Embracing Constraints

@AnjanaVakil | Codemotion Berlin | 13 October 2017

Hallo!

I'm
@AnjanaVakil

mapbox

The Recurse Center

OUTREACHY

moz://a

MOZILLA TECH SPEAKERS

Speaking of Twitter...

Speaking of Twitter...

Constraints:

How do they affect our work?
Are they all created equal?
Which help, which hinder?

Constraints for Concentration

Ally

Tech for everyone

Ally

Challenge for devs

> “ Accessibility is hard :(

The A11y Project

a11yproject.com/about.html

Ally

Challenge for devs

Web Content Accessibility Guidelines (WCAG) 2.0

W3C Recommendation

[contents]

Web Content Accessibility Guidelines (WCAG) 2.0

W3C Recommendation 11 December 2008

This version:
http://www.w3.org/TR/2008/REC-WCAG20-20081211/
Latest version:
http://www.w3.org/TR/WCAG20/
Previous version:
http://www.w3.org/TR/2008/PR-WCAG20-20081103/
Editors:
Ben Caldwell, Trace R&D Center, University of Wisconsin-Madison
Michael Cooper, W3C
Loretta Guarino Reid, Google, Inc.
Gregg Vanderheiden, Trace R&D Center, University of Wisconsin-Madison
Previous Editors:
Wendy Chisholm (until July 2006 while at W3C)
John Slatin (until June 2006 while at Accessibility Institute, University of Texas at Austin)
Jason White (until June 2005 while at University of Melbourne)

Please refer to the **errata** for this document, which may include normative corrections.

See also **translations**.

This document is also available in non-normative formats, available from Alternate Versions of Web Content Accessibility Guidelines 2.0.

Abstract

w3.org/TR/2008/REC-WCAG20-20081211

Ally

Challenge for devs

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w3.org/TR/2008/REC-WCAG20-20081211

@AnjanaVakil

Ally

Clarity for products

Web Content Accessibility Guidelines

W3C Recommendation

Guideline 1.3 Adaptable: Create content that can be presented in different ways (for example simpler layout) without losing information or structure.

Understanding Guideline 1.3

1.3.1 Info and Relationships: Information, structure, and relationships conveyed through presentation can be programmatically determined or are available in text. (Level A)

How to Meet 1.3.1
Understanding 1.3.1

1.3.2 Meaningful Sequence: When the sequence in which content is presented affects its meaning, a correct reading sequence can be programmatically determined. (Level A)

How to Meet 1.3.2
Understanding 1.3.2

1.3.3 Sensory Characteristics: Instructions provided for understanding and operating content do not rely solely on sensory characteristics of components such as shape, size, visual location, orientation, or sound. (Level A)

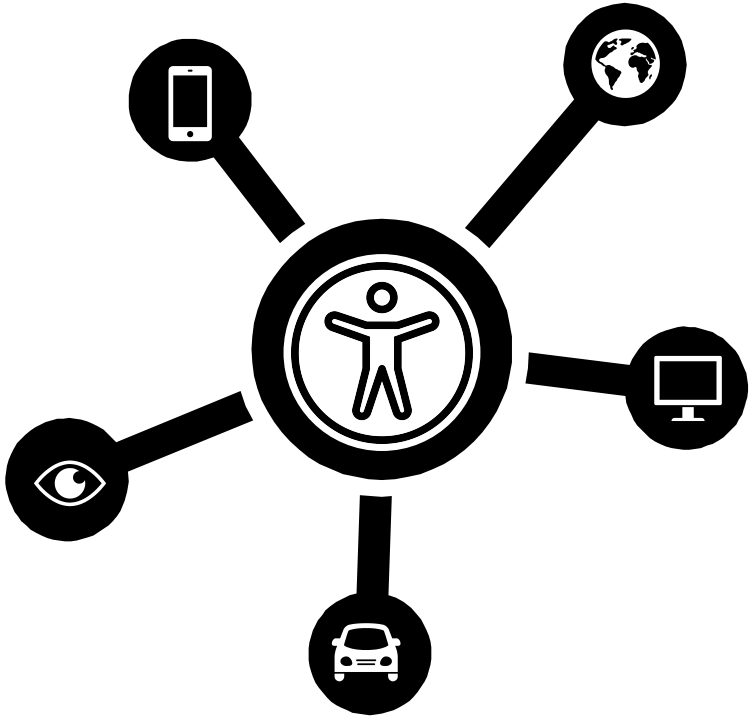
Note: For requirements related to color, refer to Guideline 1.4.

