



Connected Vehicle Services

Speech in the Car: Improving User Satisfaction

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Agenda

- User satisfaction data
- UI in car goes much beyond VUI
- User satisfaction – accuracy, latency, grammars
- Speech, gesture, and touch are natural
- UI for discovery
- HMI design guidelines

Speech in the Car... Are Users Satisfied?

2012 Navigation Usage And Satisfaction Study

-- J.D. Power and Associates (1/11/13)

- Study clearly shows that drivers want speech
 - 67% of the users without speech – want it
 - 80% of the users with speech – want it again
- Speech scored lowest satisfaction score in study
 - Significantly worse than 2nd lowest score
 - Most frequently reported problem in the study

Are Users Satisfied? Continued...

2013 Initial Quality Study

-- J.D. Power and Associates (6/19/13)

- 83,000 2013 vehicle owners surveyed
 - People want speech, but are not satisfied
 - Worst satisfaction score in the study

Other data suggests need to improve usability

- 2013 Texas A&M driver distraction study
- 2013 University of Utah driver distraction study

Human Modalities for User Interfaces

ENTRY

Gesture
Speech
Touch

Communication to Device



PRESENTATION

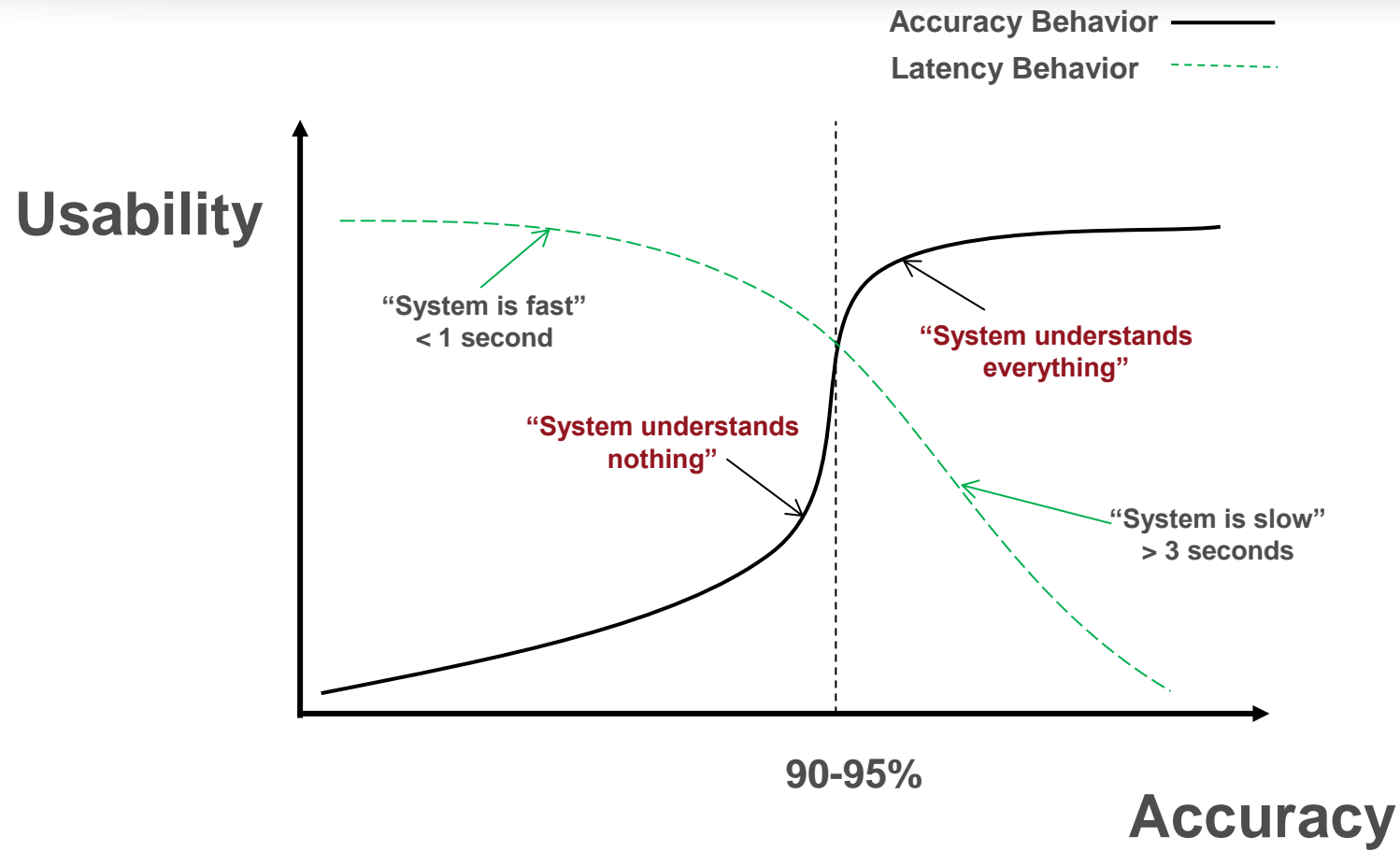
Vision
Sound
Haptic

Communication to User

Speech Input in the Car...

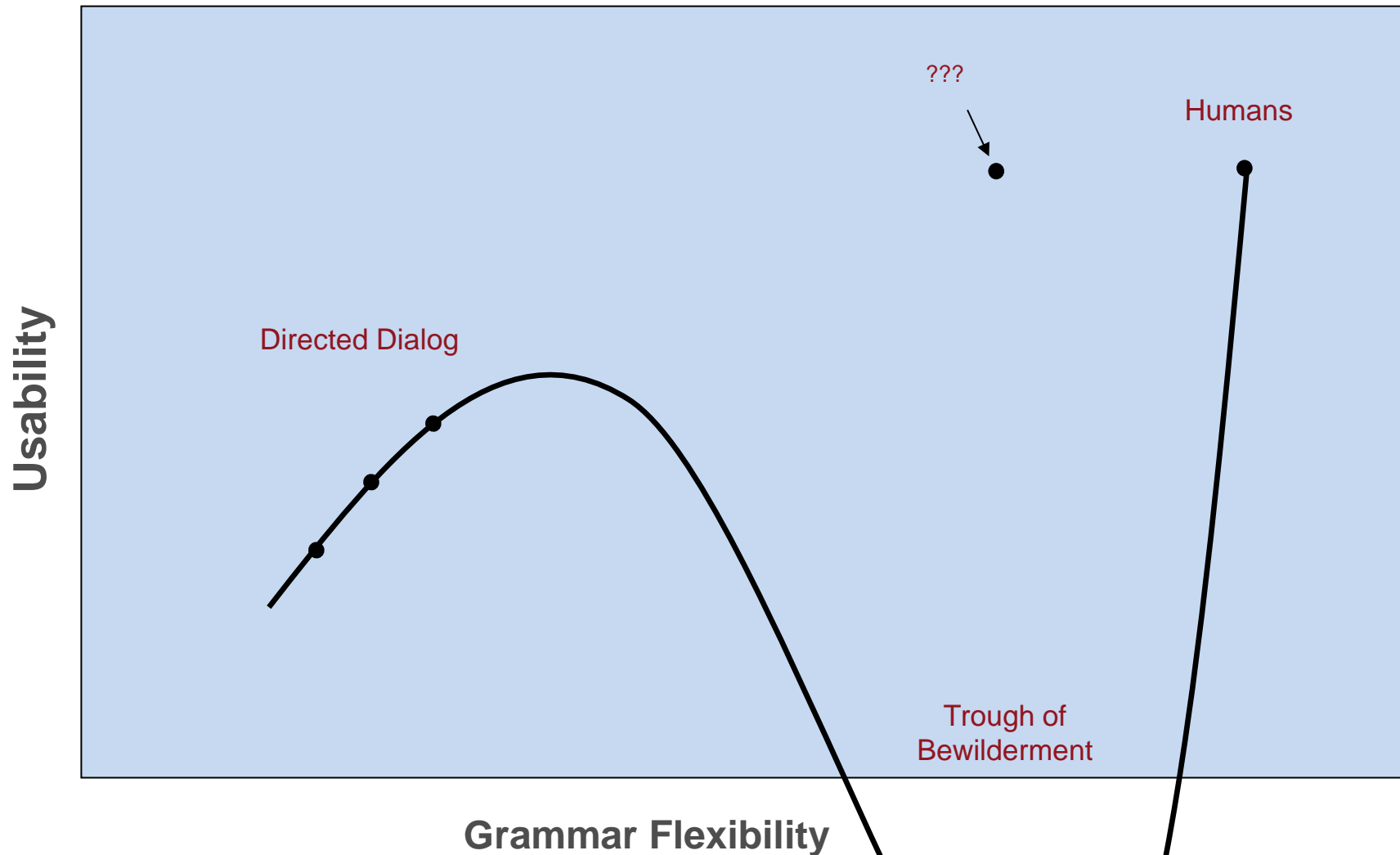
- Critical for entering text
 - Good for making requests
 - Avoids typing while driving
- Good for long-list item selection
 - Only when the user knows what is valid
 - Good for shortcuts
- Generally not good for menus
- Good for confirmation
- Increases task completion time

