Talk to me Drupal

Using Drupal to power a Voice App

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- Talk to me Drupal; Using Drupal to power a Voice App
- You should be able to follow along by visiting the link below.
- If you have an Echo device, please mute the mic now.
  - You have been warned and I/we/no-one is to blame if we trigger it but you.
  - You only have yourself to blame.

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Hello My Name Is Frank

I am a Christian, Father, and Technology Enthusiast.

- *Online my name is* **frob** (IRC, d.o, github)
- *On Twitter I am* **@frobdfas**
- *My Blog is* www.frobiovox.com
- *I work for* Clarity Innovations Inc.

- Hello my name is Frank Robert Anderson
- I am a Christian, Father, and Technology Enthusiast.
- Web development since high school
- Been working in Drupal professionally for just shy of 10 years.
- I have worked almost exclusively in the Education industry both higher ed and k-12 for over 5 years.
- Online you can find me as frob
  - IRC
  - github
  - drupal.org
- Twitter frobdfas
- blog
- website
- I work for Clarity Innovations.

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- Clarity Innovations is a professional services firm based in Portland, Oregon focused on providing K-12 and higher education technology consulting to non-profits, schools, and corporations.

- Our 25 employees combine leading edge technology and design skills with direct experience in the classroom and university.

- We develop solutions for our clients including strategic consulting, professional development and content creation, and engineering solutions such as apps, web apps, and websites to help improve the process and practice of teaching and learning.

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Technology Enthusiast

- I make it my job to know as much as I can about emerging technologies.
- I have many hobbies that have span many things.
  - Dnd
  - Game Mechanics
  - Used to record music
  - Still live sound (at church)
- Making things

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Jack of all Technologies

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- New technologies that have recently become main stream
  - Natrual Language Processing
  - Machine Learning
  - Internet of things
  - Intelegent Chatbots
    - not druplicon or drupalbot or hubot
    - Real conversational chatbots that respond in non-preprogrammed ways and expected ways to unexpected commands
    - Virtual Assistants, such as those used by Google, Amazon, Microsoft, and Apple are just smart chatbots.

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Live Demo

I would Ask Alexa for something

It would respond

I would edit something in Drupal and ask again

It would respond differently

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Cool Stuff

- I believe presentations are more insteresting if you show the cool stuff first
- Originally this was going to be a live demo
  - I would Ask Alexa for something
  - It would respond
  - I would edit something in Drupal and ask again
  - It would respond differently

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Realization

Everyone here has likely seen the node edit page.

- But then I had a realization
- Everyone here has seen the node edit page.
- About that time my bosses boss came back with some interesting stats from SXSW

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https://twitter.com/chrisferrel/status/97286151392803225 6

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- Most of these numbers come from Christonpher Farrel's SXSW presentation I've got no strings https://www.slideshare.net/cwferrel/ive-got-no-screens-internets-screenless-future-sxsw-2018-90319757

clarity-innovations.com

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Numbers are cool

By 2020, 30% of *web* browsing will be done without a screen.