How to Meet 1.3.3
Understanding 1.3.3

Ally

Clarity for products

Content vs. Presentation



Elm

elm-lang.org

Elm

The joy of constraints

“

Elm **restricts the way you program**, resulting in maintainable code no matter what.

There are **no runtime exceptions** so debugging is way less of an issue.

Ossi Hanhinen, Futurice

“How Elm made our work better”

futurice.com/blog/elm-in-the-real-world

Elm

Types vs. Typos

```
1  type alias Person =
2    {
3      firstName : String,
4      lastName : String,
5      phoenNumber : String,
6      email : String
7    }
8
9  getFullName : Person -> String
10 getFullName person =
11   person.firstName ++ " " ++ person.lastName
12
```

Elm

Types vs. Typos

```
1  type alias Person =
2    {
3      firstName : String,
4      lastName : String,
5      phoenNumber : String,
6      email : String
7    }
8
9  getFullName : Person -> String
10 getFullName person =
11   person.firstName ++ " " ++ person.lastName
12
13
14
15 max = getFullName
16     {
17       firstName = "Max",
18       lastName = "Mustermann",
19       phoneNumber = "030-1234567",
20       email = "max@codemo.com"
21     }
```

Elm

Types vs. Typos

```
-- TYPE MISMATCH ------------------------------------------------------------

The argument to function `getFullName` is causing a mismatch.

16|       getFullName
17|>    {
18|>      firstName = "Max",
19|>      lastName = "Mustermann",
20|>      phoneNumber = "030-1234567",
21|>      email = "max@codemo.com"
22|>    }

Function `getFullName` is expecting the argument to be:

    Person

But it is:

    { email : String
    , firstName : String
    , lastName : String
    , phoneNumber : String
    }

Hint: The record fields do not match up. Maybe you made one of these typos?

    phoenNumber <-> phoneNumber
```

Elm

The joy of constraints

“

Constraints:

- Limit design space
- Limit choices
- Give guarantees

Ilias van Peer

“Elm - The Freedom of Constraints”
PartialConf 2017

speakerdeck.com/zwilias/elm-the-freedom-of-constraints

“ **[There are] barriers that lead to breakthroughs.**

Patricia D. Stokes

Creativity from Constraints

2006: Springer publishing, New York. p. 7

Constraints for Creativity

“The power of constraints”
Phil Hansen
youtu.be/BgoAFS3xu74

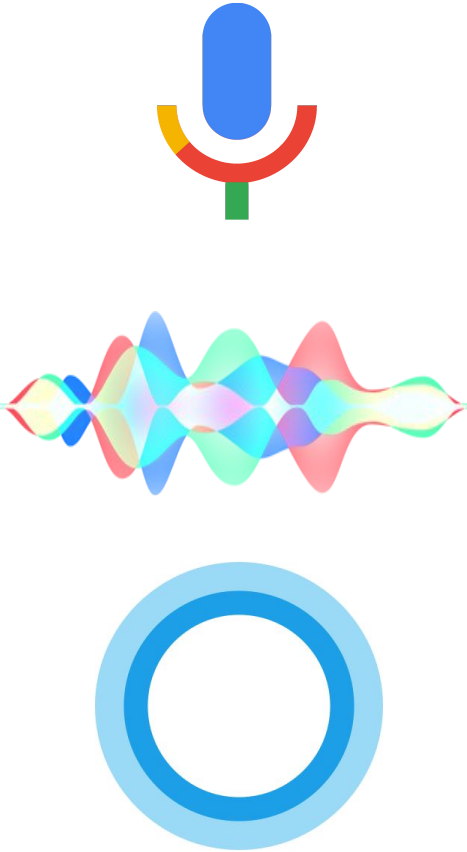
> **“ Free to do anything, most of us do what's worked best, what has succeeded most often in the past.**