Accuracy and Latency



Accuracy and Latency are Both Critical

Usability and Grammar Size



Icons: Discovery and Task Selection

- Drivers are accustomed to Icons
 - Mobile device usage continues to grow
 - Touchscreens in cars is a trend

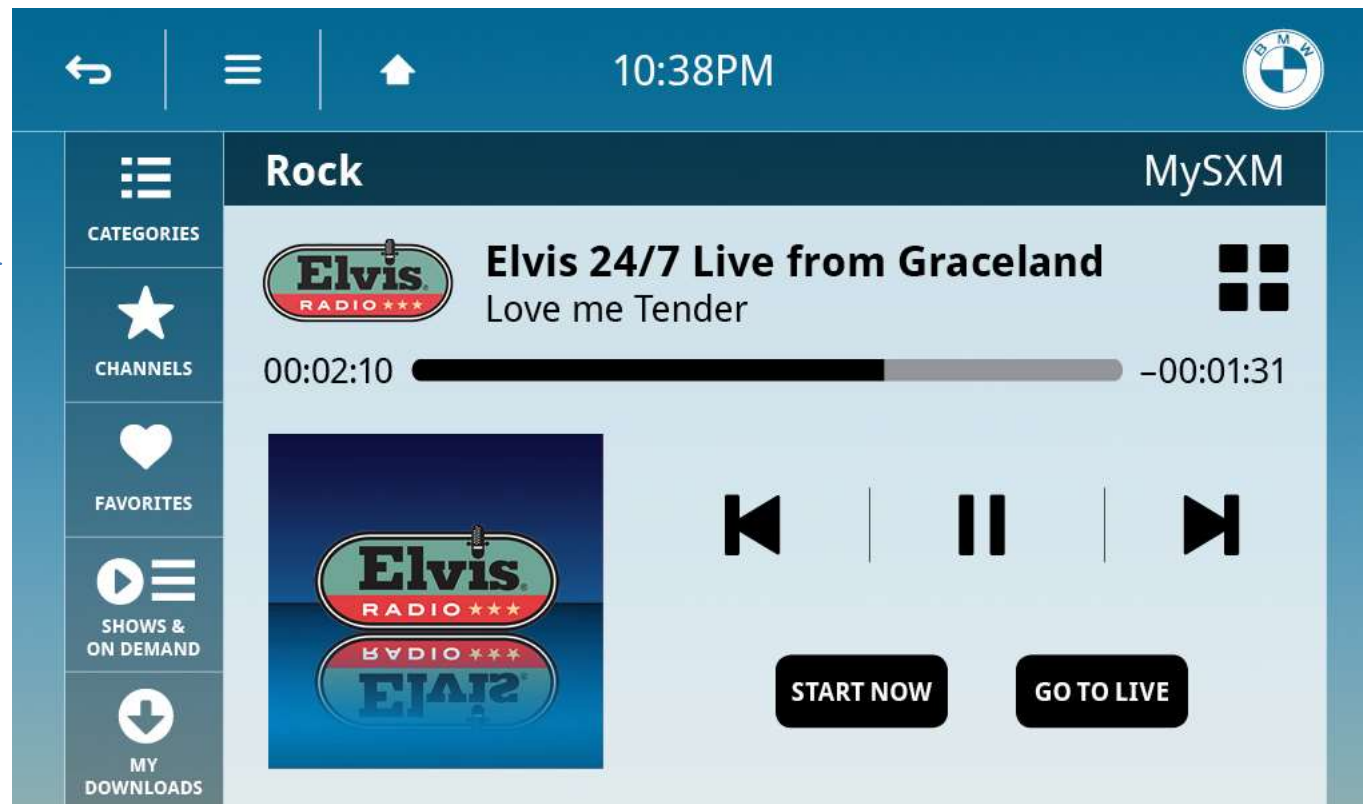


- Icons are easy to understand and remember
- Icons are easy to scan
- Adding text helps speech UI

UI for Content Discovery

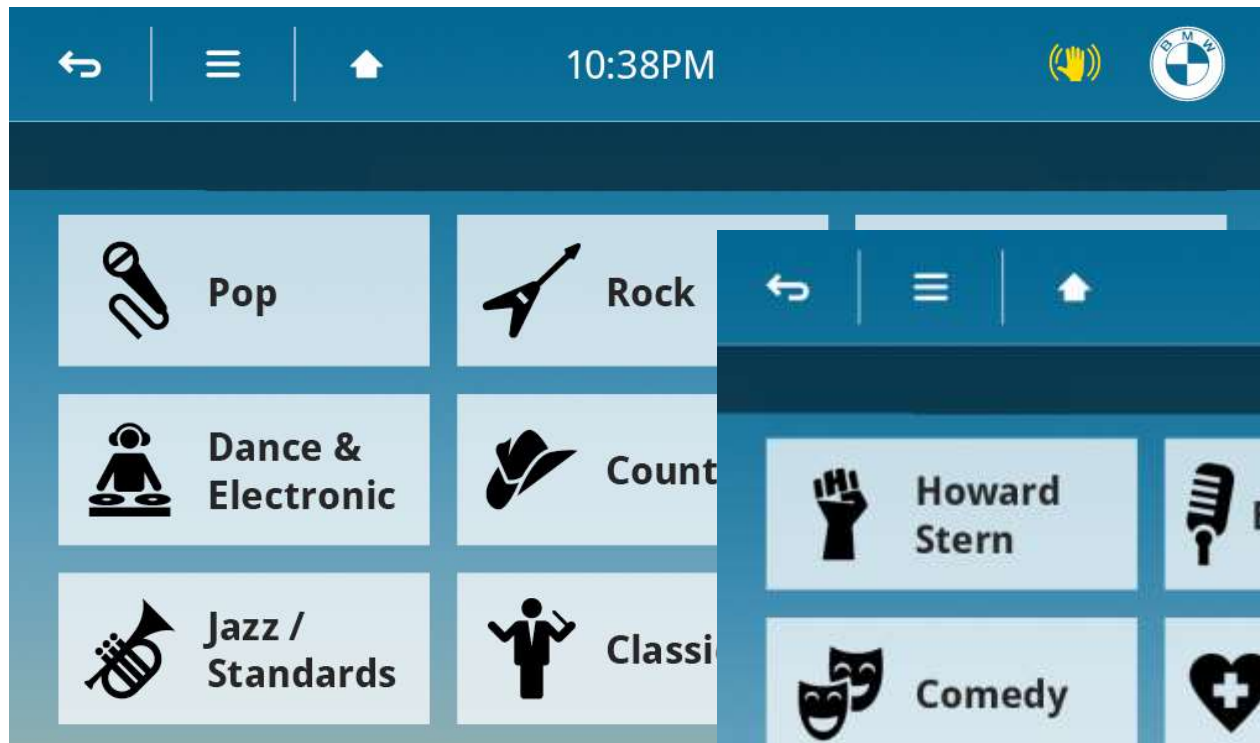
Satellite radio example...