Gartner research

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- The cool thing he starts with is a prediction from Gartner
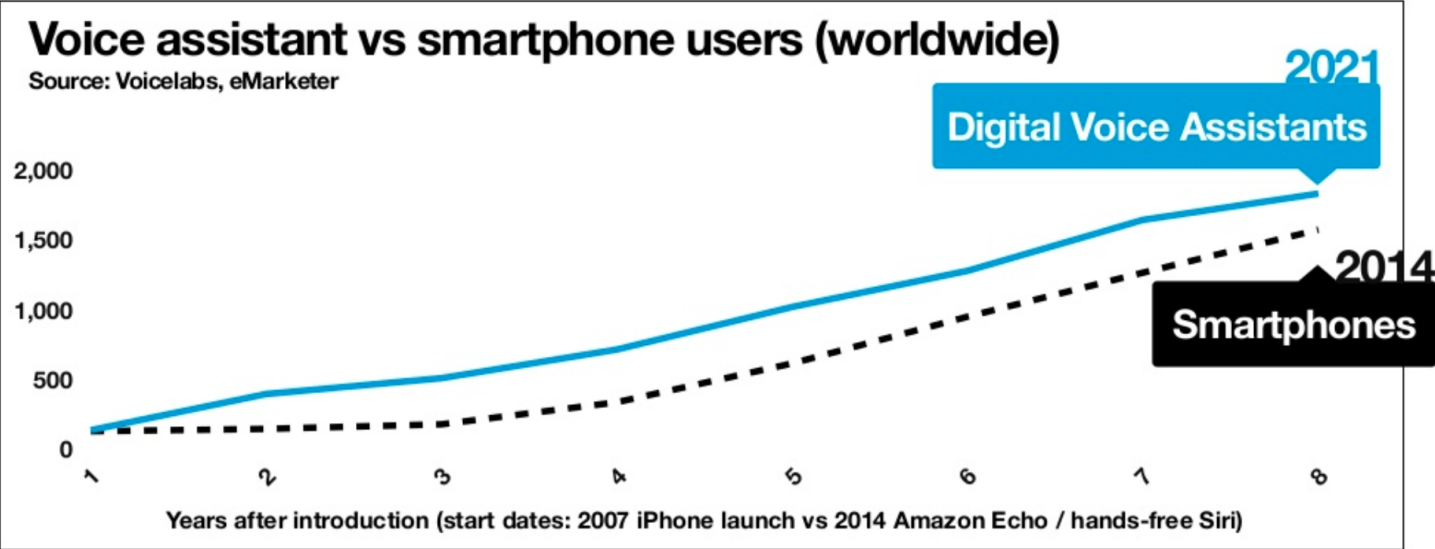 - by 2020, 2 years from now, 30% of webbrowsing will be done without a screen.

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Voice first is the new mobile first

Best viewed on Internet Explorer at 800x600 resolution.

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- Voice is the new mobile
- Bottom line
  - Mobile first will be voice first
  - Screens will become speakers
  - Hopefully,
    - People will go from face-down in their phone to face up

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Voice Assistants Adoption

Voice assistant vs smartphone users (worldwide)
Source: Voicelabs, eMarketer

2021
Digital Voice Assistants
2014
Smartphones

2,000
1,500
1,000
500
0

1   2   3   4   5   6   7   8

Years after introduction (start dates: 2007 iPhone launch vs 2014 Amazon Echo / hands-free Siri)

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- This graph really shows how imparative this revolution is.

-

- The adoption rate of Digital Voice Assistants is outpacing the adoption of smartphones

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Much cooler than the node edit page.

- Was that more insteresting than the node edit page?

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So you have decided to build a **Voice App**

We want a voice app that tells one new joke every day

This can be done multiple *bad* ways

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By now you have decided to build a voice app

- you have a client that wants to have a chatbot that tells one new joke every day.
- This can be done multiple ways.
  - you can manage the jokes through the vendor console
    - log in every day at the same time, every morning, and copying in the joke.
  - you can have the response pre-programmed with hardcoded responses that get cycled through.
- If only there was some sort of system that could manage this content.

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Foreshadowing

- [✔] Cool stuff
- [ ] Voice App 101
- [ ] Architecture
- [ ] Natural Language Processing
- [ ] Current Market
- [ ] VUI design tips
- [ ] Bringin it Home
- [ ] Questions

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- Cool stuff
- Voice App 101
- Architecture
- Natural Language Processing
- Current Market
- VUI design tips
- Bringin it Home
- Questions

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Intents, Utterances, and Slots

Intents

The goal, function, or command you want to happen

Utterances

The words you expect a user to say to make the intent happen

Entities

Data that the intent needs

Intent Parameters

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- Intents, Utterances, and Slots
  - Intents
    - It all starts with Intents.
    - The goal, function, or command you want to happen
  - Utterances
    - The words you expect a user to say to make the intent happen
    - Really it is the training data for the AI part of all of this
  - Slots or Entities
    - Data that the intent needs to be fulfilled
    - If the Intent is a function then the slot is the paramater
    - Entities are somewhat selfcontained
      - Slots can be custom or one of Amazon's prebuilt data types
      - Slots also control how Alexa asks for the data
        - If Alexa needs a piece of data then it will ask the user for it, how the user is asked is controlled by the slot
        - They also hold the validation logic and the formatting logic
        - Your code or API expects a date to be formatted a certain way, the Slot or Entity is what makes sure the words that come out of a persons mouth become a properly formatted date, or location, or color, or food, or whatever.

