

The Challenges of Moving from Web to Voice in Product Search

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Amazon Research - Alexa Shopping

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Natural Way to Interact with Personal Assistants: Voice Input [TheWebConf 2018 keynote]

- Limited information flow into smartphones/devices with typing/touch
- People can speak up to 4 times faster than they can type
- Speech is expected to replace touch/typing as the primary input form
 - By 2018 30% of all interactions with devices will be voice based (Gartner)
 - By 2020 50% of all searches will be voice searches ([comScore](#))
 - By 2020 about 30% of searches will be done without a screen ([Mediapos](#))

- Music
- Information
- Smart home
- Games
- Shopping
- ...

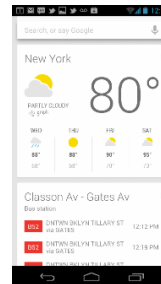
Alexa/Echo (2014)



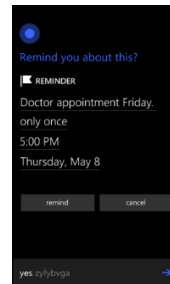
Siri (2011)

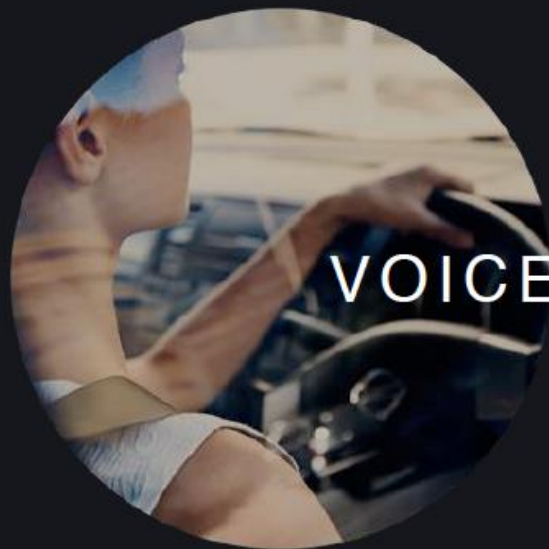


Google Assistant (2012)



Cortana (2014)





VOICE WILL BE EVERYWHERE



Alexa Shopping

research



Voice Shopping

Voice Shopping Set to Jump to \$40 Billion By 2022, Rising From \$2 Billion Today

Voice Commerce Next Major Disruptive Force in Retail, According to OC&C Strategy Consultants Study
Amazon-Dominated Household Speaker Penetration Expected to Soar to 55% Over Next Four Years, from Current 13%

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Feb 28, 2018, 08:07 ET

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Source: <https://www.prnewswire.com/news-releases/voice-shopping-set-to-jump-to-40-billion-by-2022-rising-from-2-billion-today-300605596.html>



Web Product Search

Amazon.com

Input: product name

Output: list of products

The screenshot shows the Amazon.com search results for the query "dog food for puppies". The search bar at the top is highlighted with a red box. The results are sorted by "Featured". The left sidebar contains filters for "Show results for" (Pet Supplies, Dry Dog Food, Canned Dog Food, Dog Food), "Refine by" (Subscribe & Save, Amazon Prime, Eligible for Free Shipping, Pantry), "Dog Life Stage" (Adult, Puppy), and "Pet Food Flavor" (Chicken, Beef, Bison, Venison, Seafood, Turkey, Lamb, See more). The main content area displays three sponsored product listings:

- Blue Buffalo Wilderness High Protein Grain Free, Natural Puppy Dry Dog Food...** by BLUE Wilderness. Price: \$47.49 (was \$53.38). 5 stars, 973 reviews. Prime.
- Blue Buffalo Life Protection Formula Natural Puppy Dry Dog Food, Chicken and Brown Rice 30-lb (Packaging May Vary)** by BLUE Life Protection Dog Food. Price: \$44.64 (was \$65.99). 5 stars, 574 reviews. Prime. FREE Shipping on eligible orders.

The third product listing is partially visible at the bottom of the page.

Voice Product Search



CUSTOMER

"Alexa, buy dog food for puppies"



"Ok. The top search result is
*Purina ONE SmartBlend Healthy
Puppy Formula Dry Dog Food*"



Moving from Web To Voice

Data

Patterns

Behavior

Metrics

Using voice, customers:

- Buy different things
- Describe products differently
- Behave differently
- Are exposed to fewer results, with less information
→ *Optimizing for relevance metrics such as success@1-2*



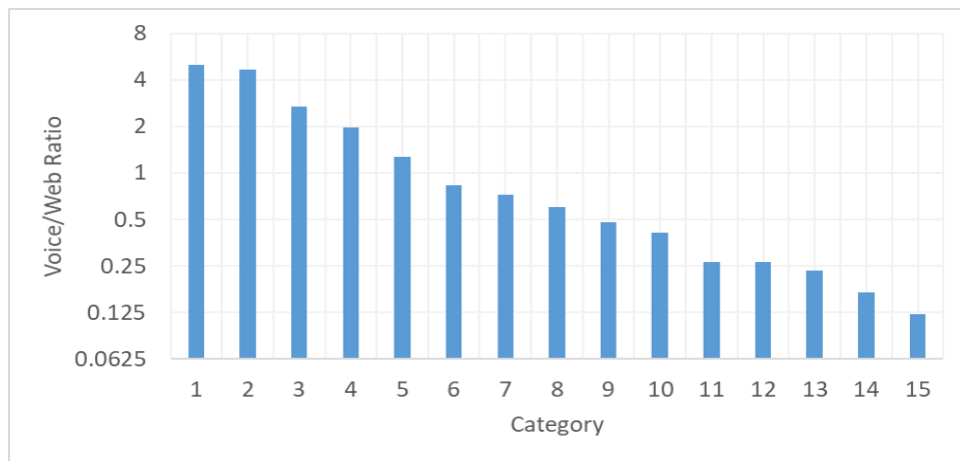
Gap between Web and Voice

- Based on 7 months of product search traffic in Amazon Web site and Alexa Shopping
- Considering users active in both domains



