Alexa’s Journey in Advancing Conversational AI
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Our Brains are Wired for Speech
Challenge
Natural Human Machine Interaction
Voice Enables

Seamless Interactions
Powerful machine learning algorithms

Foundations in

Conversational AI
Powerful machine learning algorithms

Massive computation power

Foundations in

Conversational AI
Powerful machine learning algorithms

Heterogeneous data

Massive computation power

Foundations in Conversational AI
Conversational AI Evolution

- 1970: Hundreds of words
- 1980: Thousands of words
- 1990: Hundreds of thousands of words
- 2000: Millions of words
- 2010: Tens of millions of words
- 2020: Further increase
What can Alexa do

- Entertainment: Music, Books, Video..
- Household Tasks: Timers, ToDos Lists, Calendar..
- Information: Weather, Traffic, Facts..
- Smart Home: Lights, Thermostats, Switches..
- Shopping: Reorder, Buy, Check Status…
- Communication: Calling, Messaging, Drop-in..
- 20,000+ skills built by 3rd Party Developers
How Does
Alexa Work Today
How Does Alexa Work Today

On-device processing:
- Signal Processing: Beamformed signal
- Wake Word Detection: Audio stream to cloud

Cloud processing:
- Dialog Management:
  - ACTION: Shuffle songs
  - INTERPRETATION:
    - Intent: play music; Artist: Sting
- Text-to-Speech Synthesis:
  - AUDIO: Shuffling songs by Sting
Privacy
Alexa heard, “tell me a joke.”
Ecobee Thermostat

Ford

Huawei Mate 9
“Create a socialbot that converses coherently and engagingly with humans on popular topics and news events for 20 minutes.”

Alexa, let’s chat