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Fulfillment

- This is what happens when the app thinks it know the intent of the user and all the data slots are filled
- This can be any https REST endpoint
- This can also be a straigt up lambda function

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- Fulfillment
  - This is what happens when the Alexa thinks it know the intent of the user and all the data slots are filled
  - This can be any https REST endpoint
  - This can also be a straigt up lambda function
  - Segway
    - https://en.wikipedia.org/wiki/Segway_PT#/media/File:Black_x2_and_white_i2.jpg
    - Maybe a gif of wierd al from the white and nerdy video

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High level architecture

- I talk to Alexa
- Alexa calls Drupal
- Drupal gives the response to Alexa
- Alexa talks back to me

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- I talk to Alexa

- Alexa calls Drupal

- Drupal gives the response to Alexa

- Alexa talks back to me

This is how all this stuff works. We can add more complexity by having Alexa call lambda which can do more caching or turn everything after Alexa into a giant microservice based behemoth, but we don't have to. This is all that is required to get Drupal to back an alexa app.

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Theres a module for that

Chatbot API

Currently the following platforms are supported:

- Alexa, by using the internal `chatbot_api_alexa` submodule together with the Alexa module.
- Dialogflow, by using the internal `chatbot_api_ai` submodule together with the Dialogflow Webhook module

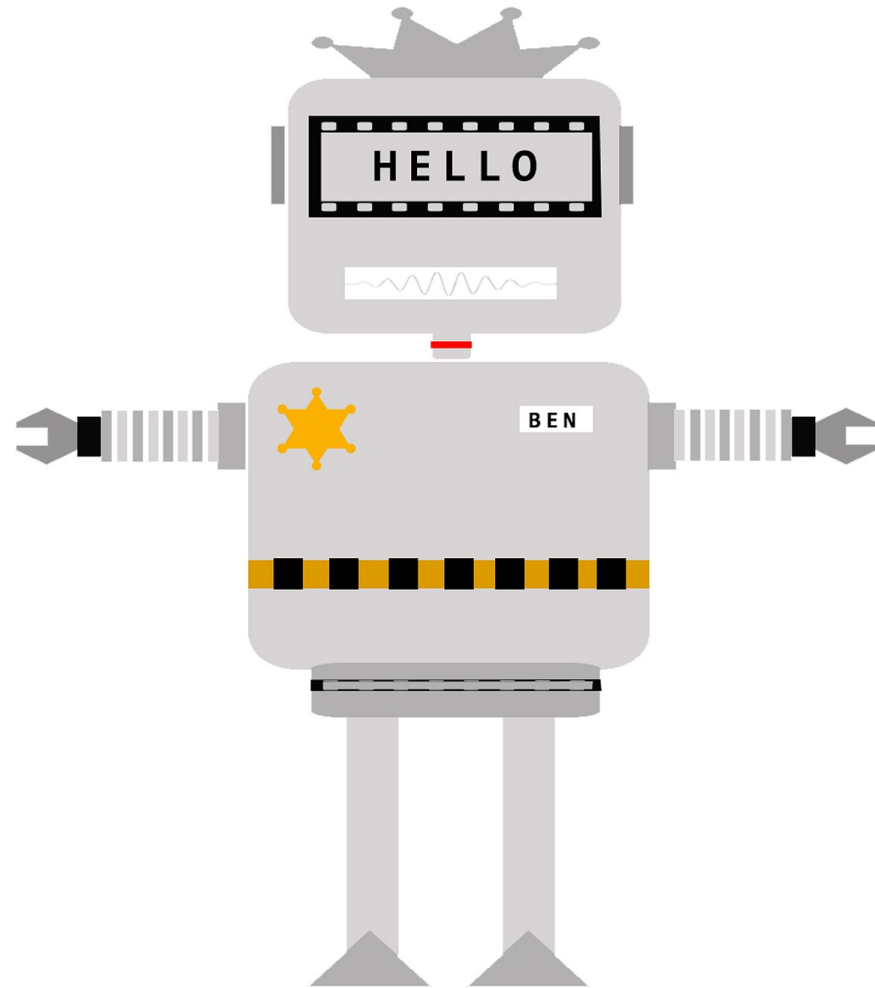More integrations are coming. Also if you've written a driver or an useful plugin let us know!

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In this barebones sencario, Drupal would need to have some sort of integration module. And as usual. Theres a module for that.