Shopping across Categories

- For each category – ratio of its popularity in voice vs Web
Popularity = fraction of purchases per category within the domain



Categories with highest voice/web ration - products that people buy on a regular basis (supplies, groceries, beauty & health...)

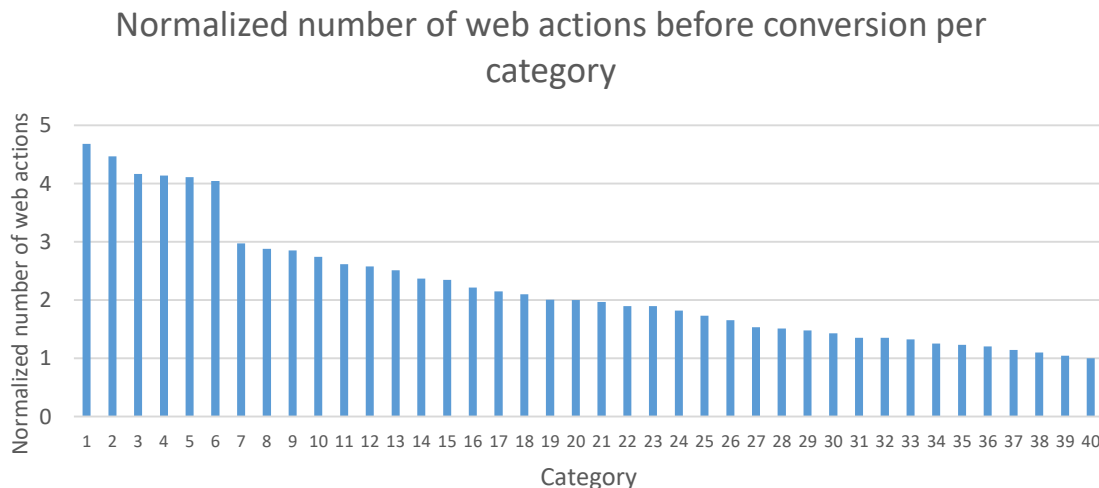


Behavioral Patterns

In voice: either buy (add-to-cart/send-to-mobile) or move to next

In Web: navigate

- Number of users' actions between a query and a purchase
- Normalized, ordered from higher to lower



In Web, a user will likely perform several navigation actions before a purchase



Predicting Purchase Category

- Used as a significant signal for offering the customer the right type of product
- Given the query, using the same model:

Predicting product category in voice is 39% more accurate than in Web

* measured in multi-class log-loss

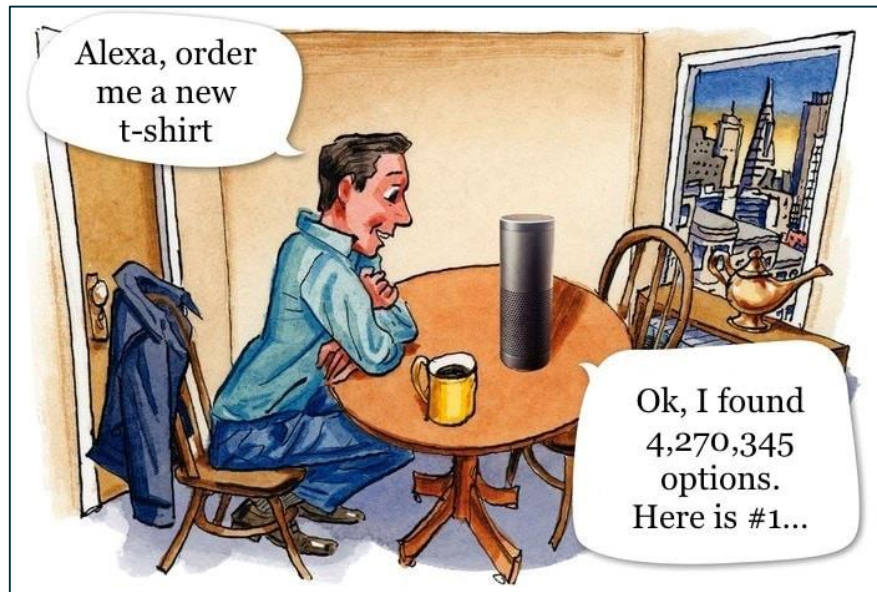
In voice shopping, the user query is closer to the purchase than in Web

Query	Category	Item Purchased (Web)
mickey mouse	beauty	Disney Minnie Brush and Comb Set
lamps	mobile-apps	Color Flashlight Lamp (mobile app)
pirates	digital-music	Pirate Overture (music track)



Future Directions

- Characterize and contrast users' behavior in Web vs voice product search
- Revisit user search experience in the voice domain
- Explore transfer learning methods from Web to voice



Thank you



It's Day One.
We Are Hiring!