

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 phrase
 - 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

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 phrase
 - 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?

FRIEND FINDER

HOME FRIEND FINDER MY PROFILE ECO MONITORING



FRIENDS	SEARCH RESULTS
	Mike Phone: 323-630-1271 Distance: 1.76 mi
	siffa Phone: 214-796-6183 Distance: 2.32 mi
	Fredrick Phone: 431-555-1212 Distance: 1.99 mi
	Harris Phone: 214-555-1212 Distance: 1.24 mi
	Tom Phone: 214-437-1512 Distance: 22.98 mi
	Lauren Phone: 617-771-9037 Distance: 6.94 mi
	Julie Phone: 630-240-1800 Distance: 21.89 mi
	Tod Phone: 214-437-1512



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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