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Open Source Voice and NLP

Natural Language Processing is hard.

- Open Source Voice and NLP

- NLP is hard

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- I am not talking about Voice to Text
- Voice to text has gotten really good due to the critical mass of training data and modern ML based approachs.
- On its best day to voice to text was only around 60% accurate.
- Now, Google and the like is in the high 90% of accuracy. That is rivaling human beings.
- But voice to text isn't even Natural Language Processing.
- That is converting voice audio to text strings.
- NLP is when the computer doesn't just figure out what you are saying, but also what you mean. Or in the case of a Voice Assistant, what you want.

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Italian grandmother learning to use Google home

NLP is hard

- NLP is hard

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NLP in 4 easy steps

Open Source Language Parsing libraries

NLTK for Python   **NLPTools** for PHP

Do lots of data science processing to format the spoken language into something the computer can understand.

Lemmatization   Sentence breaking

Morphological segmentation   Stemming

Do Machine Learning

TensorFlow

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- Lets say the voice to text problem is solved. You can do that.
- All of them start with some sort of natual language tool kit
  - NLTK in python
  - NLPTools in php
  - lots of processing of the text must be done in order to make the data suitable for a computer. @TODO write blog post on this.
    - To learn more you can read
    - Not going into it in this session. Just know it is very hard.
    - https://en.wikipedia.org/wiki/Natural-language_processing
    - Lemmatization
    - Morphological segmentation
    - Sentence breaking
    - Stemming
- Then feed the data from those into a machine learning framework, such as TensorFlow or SageMaker
- or just use a prebuilt closed source NLP solution such as AWS Comprehend

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Roll your own Machine Learning library

Can't be to hard, this guy did it in Excell

Machine Learning using a Neural Network in Excel

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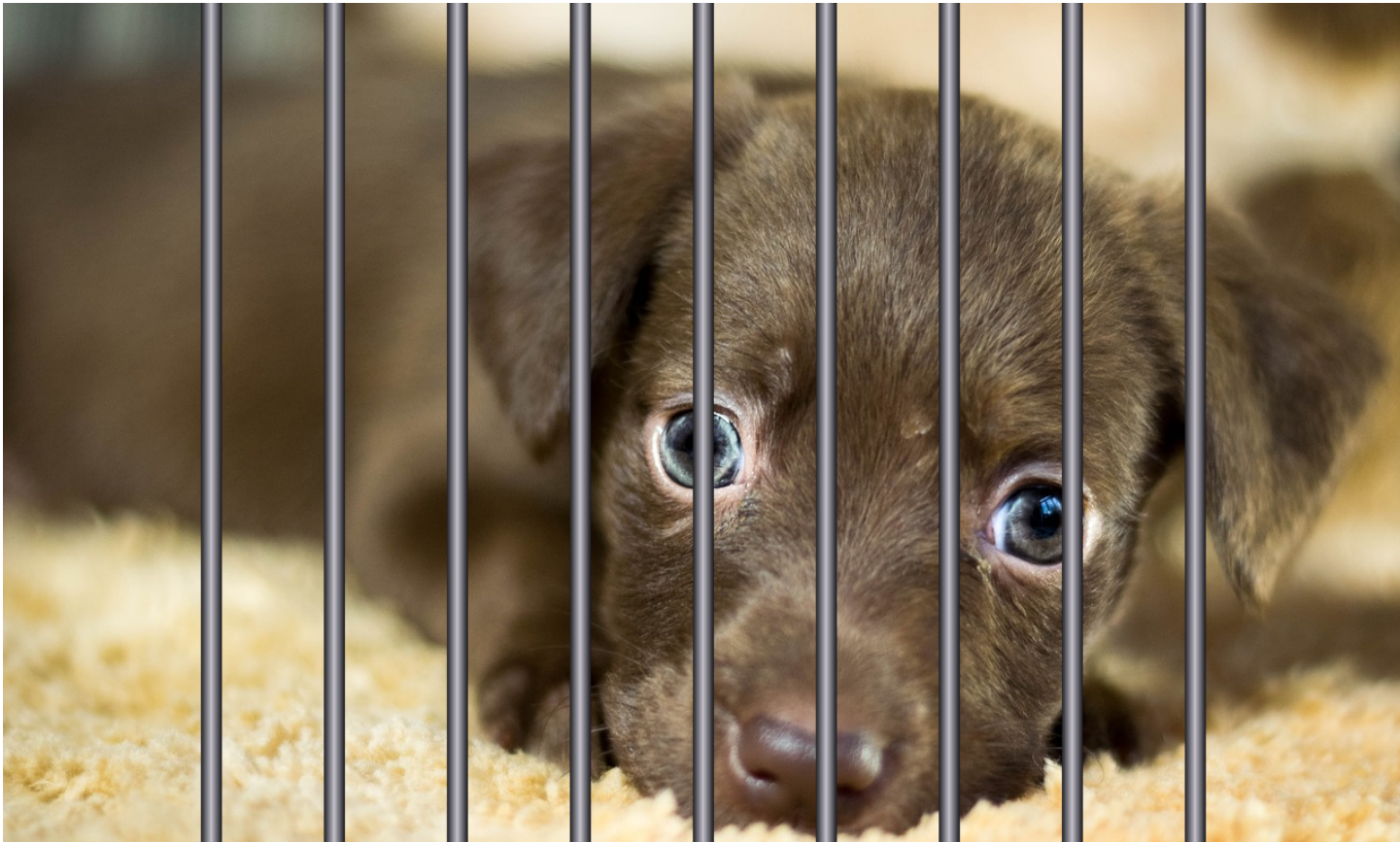Do the thing your clients want done.

