# The Future of Voice-based Intelligent Conversational Agents for the Enterprise

*Restaurants, Retail and Beyond*

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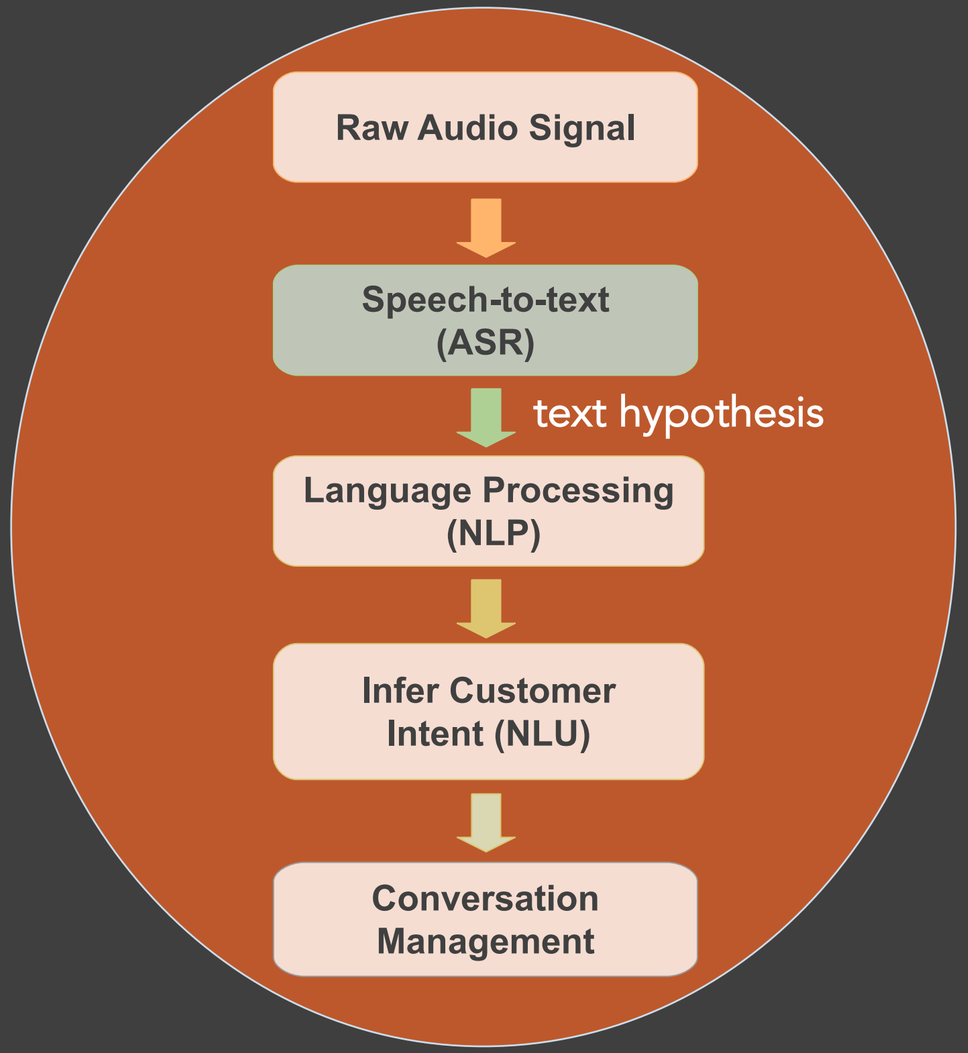
# DOMAIN-SPECIFIC CONVERSATIONAL AGENTS
An enterprise perspective

Broad opportunities on the enterprise side for domain-specific voice-based conversational agents

- Very different from consumer-facing voice agents
  - Restricted in domain scope
  - Demand robustness to language variations
- Diverse enterprise use cases
  - Call centers - >$100B/year in OPEX
  - Restaurants – mobile ordering, self-service kiosks, drive-thrus
  - Retail – virtual customer assistants, info-stations, payment stations

# CHALLENGES WITH CONVENTIONAL DIALOG SYSTEMS FOR THE ENTERPRISE

What's behind Siri, Alexa and Cortana?



Cortana

Siri

Bixby

alexa

# TECHNICAL HURDLES
## Challenges in driving customer experience

### Poor speech transcription (ASR)

real-world settings are often noisy and customers use poorly structured language degrading speech recognition.