Patricia D. Stokes

Creativity from Constraints

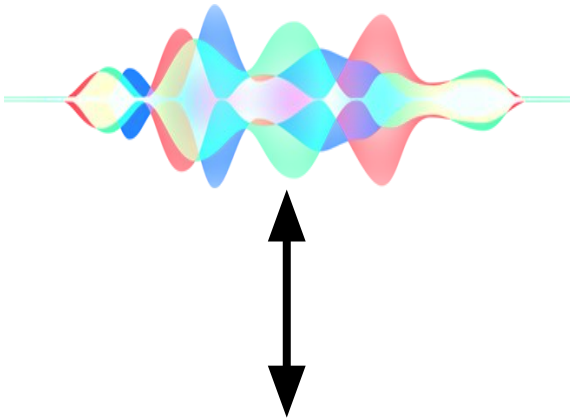
2006: Springer publishing, New York. p. xii

Speech to Text



Speech to Text

Acoustic model



/h e ɪ ˈs ɪ r i/

Speech to Text

Trained on

15,000 hours

selected from

30 years(!!)

of speech

Olga Kapralova et al., "A big data approach to acoustic model training corpus selection", INTERSPEECH 2014
193.6.4.39/~czap/letoltes/IS14/IS2014/PDF/AUTHOR/IS140948.PDF

Speech to Text

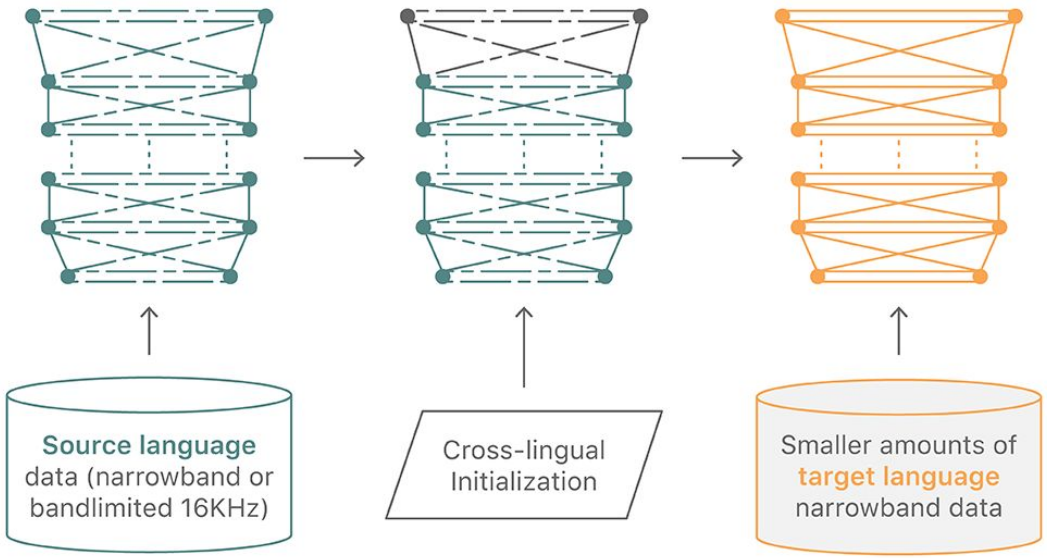
Languages Supported

Microsoft msdn.microsoft.com/en-us/library/hh378476	< 30
Apple apple.com/ios/feature-availability/#siri	< 40
Google cloud.google.com/speech/docs/languages	< 70
Humans .ethnologue.com/guides/how-many-languages	**> 7000**

Speech to Text

constrained

Innovations in machine learning

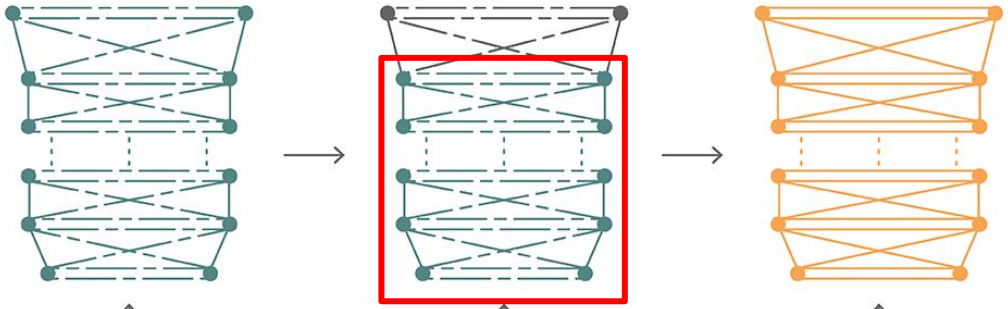


Siri Team, "Improving Neural Network Acoustic Models by Cross-bandwidth and Cross-lingual Initialization", Apple Machine Learning Journal, Vol. 1, Issue 2, August 2017. machinelearning.apple.com/2017/08/01/cross-initialization.html