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Lastly we get to do the thing that our clients wanted us to do.

To review

- Do voice to text somehow
- Process the text with AI and Machine learning
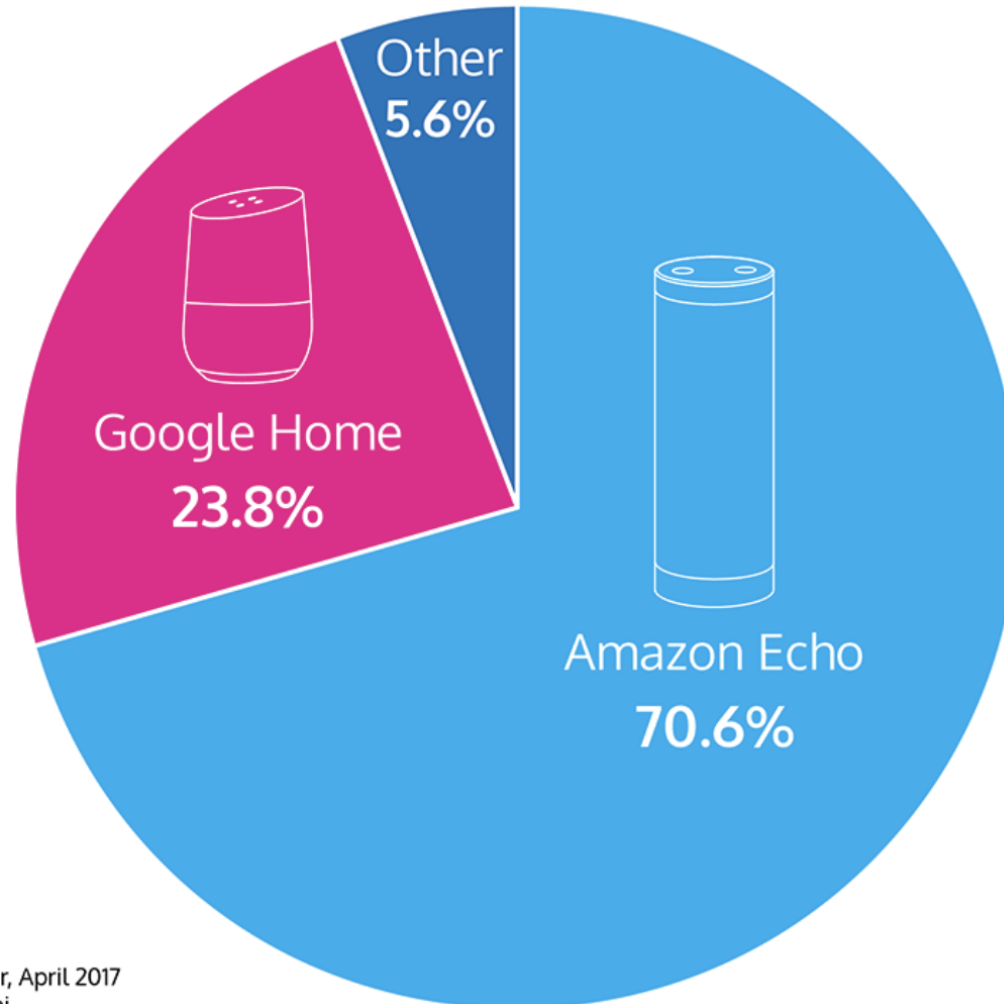- profit
- but in my opinion that isn't the hardest part.

