Deploying Speech and AI Technologies in Consumer Electronics

...10 or so Lessons from the Real World

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Sensory has A LOT OF EXPERIENCE

Customers

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Platform Partners

- Sensory
- CSR
- Analog Devices
- ARM Connected Community
- Cadence
- CEVA
- Cirrus Logic
- Conexant
- Qualcomm
- QuickLogic
- Retune DSP
- Synopsys
- VeriSilicon
- Xmos
- Yamaha
...and Lots of Technologies & Products

- **Technologies**
  - Speech Recognition, Natural Language, Biometrics, and Computer Vision

- **3 Key Products**
  - TrulyHandsfree Voice Control
    - low power tiny speech engine
  - TrulyNatural
    - Natural language embedded speech recognition
  - TrulySecure for Biometric Security
    - Face ID
    - Voice authentication

- **One Application**
  - Google Playstore application
SO...
Let me share some stories of things we have seen and learned after helping design hundreds of products shipping in BILLIONS of units
#1 It’s All About the Consumer Experience
#2 Actually...it’s REALLY all about the **DATA**

- **Representative Data**
  - Large Japanese company
  - Large Korean mobile company

*Collect Real World Representative Data!*
#3 It’s all about the DATA

- Don’t over-train the data
  - Audio channel
  - Noise front end
  - Training/Testing data rarely matches real world usage

Vary the audio channel
(it can be better than “anti-data”)
#4 Get LOTS OF DATA

- NOT stop signs
- Rifle
- Gorillas
#5 There’s a LOT of ACCENTS & DIALECTS

>6000 languages in the world and >2B people speak English

Train & Test on the Right Demographics!
#6 Align Testing between Suppliers and OEM’s

- Who is the target users (demographics, accents, etc.)
- What are environmental conditions (noise, lighting, etc.)
- Capturing channels (AEC, noise suppression, cameras, etc.)

Model Training → Model Testing → Model Usage

*separate training from testing*
#7 It’s Not Always the Recognition!

Voice Controlled IR Remote Dog
#8 Careful Product design!
#9 Make it foolproof!

- They won't design it the way you want
- They won't train the way you want
- They won't use it the way you want
- They won't read the directions
- There's no such thing as quiet
- It's gotta just work

Our customers aren't idiots... we are unrealistic
Summary Conclusions

• Consumer liking and usage is key to success
  – Ease of use very important
  – Make the technology work for what the CUSTOMER wants
  – Face biometrics appears as a top choice for its convenience

• Get the right data for the right usage
  – Training data
  – Channel effects
  – Testing data

• Application design is highly important in user acceptance, liking, compliance, and performance
  – Make it foolproof