Speech to Text

constrained

Innovations in machine learning



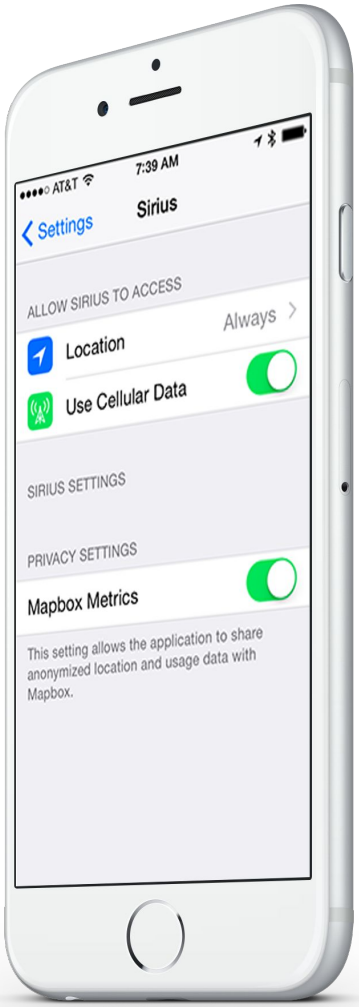
> the **hidden layers** learn feature transformations that are less language-specific and instead **generalize between languages**

Siri Team, "Improving Neural Network Acoustic Models by Cross-bandwidth and Cross-lingual Initialization", Apple Machine Learning Journal, Vol. 1, Issue 2, August 2017. machinelearning.apple.com/2017/08/01/cross-initialization.html

Map Data

Map Data

constrained



mapbox.com/telemetry

Map Data

constrained

Innovations in data collection

@AnjanaVakil

Map Data

constrained

Innovations in data collection

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Map Data

constrained

Innovations in location services

- **New streets** Location data is used to identify new streets, hiking trails, and bike paths.
- **Turn restrictions** Sensor data helps us better understand turn restrictions and identify one-way streets.
- **Speed profiles and traffic** Understanding posted and time-sliced real-world speeds improves traffic modeling and routing.
- **Lane detection** High-definition mapping requires intra-road analysis of lane counts and types.

mapbox.com/telemetry

“ **Creativity thrives best when constrained.**

Marissa Mayer

bloomberg.com/news/articles/2006-02-12/creativity-loves-constraints

“ **But constraints must be balanced with a healthy disregard for the impossible.**

Marissa Mayer

bloomberg.com/news/articles/2006-02-12/creativity-loves-constraints

“ **[Some constraints] preclude the surprising & promote the expected**

Patricia D. Stokes

Creativity from Constraints

2006: Springer publishing, New York. p. xii

~~Constraints for Conformity~~

“Java” Script

“ the language must “look like Java”

Netscape to
Brendan Eich
1995

brendaneich.com/2008/04/popularity

“Java” Script

> “ The Java influences, especially y2k `Date` bugs but also the primitive vs. object distinction (e.g., `string` vs. `String`), were **unfortunate**.

Brendan Eich
2008

brendaneich.com/2008/04/popularity

Pipe Lines

> “True diversity means better teams, better financial returns, better companies and a better, more innovative world.

Project Include

projectinclude.org

Pipe Lines

stackoverflow NEW Questions Developer Jobs Tags Users

Python Developer (f/m) for Data Analytics

- Berlin, Germany

Requirements

- You have successfully completed a degree in Computer Science, Software Engineering, or a similar qualification
- You have minimum 3 years of work experience in software development
- You have good knowledge in working in and with agile teams with SCRUM and you can handle challenging deadlines

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stackoverflow NEW Questions Developer Jobs Tags Users