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The biggest hurdle to open source NLP

Adoption

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- There is still a very large hurdle to overcome.

- Adoption

- You might be able to convice the user on your website or app to allow you access to the microphone, most users will just click okay to anything you pop up to make the popup go away.

- The rest of the problems are just technical, this is more of a sociaty issue.

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Amazon is leading in adoption

US Voice-Enabled Speaker User Share by Player, 2017

Other
5.6%

Google Home
23.8%

Amazon Echo
70.6%

Source: eMarketer, April 2017
Image: Voicebot.ai

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Amazon is leading in both device adoption and 3rd party app development.

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What is alexa and why is it leading?

Amazon devices

- Echo
- Echo Dot
- Echo Show
- Echo Spot
- Echo plus
- Echo Look
- Fire TV

- Fire Tablet
- Amazon app on your phone
- Invoxia Triby
- Ultimate Ears Blast
- Sonos One
- Eufy Genie

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- Amazon's AI backed NLP service for Amazon
- Alexa is the voice interface for many amazon devices
  - Echo
  - Echo Dot
  - Echo Show
  - Echo Spot
  - Echo plus
  - Echo Look
  - Fire TV
  - Fire Tablet
  - Amazon app on your phone
- And non-amazon devices are powered by Alexa
  - Invoxia Triby
  - Ultimate Ears Blast
  - Sonos One
  - Eufy Genie
- Not an ad, just wanted to show you the saturation of Alexa
  - Aside from amazon on my phone, I don't own an echo
  - Prefer Google Assistant and I have a Google Home
  - There is no denying Alexa is everywhere and can be in anything, but the Google assistant is wherever I am. It is in my phone, and if you have an android phone whether you are using it or not, it is likely in your phone. Even if you have an iPhone, it can be in your phone too. While it is usually

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nothing more than a timer, it is also more and more the first place I go when I would normally be googling for simple information. Lit the temprature of the sun, or what is the largest north american dinosaur.

What makes Alexa so appealing to developers

Alexa Automated Workbench Part 1

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Why does Alexa domminate 3rd party apps?

- I use Google Assistant but I don't have any published google voice apps.
- I don't have an Alexa enabled device, but I have built and published Alexa skills.
- Alexa Skills Kit makes it easier to just pick it up and build it.
- A lot of DIYers will use Alexa to connect to any enpoint with ngrok and do home automation or something else.
- Amazon has developer programs to help, everything from mothly payments to top application to AWS vouchers to pay for the AWS services that they hope you will be using.
- I am not sure if they are still doing it, but when I made my voice app Amazon would give the developer a free echo dot if they had over 80 users in the first month. Mine got 78. So close!
  - as an example of that this is a video from the Ben Heck show where he used Alexa to automate his work bench.
    - https://www.youtube.com/watch?v=3TaLlI4BqeI

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Another reason Alexa dominate in apps

lambda and tight AWS integration

Lambda languages

- Python
- Javascript
- Go
- C#
- Java

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- AWS serverless comput service
- Serverless ooooooo
  - Of corse there is a server because there has to be a place for the code to run.
- Lambda provides developers with a place to run simple single purpose scripts
  - This allows us to keep the code as simple as possible without having to worry about lingering effects and server maint
- Multiple languages
  - php isn't one of them
  - I like python, it is well suited for this task
    - So many great libraries exist for python to do many amazing things in scripts
  - Others
    - Javascript
    - go
    - C#
    - Java

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How does Drupal fit in?

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- why we are here!

- Drupal is an awesome content management system.

