Multimodal Voice Search in the Car

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Agenda

- Automotive cockpit considerations
- Interactions of voice, vision, touch
- Applications of voice search
- Demonstrations of HMI prototypes
- Off-board architecture
- Voice search trends
Speech Interfaces in the Vehicle

• Advantages of speech (high value)
• Input modalities
• Convergence of embedded with off-board
• Challenges in usability (keep it simple!)
• Bringing productivity and entertainment

- Mixing a visual display with speech is key
- HMI principle: ability for vehicle driver to glance
- Latency and reliability are key to usability
SR71 Blackbird

Example of Complex HMI

UI Designed 50 Years Ago
Examples of Vehicle Cockpits with Navigation

Acura RL

Mercedes CLS
Speech-Enabled Typing in the Vehicle

• **Browse by Voice**
  - Speak search phrase and see search results

• **Text by Voice**
  - Speak text message for safe outbound texting

• **Local Search by Voice**
  - Speak POI and view “near by” results

**Advanced off-board speech recognition**
Browse by voice: coming soon in the vehicle

Browse by voice for vehicle display
User Interface for Browsing in the Vehicle

• Voice channel to off-board interactive system
• Say the search phrase
• Text-to-speech used to repeat phase
  – special sound for low confidence
• See search results (data to vehicle)
• Button or knob interaction to narrow search
  – optional
Text by voice: coming soon in the vehicle

Recording of text-by-voice from car to off-board iPhone

ATX Confidential
User Interface for Texting from the Vehicle

- Voice channel to off-board interactive system
- Say the text phrase
- Text-to-speech used to repeat text phase
  - special sound for low confidence
- Say who you want to text
  - Action commands and contact choices available
- Message sent (off-board)
Local search by voice: coming soon in the vehicle

Local search by voice for in-vehicle navigation display
User Interface for Local Search in the Vehicle

- Voice channel to off-board interactive system
- Say a category, business name or address
- Text-to-speech used to repeat search phase
  - special sound for low confidence
- Results on navigation display (data to vehicle)
- Narrow search through mechanical interaction
Is Social Networking Right for the Car?
CONCLUSION: Challenges and Trends

- Open speech and dealing with the unexpected
- Avoiding driver distraction
- Convergence of embedded and off-board
- Improved consumer acceptance
- Mobile device HMI controlled by vehicle
  - Key trend for future navigation and infotainment
Thank You