Conversation with cars
Present and future of in-car voice interfaces

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Conversational Interaction Conference 2019
Automotive Voice - Timeline

- **Mid 80s**: Voice Alert and Warning systems in various auto
- **Early 2000s**: IBM ViaVoice Installed in Honda
- **2005**: Nuance & Scansoft Merge
- **2013**: Apple Siri integrated into Honda
- **2014**: Apple CarPlay launches
- **2015**: Android Auto Launches
- **2018**: Google Assistant now embedded in Android Auto
- **1Q 2019**: MBUX system introduced with Nuance Voice tech

- **2014**: SoundHound raises $100M and is valued > $1B
- **2015**: Amazon Alexa support rolls out in several vehicles

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Automotive Voice

• Car is a natural place to have voice interfaces
  – Users have incentive to keep eyes on the road

• Voice commands never fully caught on
  – Steep learning curve, limited features, poor accuracy

Image source: Jacki Li UX Design.cc
Voice Usage in-car

Voice in car is already bigger than Home

Source: Voicebot.ai’s In-car voice assistant consumer adoption report Jan 2019
Top 5 in-car use cases:
1. Making Phone
2. Navigation/Directions
3. Sending a text
4. Start Playing Music
5. Ask about Restaurant
What makes car unique

• Car cabin is noisy
  • Engine noise, road noise, wind noise

• Auto OEMs can tune the space
  • Control of microphone, acoustics and materials

• User is at the same place
  • User is seated and relatively

• Shared space
  • Passengers including guests, family, children

• Mistakes are expensive
  • Safety first, distraction means life or death
Trends impacting in-car voice

**Automotive**
- Connected: Removing resource constraints to enable richer voice interfaces
- Autonomous
- Safety

**Smartphone & Home**
- Smartphone digital assistants pushing boundaries of features, experience
- Pervasion of Smart speakers and assistant enabled devices.
- Benchmarks for user expectations

**Mobility**
- Vehicle ownership changing e.g., cars sharing
- MaaS, Ridehailing, Ride sharing
Current state of voice in car

A paradigm shift in interaction is here now:
“Natural language voice as input and audio as output”

Smartphone/Home
- Apple CarPlay
- Amazon Alexa

White Label Solutions
- Nuance

Auto OEM Custom Solutions
- BMW Intelligent Personal Assistant
- NOMI mate On Nio ES8

High Differentiation
- Full data ownership
- Higher cost

No differentiation
- No data ownership
- Low/No cost
Vehicle Personal Assistants: Key differentiators

- Automated Speech Recognition (ASR)
- Natural Language Understanding (NLU)
- Dialog Management
- Text to Speech (TTS)
- Context Engine: Vehicle & User
- Intelligence and Smart Capabilities
Where are we heading next?  
→ **Natural Interactions**

**From Traditional VR**
- Tree based menu structure
- Step by step
- Confirmations
- No context of prior conversation

**To Full Conversational AI**
- Conversational top-level
- Flat and open dialog
- AI powered intent decisions
- Leverage prior conversation in context

- We are currently in a where close domain conversations are possible. (e.g., Duplex)
- Over the next couple of years we can expect to see more open and cross domain conversational abilities in Voice assistants
Where are we heading next?

→ Full UX

• Voice is just one interaction mode – integrated full UX multi-modal interactions need to be designed for a great user experience.
• Users will have ability to move seamlessly between voice and other modes of input.
Where we are headed next?

→ **Proactive**

• Notifications on smartphone are broken.
  – Too many, Too distracting

• Proactive initiation of voice can be useful and meaningful when done right.
  – The cost of getting this wrong is huge so we must tread carefully

• Learning when it’s right time to notify the user is key.

• Leveraging multiple channel (smartphone, home assistants, email, phone) both inside and outside the car is key
Where we are headed next?

→ Personalized

- User’s interactions with Voice Assistants – will to move away from generic to becoming “personalized”.
- Average person spends over 80 mins/weekday in the car.
- Connected cars now can collect a wide array of data including location, navigation, infotainment, and vehicle sensor data.
- Coupled with rich voice data and other digital assets can enable personalization.
Where we are headed next?

Secure and Private

- Users are paranoid about voice interfaces (especially the always-on solutions).
- There is a trend to perform commerce via voice in the car (e.g., Quick Service Restaurant ordering, Pay for parking or other services)
  - Voice Biometrics tech is one of the key enablers in identifying the user and securing the transactions and reducing fraud
  - Other forms of biometrics e.g., FaceID, Finger print sensor can be use to augment security
- Personal (e.g., Headrest mounted speakers) enable private interactions (similar to Apple Airpods)
Where we are headed next?

→ **Challenges**

- Voice feature discovery is challenging especially when only limited domains/capabilities are supported
- Business models need to evolve
  - Winner takes it all – and the fight the own the in-car user experience is already underway. Competing with FREE is possible by not easy.
- Auto OEMs need to think beyond the vehicle
  - Ecosystem, post sales revenue opportunities,
- Automotive vehicle refresh cycles are slow (cloud is helping partially)
- Data-costs
Conclusion

- Voice has come a long way in-car. Fundamental shifts in connectivity, interaction and breakthroughs conversational AI taking this to the next level.
- Cars pose unique challenges and opportunities that must be exploited carefully.
THANK YOU!

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