom.aaa.com/2014/10/imperfect-hands-free-systems-causing-potentially-unsafe-driver-distractions/
“Two new AAA-University of Utah studies show that despite public belief to the contrary, hands-free, voice-controlled automobile infotainment systems can distract drivers, although it is possible to design them to be safer....”

http://unews.utah.edu/news_releases/talking-to-your-car-is-often-distracting/
“The research revealed that the more distracting voice-based systems were that way because they were too complex, mentally demanding, difficult to use and often inaccurate at recognizing voice commands.”
Don't Dismiss Voice Recognition in Cars

BY DOUG NEWCOMB     AUGUST 15, 2014     2 COMMENTS

While voice recognition can be frustratingly inconsistent, when it works it's great to be heard.

http://www.pcmag.com/article2/0,2817,2462627,00.asp
“55 percent of all new motor vehicle vehicles produced in 2019 will incorporate voice recognition, up from 37 percent in 2012.”
“...Within the past year alone, there has been an 11% increase in the proportion of consumers who say that the lack of the latest technology features is one of the most important reasons why they avoided a specific model or brand.”
Contradictions?
Survey: Speech technologies in the car

1. Which specific technologies?
2. For what purposes?
3. How often?
4. Motivation for using speech?
5. What do people think of it?
Survey Participants

- 50 participants, age 18+
- Qualifying criteria:
  - Must have a valid driver’s license
  - Own a smart phone
  - Use some kind of speech technology in the car at least 3 times per week
Q2 I use speech recognition in my car for......(choose all that apply, or explain if the reason you use it isn't listed)

Answered: 50  Skipped: 2

- Making phone calls
- Answering incoming phone calls
- Sending text messages
- Listening to incoming text
- Sending email
- Listening to incoming email
- Directions and navigation
- Internet searches
- Controlling the radio and...
- Built-in speech recognition system
- After-market navigation systems
- Mobile apps
Built-in Speech Systems

- 39/50 have built-in system
  - Every participant who had one uses it
- 74% use it every time they’re in the car, 100% use it at least a few times a week

Q6 What is the most important reason you use the speech recognition system that’s built-in to your car?

- It’s easier.
- It’s easier.
- To comply with laws about...
Opinions of Built-in Speech Systems

92.1% ▪ My car’s built-in speech system is easy to use.
92.1% ▪ I can complete my tasks quickly using this system.
81.6% ▪ My car’s built-in speech system is logical and organized.
76.3% ▪ My car’s built-in speech system usually understands what I say.
78.6% ▪ I trust my car’s built-in speech system to work correctly.
78.6% ▪ My car’s built in speech system has a pleasant voice.
81.6% ▪ I feel confident using my car’s built-in speech system.

Users who Strongly Agree or Agree

Rate on 7-point Likert scale
Strongly Agree – Strongly Disagree
After-Market Navigation Systems

- 33/50 have built-in system
  - 5 participants have a system but don’t use it
- 50% use it every time they’re in the car, most use it at least a few times a week

Q11 What is the most important reason you use the speech recognition with your navigation system?

Answered: 28  Skipped: 24

- It's safer.
- It's easier.
- To comply with laws about...
Opinions of After-Market Nav Systems

Users who Strongly Agree or Agree

- 78.6%  ▪ Using speech with my navigation system is easy.
- 75.0%  ▪ I can complete my tasks quickly using speech with my navigation system.
- 82.1%  ▪ The speech recognition in my navigation system is logical and organized.
- 64.3%  ▪ My navigation system usually understands what I say.
- 71.4%  ▪ I trust speech recognition in my navigation system to work correctly.
- 74.9%  ▪ My car’s navigation system has a pleasant voice.
- 71.4%  ▪ I feel confident using my navigation system.

Rate on 7-point Likert scale
Strongly Agree – Strongly Disagree
Mobile Apps

- 39/50 use speech-enabled apps in the car
  - 9 have speech apps but don’t use them in the car
- 61.5% use them every time they’re in the car, 38% use them at least a few times a week

Q17 What is the most important reason you use this mobile app in the car?

Answered: 39  Skipped: 13

- It’s safer.
- It’s easier.
- To comply with laws about...
Opinions of Mobile Apps

- 87.2% ▪ Using speech with the mobile app is easy.
- 89.7% ▪ I can complete my tasks quickly using speech with the mobile app.
- 87.2% ▪ The speech recognition in the mobile app is logical and organized.
- 74.4% ▪ The mobile app usually understands what I say.
- 82.1% ▪ I trust speech recognition in the mobile app to work correctly.
- 76.9% ▪ The mobile app has a pleasant voice.
- 82.1% ▪ I feel confident using speech recognition with the mobile app.
What do you like best about using speech recognition technology in the car?

“I can multitask and make use of what would be wasted time sitting in traffic.” (2011 Chrysler Town & Country)

“It is safe, recognizable, quick, chic, & modern!!” (2013 Toyota Prius)

“Very easy to use. Helps get to the options in my car easily and quickly without me having to search through the menus.” (2014 Lincoln MKX)

“It's easy and safe because I'm not taking my eyes off the road. It also feels like your personal assistant. Just say what you need done and you're taken care of.” (2014 Chevrolet Volt)
What's the biggest problem with using speech recognition technology?

Recognition accuracy (80%)

None

Technical

Design
Why the high satisfaction scores?

Motivation + Good Enough Performance = Investment

Investment - Awareness of Better Alternatives = High Ratings
Next Steps

Field observations
Identify design patterns
Usability test alternatives
Develop design guidelines
Thank you!

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