Replace with Discover



Iconography for Content Discovery

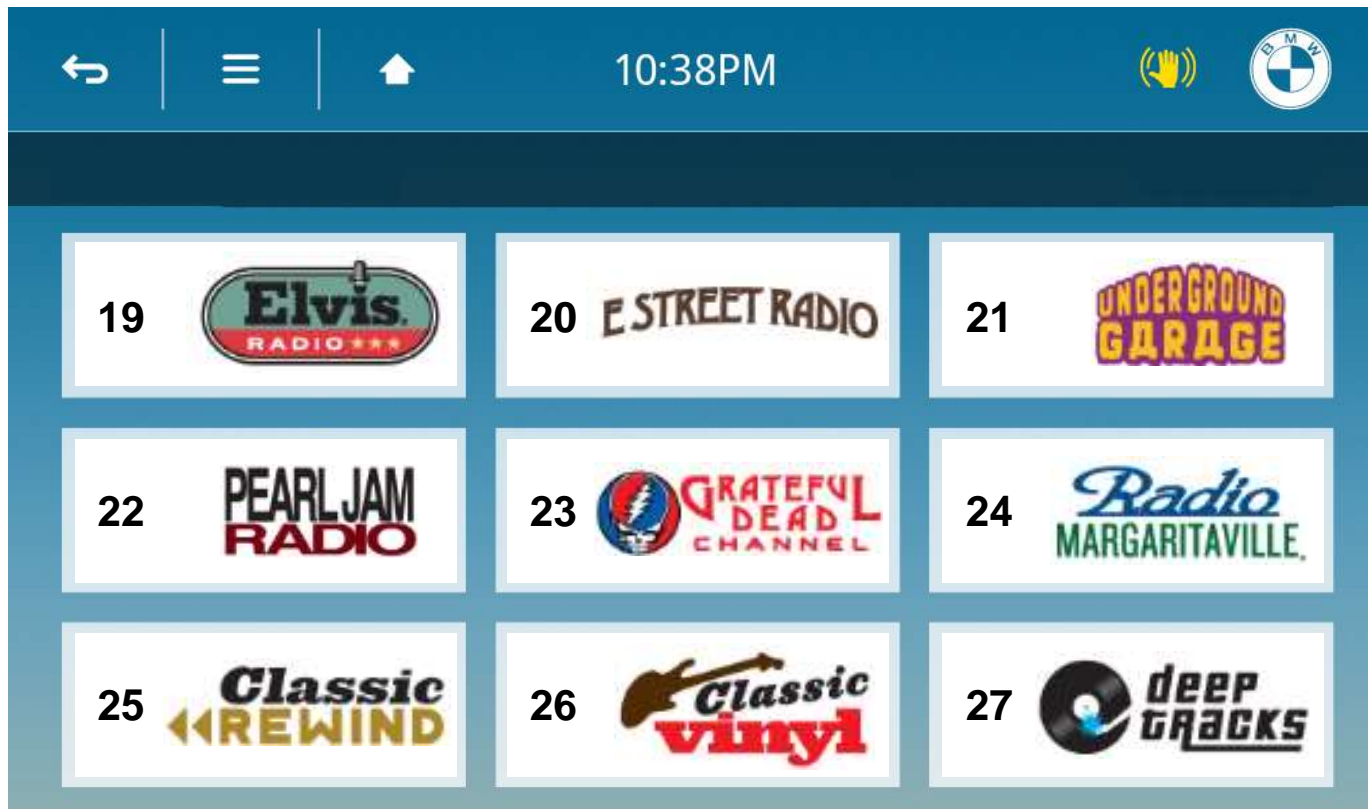
Tap, Say, or Gesture



(2 pages of categories)

Iconography for Content Discovery

Tap, Say, or Gesture



Guidelines for the Best Automotive UI

- Maximize simplicity
- Minimize # of task steps and menu layers
- Avoid voice menus
- Use speech for text entry and disallow typing
- Minimize incoming messages
- Maximize interruptibility
- Minimize verbosity
- Remove need for learning mode
- Minimize glance duration and frequency
- Minimize task completion time

Speech Button Task Initiation



“Tap or say your selection”

Speech Button



Scenario 1:

User taps weather icon

Scenario 2:

User says “weather”

Scenario 3:

User says “What’s the forecast for tomorrow?”

Conclusion: Focus on Multimodal UI Design

User Experience Goal:

- Simplicity and low driver distraction
- Intuitive and interruptible
- Minimize task completion time

Thank You