- Why use Drupal
  - Fieldable content
  - User permissions/Content Access
    - Gates access to content
    - Limits access to published content
  - Content Workflow
  - Content Translations
    - Language Matters
  - RESTFULL capible
    - Not limited to the browser
  - Still has a frontend
    - Not limited to not the browser

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Other Voice Interfaces

- Google Assistant
- Microsoft Cortana
- Apple Siri

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- There are other voice assistants and it is only fair that I give them some attention too.
- google assistant
  - Apps are built with "Acitons" on Google using api.ai formerly dialogflow.
  - really well built
  - has a unique training interface
    - Allows you to better see what people are saying
  - focused more on good design less on adoption
  - links
    - console.actions.google.com
    - g.co/dev/facts-about-google
    - g.co/actionsdev
- microsoft cortana
  - low market share
  - harmon kardon speaker
  - still in preview
  - nice thing is it is built on the bot framework
    - means there is a unified framework for working with voice and text based skills.
- apple siri
  - sirikit
    - confusing, tied to maps for some reason, very limited in what kinds of things can be done (limited to pre defined

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domains)

- likeness to chatbots
- aws lex
- microsoft chatbot api
- ibm watson

Call to action

Rescue NLP

Eventually

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- Eventually,

- like this puppy, NLP will need to be recued

- But it isn't so bad right now. Remember that it wasn't too long ago that most people used closed source web browsers.

- If an open source alternative is available and it is good people will use it.
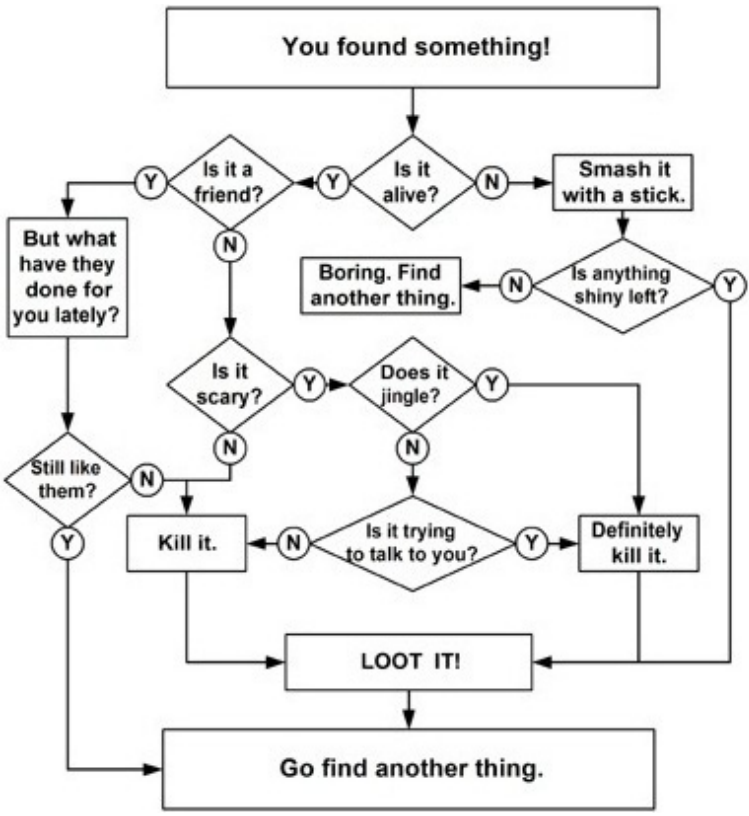
- Some people will use it, others will just continue using Edge and Safari

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VUI Design

It is imposible to have no design, you either have a good design or a bad design.

Adam Judge said something like that.

- I would be remis if I told you to go yander and make voice apps and voice user interfaces without also telling you a bit about some of what makes a voice interaction good.
- Luckily Google I/O 2017 was all about that. So here are the cliff notes.

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Cartography & Dialog Trees

- cartography & dialog trees
  - We cannot think about a VUI in the same way as we would a normal app.
  - For many things sematic markup, accessible markup, and SEO are the things that you still need to work on. Making sure the data on a site is consumable by a computer, or a screen reader goes a long way to make sure that it will work well with a Voice Assistant. After all, asking google something is pretty close to doing an "I feel lucky" search.
  - While that will work for sites, it isn't what will work for actual voice apps. That is if you are registering an app on Amazon or Google then you need to go a few steps farther and really design the voice of your app.
  - You will need to lead your users without showing them the way.