### Consumer products are open-ended

personal assistants (Siri, Alexa, Cortana etc.) are not optimized for the domain-restricted use case of enterprises

### Not enough data

Deep Learning is often used to infer customer intent,
however it requires lots of domain-specific data which is often not available

## AN ALTERNATIVE TECHNICAL APPROACH
Conversational agents for restricted domains

Speech-to-meaning system architecture trained on real and synthetic data

### speech-to-meaning

no speech transcription -
robust & direct NLU

### conversation simulator

augment real (collected) data with
synthetic data for model training

### business logic layer

customized business
reasoning logic

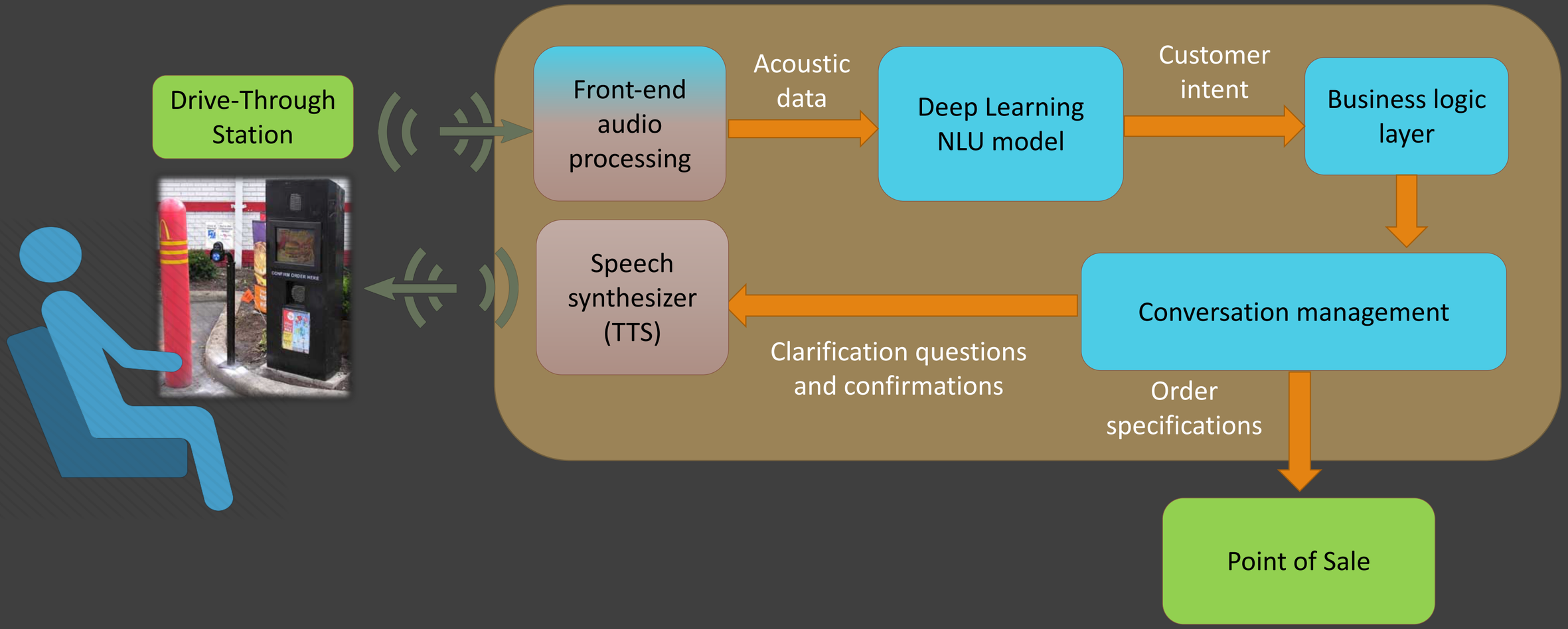
# AUTOMATING THE DRIVE-THRU FOOD ORDERING AT QSRs
canonical enterprise use case

**US QSR fast-food market is $350B in revenue per year[1]**
**Drive-thru orders responsible for ~70% of revenues[2]**

- Broad value proposition:
  - Cost reduction
  - Revenue growing
  - Improve interaction with the brand
  - Relieves labor accessibility challenges

[1] *"2017 State of the Industry", National Restaurant Association*
[2] *The 2018 QSR Drive-Thru Study*, QSR Magazine, October 2018: https://www.qsrmagazine.com/reports/2018-qsr-drive-thru-study

# CAST STUDY: AUTOMATED ORDERING AGENT AT QSRs
## System overview



# CONCLUDING THOUGHTS

Voice-based conversational AI agents for the enterprise will have vast impact on many industries

- Restricted-domain dialog systems represent a huge opportunity
- Operation profile is fundamentally different than consumer-facing products
- Need novel solutions that overcome existing challenges and help drive the customer experience

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