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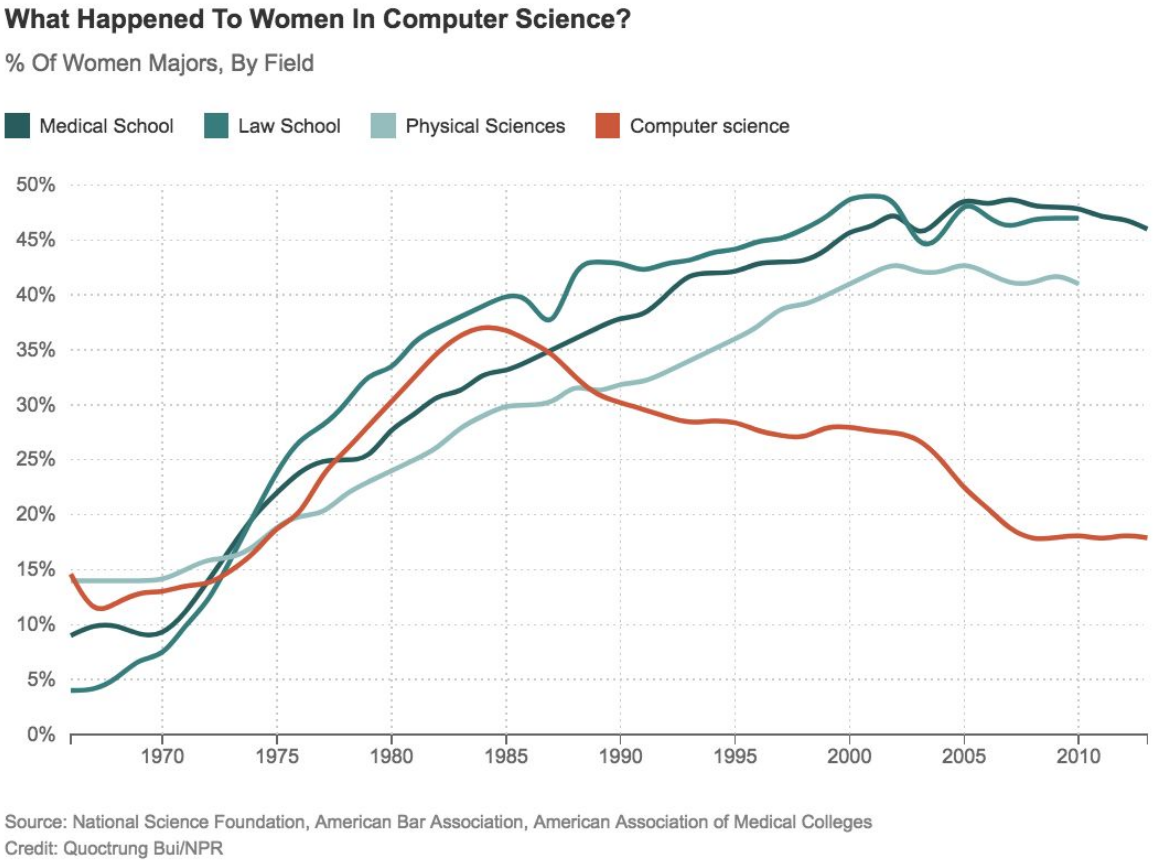

NPR Morning Edition, "When women stopped coding", 21 October 2014
npr.org/sections/money/2014/10/21/357629765/when-women-stopped-coding

Pipe Lines


Sarah Mei @sarahmei · Sep 30
There exist jobs that use CS fundamentals more directly. Just look at my mentions, dudes love to tell me about them.
3
15
120
Sarah Mei
@sarahmei
Following
But for most jobs, the CS fundamentals interview serves more as a tribal marker than as a test of anything you'll actually do.
5:52 AM - 30 Sep 2017
175 Retweets 559 Likes
17
175
559

Pipe Lines

> “The worst kind of group for an organization that wants to be innovative and creative is one in which everyone is alike and gets along too well.

Professor Margaret A. Neale
Stanford Graduate School of Business
gsb.stanford.edu/insights/diverse-backgrounds-personalities-can-strengthen-groups

Consider your constraints

Question constraints

Reject constraints

for conformity

Embrace constraints

for concentration

Embrace constraints

for creativity

Let constraints work for you

Vielen Dank!

Thanks to:

Mozilla TechSpeakers

Havi Hoffman & Denise Graveline

Mapbox

Young Hahn & Lauren Budorick

Codemotion Berlin organizers

SlidesCarnival.com

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