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VUI basics

- keep it conversational

- never tell someone what to say

- Allow for help, but handle errors gracefully

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- vui basics
  - convertaional ui/conversational hacks
    - keeping the interface conversational
      - Give your app multiple ways to ask something and multiple ways to tell someone something
    - gleening information
    - https://www.youtube.com/watch?v=wuDP_eygsvs
    - Applying Built-in Hacks of Conversation to Your Voice UI
  - Dealing with errors in conversation

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Voice Design

- There is no *No Design*
- Nothing has *No Attitude*
- Nothing has *No Voice*

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- voice design
  - There is no no design
  - Nothing has no attitude
  - Either define your apps voice or your users will define it for you
  - https://www.youtube.com/watch?v=0PmWruLLUoE
- vui resources
  - https://www.youtube.com/playlist?list=PLJ21zHI2TNh9VkAu1EsOhpw92Wkm-XcuD

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Bring it home

Want to have a voice app that tells one new joke every day

This can be done multiple ways.

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Consider this

- you have a client that wants to have a chatbot that tells one new joke every day.

  - Because, pew research says 46% of Americans use digital voice assistants
- This can be done multiple ways.

  - you can manage the jokes through the vendor console
    - log in every day at the same time, every morning, and copying in the joke.
  - you can have the response pre-programmed with hardcoded responses that get cycled through.
- Like most things there are a million ways to accomplish this task.

  - What if the content is more complicated than just a single joke.
  - What if you wanted to tell different jokes to different people.
  - What if you wanted to keep track of what jokes you told to each person so that you never repeat the joke.
  - What if you wanted to remember what joke you just told so the user can ask for it again.
  - What if you wanted to tell jokes in different languages?

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- This is huge by the way (Ovum expects 47% of Asia and Oceania by 2021, those are the developing markets)
  - What if you wanted to have people rate the jokes and then you can give them better jokes based on what they liked/disliked.
  - What if you wanted to allow for users to submit their own jokes.
    - What if you wanted to moderate these user submited jokes to keep them safe for all ages?

What we covered

- [✔] Cool stuff
- [✔] Voice App 101
- [✔] Architecture
- [✔] Natural Language Processing
- [✔] Current Market
- [✔] VUI design tips
- [✔] Brought it home

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- Cool stuff
- Voice App 101
- Architecture
- Natural Language Processing
- Current Market
- VUI design tips
- Brought it home

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The Revolution has begun

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Voice is just the start. We are already starting the screenless revolution.

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Join us for contribution sprints?

Friday, April 13, 2018

Mentored Core Sprints	First Time Sprinter Workshops	General Sprints
9:00-18:00		9:00-18:00
Room: 103	9:00-12:00	Room: 104
	Room: 101	

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Speaker notes

- When are sprints
- Friday the 13th
- Mentored core sprints in room 103
- First Time springers in room 101
- General sprints in room 104
- I will probably either be in the core sprint room or in the general sprint room.

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What did you think?

Give us some feedback on this presentation!

[Talk to me Drupal!](#)

Take the DrupalCon Survey

www.surveymonkey.com/r/DrupalConNashville

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Links

Italian grandmother learning to use Google home (https://www.youtube.com/watch?v=e2R0NSKtVA0) I've got no screens (https://www.slideshare.net/cwferrel/ive-got-no-screens-internets-screenless-future-sxsw-2018-90319757) Chatbot API Drupal Module (https://www.drupal.org/project/chatbot_api) Excell Neural Network (https://www.youtube.com/watch?v=kCL065_0zTY) NLP in Python (https://elitedatascience.com/python-nlp-libraries) NLP wikipedia (https://en.wikipedia.org/wiki/Natural-language_processing) Ben Heck's Alexa Powered Workbench (https://www.youtube.com/watch?v=3TaLlI4BqeI) Google Actions Dashboard (chttps://onsole.actions.google.com) Google Actions Facts (https://g.co/dev/facts-about-google) Google Actions Dev Docs (https://g.co/actionsdev) Applying Built-in Hacks of Conversation to Your Voice UI (https://www.youtube.com/watch?v=wuDP_eygsvs) Finding the Right voice (https://www.youtube.com/watch?v=0PmWruLLUoE) Google I/O 2017 Voice App Playlist (https://www.youtube.com/playlist?list=PLJ21zHI2TNh9VkAu1EsOhpw92Wkm-XcuD)

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- @TODO put notes here .

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